



**Behoeften, Obstakels en Helpende Factoren om te gaan
Sporten bij Jongeren met een Eerste Psychose**

**Needs, Barriers, and Facilitators to Playing
Sports in Youth with a First-Episode Psychosis**

Masterthese Klinische Neuropsychologie

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Abstract

Introduction: First-episode psychosis (FEP) is most prevalent among individuals between 18 and 35 years old and is characterized by positive symptoms, negative symptoms, disorganization, depression, and mania. Furthermore, cognitive impairments are common in FEP. Symptoms of FEP increase the risk of social isolation in the critical life period of social obligations and opportunities. Moreover, individuals with FEP are less physically active than the general population. A sports-based intervention potentially addresses these negative consequences of FEP. The present study helps to develop such an intervention in collaboration with individuals with FEP and thereby follows the spirit of the human-centered design model. **Methods:** Needs, barriers, facilitators, and cognitive changes in a heterogeneous sample of individuals with FEP were investigated through semi-structured qualitative interviews. All participants were between 18 and 35 years old and were diagnosed with FEP within the last five years. **Results:** The findings confirm the need for playing sports. Barriers were psychotic symptoms, lack of motivation, stigma, and low self-esteem. Facilitators were feeling connected and safe, having a skilled and motivating trainer or sports partner, an individually tailored intervention, and goal-accomplishment. **Discussion:** The present study confirms findings from previous research and increases knowledge by investigation of a heterogeneous sample. The findings indicate the sports-based intervention should be flexible and individually tailored. Safety, self-esteem, and motivation can be increased by including a goal-component and a skilled and knowledgeable trainer or sports partner who considers individuals' symptoms and needs. Future research may investigate a representative sample to generalize findings to a broader population and to thoroughly investigate the influence of factors such as gender and comorbidity on opinions about sports.

Table of Contents

Introduction	p. 5
FEP according to the DSM-5	p. 5
FEP and the Risk of Social Isolation	p. 6
Other Negative Consequences of FEP	p. 7
Sports as an Intervention to address Negative Consequences of FEP	p. 8
The Need for Early Interventions	p. 9
‘Don’t Stop Me Now’: addressing Social Isolation through Sports	p. 10
This study: a Step towards implementing the Sports-based Intervention	p. 10
Aim of this Study	p. 10
Methods	p. 12
Ethical Consideration and Consent	p. 12
Participants	p. 12
Materials	p. 12
Data Collection	p. 14
Data Analysis	p. 14
Results	p. 15
Demographics	p. 15
Needs and Reasons for playing Sports	p. 15
Barriers to playing Sports	p. 19
Facilitators to playing Sports	p. 23
Sports and (changes in) Emotions, Mood, Concentration, and Memory	p. 26
Discussion	p. 27
Clinical Implications	p. 31
Strengths, Limitations and Future Directions	p. 32
Conclusion	p. 35
References	p. 36
Appendix	p. 44

Introduction

Sofie is a 22-year-old spontaneous and outgoing medicine student who lives on her own. Three months ago, when cycling home from one of her night shifts in the hospital, she was sexually assaulted by a man with a leather jacket. Since then, Sofie is no longer her spontaneous, outgoing self. She is terrified of men in black jackets, sees men-shaped shadows, and hears voices resembling a man. Due to these experiences, she does not dare to leave her house anymore and socially isolates herself. She lost her job since she was frequently absent. She does not meet up with friends or call her parents anymore, which she used to do regularly.

Out of concern, Sofie's parents visited her. After hesitating for a while and talking at the door, she let them inside her apartment. They together decided to visit the general practitioner, who sent her to mental healthcare specialized in first-episode psychosis (FEP) (this is a vignette made by the author. Inspiration for the vignette was obtained from several vignettes by Lee et al., 2020).

FEP according to the DSM-5

The fictive case of Sofie illustrates several characteristics of FEP. DSM-5 characterizes five symptom dimensions of psychosis. These include positive symptoms such as hallucinations and delusions and negative symptoms like apathy and lack of motivation. Side-effects of antipsychotic medications can intensify negative symptoms (American Psychiatric Publishing, 2013, p. 87). The other symptom dimensions are disorganization, depression, and mania. Furthermore, cognitive impairments such as slow processing speed and attentional difficulties are often present in FEP (American Psychiatric Publishing, 2013, p. 90; Hallgren et al., 2018). FEP usually occurs between the age of 18 to 35 years (American Psychiatric Publishing, 2013, p. 87).

The development of psychosis is a process in which biological, psychological, and environmental factors play a role (Schiffman et al., 2019). Biological factors can include a genetic predisposition for the disorder (Ronald & Pain, 2018). Psychological factors include low self-esteem or maladaptive coping skills (Fusar-Poli et al., 2016). Environmental factors comprise for instance cannabis use, trauma, and other stressful life events (Fusar-Poli et al., 2016; Marconi et al., 2016; Pastore et al., 2020). If multiple biological, psychological, and environmental risk factors are present, an individual is at high risk of developing psychosis (Schiffman et al., 2019).

FEP and the Risk of Social Isolation

Social isolation is one of the first symptoms of FEP and is often already present at the onset of FEP (Sündermann et al., 2013). Social inclusion further deteriorates when the psychotic symptoms intensify, and individuals do not go to work or social activities anymore (Bjornestad, 2017). Giacco and his colleagues (2012), who included 1396 individuals with FEP from four different countries, showed that 45% of those individuals had not met any friend in the previous week and 35% of them said they did not have any close friends.

The high risk of social isolation in FEP can be explained by several factors. Firstly, social withdrawal may serve as a coping mechanism for the positive symptoms (Larsen, 2019). Secondly, side effects of medication like apathy and lack of motivation make it difficult to take initiative to meet up with friends (McCann & Clark, 2004). Thirdly, acquaintances of individuals with FEP can have stigmatizing views leading to misunderstanding and breaking contact (Chernomas, 2008). Fourthly, individuals with FEP may internalize public stigma, resulting in fear of being judged. This can result in social isolation (Judge et al., 2008).

Social isolation has significant negative consequences. It is associated with poorer self-reported quality of life in the general population and higher relapse rates and symptom severity in individuals with FEP (Tee et al., 2020). Furthermore, social isolation functions as a mediator between symptoms of psychosis and suicidal ideation (Bornheimer et al., 2020).

Other Negative Consequences of FEP

Besides the risk of social isolation, individuals with FEP are at risk of metabolic and cardiac diseases. They have significantly higher BMI's and are less physically active compared to the general population (Larsen, 2019). These issues contribute to the 15-20 years shorter life expectancy of individuals with FEP compared to the general population (Lawrence et al., 2013). Moreover, individuals with FEP often suffer persistent cognitive dysfunctions in attention and declarative memory that are unresponsive to antipsychotic medications (Hallgren et al., 2018; Bora & Murray, 2014).

Due to the risk of social isolation and other negative consequences, FEP is considered among the most burdensome illnesses for the individual and the costliest for society worldwide (Larsen et al, 2019). Recent global estimates of costs of FEP are currently lacking. However, in 2013 the annual costs of schizophrenia in the United States were estimated at 155.7 billion dollars of which 24% were direct costs and 76% indirect costs (Cloutier, 2016). Direct costs include the costs of care needed for individuals with FEP. Indirect costs are the costs of caregiver burden, loss of work productivity due to cognitive impairments, or even full dependence on social payments because of losing jobs (Rössler, 2005).

Sports as an Intervention to address Negative Consequences of FEP

Improving social inclusion, physical health, and maintenance or improvement of cognitive function are important aspects of functional recovery of FEP (Brooke et al., 2018; Larsen et al., 2019). A sports intervention can potentially support recovery of these aspects.

In the general population, sports are known to prevent physical illness, increase fitness, and improve well-being (Brooke et al., 2018). Promoting group sports for individuals with FEP addresses social isolation (Brooke, 2018). Furthermore, obtaining a daily routine including sports activities and the accomplishment of sport-related goals improves self-esteem and reduces self-stigma (Brooke et al., 2018). Presence of low self-esteem and self-stigma are associated with social isolation. Therefore, a sports intervention can indirectly increase social inclusion in individuals with FEP (Brooke et al., 2018; Schouten & Vellekoop, 2015).

Furthermore, physical activity addresses cognitive deficits associated with FEP (Bora and Murray, 2014). A twelve-week exercise program for individuals with FEP significantly improved processing speed, visual learning, and visual attention (Hallgren et al., 2018). Sports may also indirectly increase cognitive functioning via improving social inclusion since social interaction positively influences executive functioning, working memory, visuospatial abilities, and processing speed (Kelly et al., 2017). The neural correlates of the effects of physical activity on cognition were reviewed by Van Der Stouwe and her colleagues (2018). They stress that most studies currently focus on the effects of physical activity on the hippocampus. Physical activity has protective effects on the hippocampal volume or may even increase hippocampal volume in both individuals with schizophrenia and healthy controls. A few of the reviewed articles investigated other brain areas and their relation to physical activity. Increased activity in the extrastriatal body area was associated with physical activity in individuals with schizophrenia.

This area is involved in visual processing of human body parts. To summarize, physical activity is related to improvements in cognitive functioning and some of the neural correlates of this process have been examined.

The Need for Early Interventions

There are several arguments for early intervention. Firstly, individuals with FEP are young adults at a critical period of their social lives. Therefore, interventions improving social inclusion should focus on this period. Secondly, symptoms related to FEP should be targeted at an early stage to prevent full transition to FEP and to slow down the chronic course over time (Veling et al., 2013). Thirdly, early interventions addressing lifestyle issues related to FEP are more effective than later interventions since it provides the opportunity to build long-term habits at an age at which physical health is not yet deteriorated (Brooke et al., 2020). Fourthly, early interventions achieve higher recovery rates and well-being at one-third of costs compared to standard care (Mihalopoulos et al., 2009; Firth et al., 2016).

Even though there is a pressing need for early interventions that simultaneously address social isolation, physical health, and cognitive function, such interventions are scarce worldwide (Brooke et al., 2018). In the Netherlands, several mental health care institutions include psychomotor therapy as optional care for individuals with FEP (e.g. Vroege Interventie Psychose, 2021). This is a form of therapy in which physical exercise is the central component. Social isolation is indirectly addressed by giving group psychomotor therapy. However, the effects of psychomotor therapy on cognitive function and the generalization of reduction in social isolation outside the institution are often not considered (e.g. Vroege Interventie Psychose, 2021). Furthermore, individuals are currently not supported in the transition from sports in

mental healthcare institutions towards sports in sports clubs and other associations outside mental healthcare (Schouten & Vellekoop, 2015).

‘Don’t Stop Me Now’: addressing Social Isolation through Sports

The pressing need for an early sports-based intervention for individuals with FEP in the Netherlands resulted in the project ‘Don’t Stop Me Now’ (NL78270.042.21) at GGZ Drenthe.

‘Don’t Stop Me Now’ aims to develop a sports-based intervention focused on improving social inclusion and fitness in young individuals with FEP. The development of this intervention follows the spirit of the human-centered design model (LUMA Institute, 2021). This model assumes care is more effective if it is developed in collaboration with the users and not just for the users.

This study: a Step towards implementing the Sports-based Intervention

To develop a sports-based intervention in the spirit of the human-centered design model, insight into the needs, barriers, and facilitators in sports experienced by individuals with FEP is necessary. In Australia, Denmark, and England, facilitators and barriers have been investigated through qualitative research. Mentioned barriers were stigma, lack of motivation, and low self-esteem. Themes like safety, flexibility, and support were mentioned as facilitators of sports (Larsen, 2019; Brooke et al., 2019; Firth et al., 2016). All three studies interviewed individuals with prior interest in sports. In one of the studies, individuals could only participate if they joined an exercise program (Larsen et al., 2019). Brooke and her colleagues (2019) and Firth and his colleagues (2016) primarily interviewed men.

Aim of this Study

This present study aims to answer the question: What are the needs, barriers, and facilitators in sports for youth with first-episode psychosis (FEP)?

The present study adds to previous research by recruiting a heterogeneous sample of Dutch individuals with FEP, including men and women with and without interest in sports. These broad inclusion criteria allow obtaining an indication of the different opinions within the FEP population. This is important, given that not all individuals with FEP are interested in playing sports. Including these individuals in our sample allows insight into reasons for not playing sports. Furthermore, changes in cognition over time will be investigated to examine whether individuals perceive positive changes due to playing sports.

Outcomes of this study are the blueprint for the development of the sports-based intervention of 'Don't Stop Me Now'. Ultimately, this study aims to improve care in the Netherlands which will help individuals with FEP to participate in social activities.

Methods

Ethical Considerations and Consent

The Medical Ethical Committee of the University Medical Centre Groningen approved the study (NL78270.042.21) and concluded that the study was beyond the scope of the Dutch Social Support Act (WMO) and therefore did not require assessment by the METC. Local permission for this research was obtained through the 'Bureau Commissie Onderzoek en Zorginnovatie' at GGZ Drenthe and the director of KieN-VIP has approved participation in this study at KieN-VIP. Information about the interview and a formal consent form were sent per letter to each participant.

Participants

Sampling-maximum-variation was used to select a heterogeneous sample of ten participants. Eight participants were in treatment at GGZ Drenthe and two at Kien-VIP, both specialized care institutions for individuals with FEP. The inclusion criteria were that participants a) were between 18 and 35 years old, b) were diagnosed with a first episode psychosis within the last five years, according to the DSM-5 criteria (DSM-5, 2013, p. 87-123), c) had sufficient mastery of the Dutch language.

Materials

Recruitment and information

Advertisements were used to recruit participants. These were posters directed to individuals with FEP between 18 and 35 years old who were interested in giving their opinion about sports. The posters included information about the topic of the interview, the financial compensation, and the contacts to call for more information. They emphasized individuals did not have to play sports or have interest in sports to participate. The posters were present in waiting rooms at KieN-VIP and GGZ Drenthe and were sent to potential participants. Clinicians also informed

clients. If a client was interested in the study, one of the researchers briefly called to explain that informational and informed consent letters were sent both per email and per post. One week later, the researcher called again to inform whether he or she still wanted to participate. If a participant was interested, an interview was planned, and the participant was asked to fill in the informed consent form beforehand. If he or she forgot to do this at home, he or she did this in the interview room before the interview started.

Recording

A phone was used to record interviews. The recordings were directly placed into a secured folder at the RUG-server and deleted from the phone afterwards.

Content

The interviews were guided by a script and a list of topics. The interview started by making the participant feel at ease and broadly asking the participant about their experiences with sports. Thereafter, participants were asked their opinion about sports in mental healthcare, sports outside mental healthcare, individual and group sports, emphasizing potential needs and barriers they experienced. The interviews also involved questions about the effect of sports on their mental and physical health and possible changes in their cognitive functioning (for an overview of the topics and questions, see 'Appendix', p. 44). To encourage participants to openly talk about their views, each of these topics started with a broad, open, and non-suggestive question. To get a comprehensive view of their experiences, detailed questions about their views regarding the different topics followed.

Financial compensation

After the interview, each participant received a coupon of ten euros and an extra coupon of five euros for reimbursement.

Data Collection

The interviews took place between May and October 2021. One interview took approximately 60 minutes. An extra 30 minutes was scheduled for the introduction, a break, and the remaining questions from the interviewer and the participant.

Data Analysis

Participants' age, sex, and diagnosis were documented. The interviews were analyzed using the phenomenological approach developed by Colaizzi and described by Smith & Sparkes (2019) and Morrow et al. (2015). The analysis was performed to examine the essence of the interviews, which was achieved in four steps. 1) The researchers became familiar with the data by reading and rereading the transcribed interviews. 2) Relevant statements from the participants were identified. Statements were considered relevant when they described the essence of their answers to questions or general views on the main topics. 3) All statements were given meaning, after which the researchers and author brainstormed and reviewed possible common themes between the statements from all participants. 4) Common themes were named and used to coherently report the study results.

Results

Demographics

Ten individuals with FEP ($M_{age}= 26$, 80% male) were interviewed for the study. Six participants lived independently, three with their parents and one in a living accommodation. All participants completed at least their secondary school and six participants had a postsecondary degree. At the time of the interview, five participants studied and five were employed at least part-time.

All participants were in treatment for FEP ($range_{years\ of\ symptoms} = 0.5-4$ years, of which 0.5-3 years in treatment). Five were diagnosed with ‘Other specified schizophrenia spectrum and other psychotic disorder’ (298.8) and four with ‘Unspecified schizophrenia spectrum and other psychotic disorder’ (298.9). One was diagnosed with ‘Bipolar I disorder, current or most recent manic episode with psychotic features’ (296.41). At the time of the interview, six participants used medications for their psychotic symptoms.

Two participants had comorbid autism spectrum disorder (ASD), one had social anxiety disorder, and two had substance use disorder.

Needs and Reasons for playing Sports

Needs before FEP

All participants have played at least two different sports. Eight participants had experience with fitness. Other sports were football, judo, boxing, basketball, yoga, and tennis. Two participants played sports on a national level as children.

Eight played sports just before symptom onset. Participants who did not play sports mentioned they lacked time due to other activities or had no interest in playing sports.

Reasons for playing sports before FEP

All participants indicated reasons for playing sports related to both physical and mental health. Reasons related to physical health were increased flexibility, endurance, and muscle strength. Reasons related to mental health were stress reduction, blowing off steam, positive emotions, and increased self-esteem.

Participants who played sports less competitively frequently emphasized reasons related to mental health like stress reduction and blowing off steam. Participant 6 for instance said when asked about her feelings after playing sports [translated]: *'[I felt] relaxed, I was less occupied with thoughts inside my head'*.

Competitive participants more frequently emphasized reasons such as accomplishing sport-related goals. Participant 7, who has played sports on a national level, for instance said: [translated] *'It's really good for [your] health, but that is not what I was thinking about. I always thought I just wanted to be the best [...]. I wanted to win.'*

Reasons for playing individual or group sports depended on individual preferences and occupations. Participants who played sports just for fun and were able to accommodate their schedule preferred playing group sports. Other reasons for playing group sports were the ability to improve each other, and a slight feeling of pressure towards the group to play sports. Participant 6 for instance said: [translated] *'Maybe [group sports] is more motivating. [...] I just did not have anyone to play sports with, so I also did not have the motivation to play sports'*.

Participants who preferred control over their schedules and performance preferred playing individual sports. This, because it enables flexibility in time planning and their performance did not depend on other individuals.

Needs during FEP

All participants who played sports before symptom onset indicated they quit sports or played sports less frequently at symptom onset. Reasons for this reduction were the nature and consequences of their symptoms (see '*Barriers during FEP*', p.20). Especially at the start of recovery, when positive symptoms predominated, many lacked 'mental space' for playing sports. Moreover, they wanted to focus on recovery, and playing sports was too much for them. Participant 1 for instance said: [translated] '*I just didn't have the time and space [...] to play sports. I also didn't have the energy.*'

When symptoms partly resided, most participants who played sports before symptom onset felt the need to play sports again. Five of these participants were given psychomotor therapy. Participants who were not given this opportunity indicated they would have liked to do psychomotor therapy.

Reasons to play sports during FEP

Reasons for playing sports outside of the mental healthcare institution or as part of psychomotor therapy during FEP overlapped with reasons before the onset of FEP. However, participants more frequently emphasized reasons related to mental health rather than physical health. Reasons such as clearing their minds from the many thoughts increased during FEP. Moreover, reasons for playing sports were mostly related to symptoms and their consequences.

Direct relations to symptoms. Several participants indicated sports gave them a welcome distraction to their psychotic symptoms. Participant 1 for instance said: [translated] '*I could be very occupied with my thoughts and have a lot on my mind. Sports was like mindfulness for me. I could focus on my body instead of everything inside my head*'.

Participant 2, whose symptoms worsened during elevated stress levels, also mentioned sports distracted him from his symptoms: [translated] *'Sports helped me to get through stressful periods by doing something with my body instead of focusing on my stress and other symptoms.'*

Participants who had difficulty with social interaction caused by comorbid ASD symptoms indicated psychomotor therapy improved social skills. Participant 2 for instance said: [translated] *'I have a lot of social contact at psychomotor therapy, and I can use the aspects I learned in therapy by bringing them to practice. It's a form of social skills training.'*

A daily routine. Several participants were forced to temporarily lower their workload or even quit studies or work because of their symptoms. Therefore, they lacked daily structured activities besides the regular therapy sessions. Some of these participants indicated they did psychomotor therapy because it gave them a daily routine. Participant 6 for instance said: [translated] *'I wanted to do something, get out of the house. [...]. [psychomotor therapy] is two preset mornings within the week.'*

A feeling of belonging to a group. The need for belonging was already present in some of the participants before symptom onset, but this need increased during FEP. Several participants wanted to do psychomotor therapy together with other individuals with FEP for this reason. Participant 1 described feeling alone because of his symptoms, indicating a need for recognition: [translated] *'A psychosis is already alienating and makes you feel very alone, which increases the paranoia and other symptoms. Yes, it would be nice to have the feeling that I am not alone in this.'*

Needs and reasons for playing sports after FEP

Eight participants played sports during treatment, of which three did psychomotor therapy. All eight participants want to continue playing sports after treatment. Participant 2 for

instance said: [translated] *'If I can play sports outside the mental healthcare institution, my whole treatment has succeeded.'*

Participants who did not play sports during treatment indicated not going to play sports after treatment due to lack of time and no interest in this activity. Nevertheless, one of them stressed that not playing sports may have played a role in the development of symptoms, thereby stating a need to play sports to prevent symptoms: [translated] *'I did not play sports for up to three years before my symptoms. I think it played a role in my depressive symptoms since I was busy working and spend the rest of my time at home alone'.*

Barriers to playing Sports

Barriers before FEP

Before symptom onset, reasons to (temporarily) quit playing sports were related to lack of time due to studies, work, and hobbies. A busy schedule creating inability to play group sports at a preset time was also a reason for several participants to prefer individual sports over group sports. Participant 9 for instance said: [translated] *'If you are in school, you want to make some extra money and many side jobs are on Saturday. Soccer is also always on Saturdays. [...] It's not that I do not want to [play group sports], but it is hard to combine. [...] You can combine fitness with a side job'.*

Other barriers were particular to the sport and participants' characteristics. Boredom because of the type of sport was mentioned as a motive to quit sports. This was especially related to fitness due to its routine characteristic. Participant 10 for instance said: [translated] *'Well, I liked trying all the machines once, [...], but if I have to do the same routine every time, I am easily bored.'*

Some participants mentioned insecurity and shyness to perform as reasons to quit dancing and football. Participant 8 for instance said: [translated] *'I was not very good at dancing, so I got a bit insecure.'* Shyness was also mentioned as a reason to prefer individual sports over group sports in general.

Other participants mentioned subjective reasons for which they did not play certain sports, like tennis being only for 'the elite' and people at soccer being vicious. Participant 1 for instance said: [translated] *'The feeling of fraternity speaks to me, but I do not like the viciousness [in soccer]. If you play against each other, you quickly end up in unnecessary discussions'*

Barriers during FEP

At the start of treatment, lack of time was no longer a barrier, because most participants had to temporarily quit (part of) their studies or work. General barriers during FEP for instance included a cold temperature while running outside, playing a boring routine sport, and financial barriers to travel to psychomotor therapy. However, most barriers were related to symptoms and consequences of the disorder.

Symptom characteristics. Several barriers were related to symptoms such as suspicion and voice-hearing. Participant 9 mentioned that he did not dare to go outside anymore due to his suspicion, which made it impossible to go to the gym: [translated] *'Everything which was outside my home was unsafe. [...] I did not dare to go outside so going to the gym was impossible.'*

Participant 2, with comorbid ASD, indicated his psychotic symptoms, hearing voices, became more present in socially demanding situations. This made it difficult to play sports: [translated] *'I heard people around me making fun of me. Even though it was all in my head, it affected my self-esteem and social skills. [...] I tried going to the gym, but it did not work.'*

Barriers particular to individual and group sports were also symptom-dependent. Participant 4 for example indicated oversensitivity to sensory stimuli because of psychotic symptoms: [translated] *'The first week [of treatment admission] I was very oversensitive to stimuli. Sensory stimuli quickly got too much. Therefore, playing group sports was impossible.'* However, when this participant had depressive symptoms, lack of motivation was a barrier to playing individual sports (see *'Facilitators during FEP, Heterogeneity'*, p. 23).

Medication side-effects. For some participants, side effects of medication were too burdensome to play sports. Such side-effects were mainly heavy legs and lack of motivation. Participant 1 for instance said: [translated] *'[...] Medication demotivated me and made me unable to keep my eyes open. Sometimes I tried playing sports, but the side effects were always there, it just didn't work.'*

When participant 7 was asked what could motivate him to play sports while having medications, he said: [translated] *'Nothing could have motivated me. I could tell a nice story about what would have motivated me to play sports with medications, but there is nothing.'*

Stigma. Few participants indicated stigma towards the FEP population which withheld them to do psychomotor therapy. Participant 1 for instance mentioned being afraid others with FEP would say weird things, get mad, or even be aggressive and thereby create a tense group atmosphere. Participant 10 indicated not doing psychomotor therapy because he preferred to distance from the FEP population: [translated] *'I went through something, and I need to do normal activities in regular environments. [...] I don't want to keep being remembered at my psychosis. [...] I want to continue my regular life.'*

Besides stigma, participant 1 also indicated self-stigma regarding playing sports outside the mental healthcare institution. He thought he was a burden to the team because of his symptoms: [translated] *'If I don't feel good and I play sports with more than five people, then I would have to explain to all these people why I don't feel good and then they have to consider me. I would feel a bit of a burden.'*

Barriers after FEP

Participants whose symptoms were mostly diminished at the time of the interview mentioned barriers similar to those before symptom onset, such as lack of time due to other activities.

Furthermore, participants indicated feelings of insufficiency after not playing sports for a long time. Some participants therefore first wanted to improve their endurance and muscle strength before they resumed their initial sports. Participant 7, who played sports on a national level before his psychotic symptoms, even completely quit because of feelings of insufficiency: [translated] *'When I went boxing again, it didn't go well. I thought I had become much worse at boxing. So, then I didn't have the motivation and I quit.'*

Participants who still had symptoms and were in the middle of their treatment were interviewed about potential future barriers. These were also related to feelings of insufficiency. They indicated a fear to do things wrong or failing when others are watching them. Participant 1 for instance said this about going to the gym: [translated] *'The idea that people are watching you, not because I am narcissistic, but because of the fear to fail.'*

Facilitators to playing Sports

Facilitators before FEP

Facilitators before symptom onset depended on personal characteristics and preferences. Some participants preferred fun-based sports without obligations instead of risking being kicked out of the team if they were absent at training. For participant 9 this was a reason not to play group sports: [translated] *'You can cancel once, [...], but they do not like it if you cancel often.'*

Other participants indicated a slight feeling of pressure in the form of obligation helped them to play sports. participant 10 for instance said: [translated] *'I was obliged to a [gym] subscription. That of course motivated me to keep going.'*

Goal-accomplishment was mentioned as a facilitating factor to play sports because it increased motivation, self-esteem, and positive emotions. Participant 4 for example said: [translated] *'While running, you have to persevere and reset your boundaries. You are very happy when you accomplish your goal like running five miles in a certain time limit.'*

Facilitators during FEP

During FEP, participants more often indicated accomplishing sport-related goals motivated them to play sports. Additionally, participants mentioned facilitators related to reducing negative consequences of FEP. Due to symptomatic differences, there was heterogeneity in facilitating factors.

Heterogeneity. Facilitators depended on specific symptoms and therefore differed per participant. One participant indicated stress increased voice-hearing. Therefore, management of stress helped him to be able to play sports.

Participants predominantly struggling with decreased self-esteem and lack of motivation indicated factors facilitating these. Participant 4 for instance suffered from depressive symptoms

causing lack of motivation. She was helped by a group sport creating a feeling of obligation: [translated] *'when I had a depressive episode, I often did not feel like running, especially when the weather was bad. It helped I was in a sports group and felt kind of obliged to go because if you did not go, they would ask: 'hey, you weren't there, is everything okay?''*. However, when this participant was still oversensitive to sensory stimuli, being able to play an individual sport helped her to keep active (see *'Barriers during FEP, Symptom characteristics'*, p.20). This heterogeneity in symptoms made a few participants stress the importance of an individually tailored sport.

Graded participation. Some participants indicated being able to gradually increase sports activities helped them to eventually play sports on a regular basis. Participant 9 for instance said: [translated] *'When the symptoms loosened, I first went fifteen minutes to the gym when it was quiet. [...] Every time I went a little longer.*

A skilled and motivating trainer or sports buddy. Participants doing psychomotor therapy indicated a skilled trainer who has experience with the patient group such that he or she considers their needs and abilities, helped them to play sports. Participants without experience with psychomotor therapy also mentioned this as a potential benefit. A trainer increases motivation during the classes and could send reminders to play sports. Participant 4 for instance said: [translated] *'If I feel a barrier [to play sports], it helps when someone [...] sends a text message'*.

Participant 1 mentioned a sports partner as a facilitator to increase motivation for playing sports outside the mental healthcare institution: [translated] *'A partner would help me. Someone who could pull me out of bed instead of doing it all on my own'*. The sports partner considered his difficulties, like side effects of medication.

Feeling connected and safe. Participants playing sports outside the mental healthcare institution indicated a familiar sporting place with acquaintances helped them feel safe.

Participant 9 for instance said: [translated] *'It was easier to start fitness again because I had done it before, so I already knew the environment. I was still suspicious, but it felt safe because I knew people there.'*

Feeling connected by doing psychomotor therapy together with individuals with FEP was mentioned as a facilitating factor by more than half of the participants. Besides symptom recognition, it also made participants feel safe since they had similar difficulties and sports levels. Participant 1 for instance said: [translated] *'Being with a small group of people I know makes psychomotor therapy easier. [...] You also have more affiliation with each other because you have the same condition.'*

Facilitators after FEP

A few participants indicated psychomotor therapy as a preparation for playing sport outside the mental healthcare institution. Participant 1 for instance said: [translated] *'I think the barrier to play sports outside mental healthcare will eventually be lower and that psychomotor therapy is a good preparation for this.'* Doing psychomotor therapy helped them to increase endurance and get used to social contact in a safe environment.

Several other ideas to facilitate sports after treatment were mentioned by participants. Support could for instance be enabled by a sports partner sending a text message to play sports or by playing sports with someone with similar symptoms. Participant 1 indicated someone who helps you prepare via a short talk beforehand and an evaluation afterwards would help: [translated] *'Someone who can think along, giving practical support which would help me to go play sports. Like a short conversation beforehand to feel less tension to do it myself'.*

Sports and (changes in) Emotions, Mood, Concentration, and Memory

Nine participants mentioned cognitive functions did not change because of playing sports or they did not know whether there was a change. One participant mentioned improvements in concentration by being able to work on a computer for longer, but he was unsure if this was due to playing sports alone.

Several participants mentioned changes in emotion due to playing sports (see '*Facilitators before FEP*', p. 23). Participants also indicated changes in mood such as a reduction of aggression and feeling more at ease. This resulted in having more cognitive capacity for other activities. Three participants mentioned this might play a role in increased cognitive functioning, but they were unsure whether this was accurate.

Discussion

The present study aimed to qualitatively investigate the needs, barriers, and facilitators in sports by interviewing a heterogeneous sample of Dutch youth with first-episode psychosis (FEP). To summarize, most individuals indicated a need to play sports before and during FEP. The need for playing sports may be even higher in individuals with FEP than in the general population because symptoms and their consequences can be targeted through sports. Both mental and physical reasons for playing sports were mentioned. Important reasons for playing sports during FEP included symptom alleviation, improvement of social skills, having a daily routine, and a feeling of belonging. Whereas the main barrier to playing sports before FEP was lack of time, barriers during FEP were directly or indirectly related to symptoms of FEP. These included psychotic symptoms, decreased motivation due to side-effects of medication, stigma, and decreased self-esteem. Playing sports in a familiar environment facilitated feelings of safety and connectedness. In psychomotor therapy, safety and connectedness were increased via a skilled trainer with knowledge about FEP and playing sports together with other individuals with FEP. Psychomotor therapy was mentioned as a preparation to play sports outside the mental healthcare institution. Other facilitators to playing sports were the inclusion of a goal-component and an intervention tailored to individual needs.

The fact that most but not all individuals indicated interest in sports, may be explained by the heterogeneous sample selection, by which individuals with and without interest in sports were recruited. In other studies where heterogeneous sample selection was not emphasized, all participants stressed the need for playing sports (Brooke et al., 2019; Carney et al., 2017).

Similar to individuals with FEP, the general population indicates mental reasons for playing sports such as stress reduction, increased fitness, and self-esteem (Brooke et al., 2018).

The beforementioned reasons for playing sports during FEP also align with previous research. Firstly, previous qualitative research on FEP (Firth et al., 2016; Larsen et al., 2019) and long-term schizophrenia (Mason & Holt, 2012; Soundy et al., 2014), similarly found sports distracted individuals from their symptoms. Secondly, improvement of social skills is also mentioned as a need by men interviewed in the study by Brooke et al. (2019). Sports may positively influence social cognition and competence (Soundy et al., 2014) and thereby ease social interaction in other contexts (Larsen et al., 2019). Thirdly, having a daily structured activity was also a reason to play sports in a study by Larsen et al. (2019). Fourthly, group sports satisfied the need for belonging, which is one of the basic needs according to self-determination theory (Schneider & Kwan, 2013). The need for belonging may be increased in FEP due to feelings of loneliness and alienation from society (Lim et al., 2018).

Previous research supports the barriers found in the present study. Firstly, other studies similarly found psychotic symptoms like suspicion were the main barriers to going to a sports place and playing group sports (Brooke et al., 2019; Carney et al., 2017; Vancampfort et al., 2016). Secondly, decreased motivation as a side-effect of medications was also a barrier in the study from Brooke et al. (2019). Thirdly, stigma in the form of fear for being judged similarly functioned as a barrier to playing sports in other studies (Brooke et al., 2019; Carney et al., 2017). Fourthly, decreased self-esteem is often present in individuals with FEP (Vancampfort et al., 2016), and can make it impossible to cope with aspects of sports like feeling the need to perform (Brooke et al., 2019; Lee et al., 2018; Vancampfort et al., 2016).

The mechanisms behind the facilitating factors found in the present study may be partly explained by previous research. Firstly, in the present study, playing sports in a familiar environment with other individuals with FEP and a skilled trainer increased safety. A skilled

trainer also increased motivation. Previous research supports this finding (Firth et al., 2016). Furthermore, it stresses that playing sports with other individuals with FEP increased safety because it diminished judgment, stigma, and gave a feeling of belonging (Firth et al., 2016). Secondly, goal-accomplishment was also a crucial motivator in a study by Larsen et al. (2019). Goal-accomplishment may be a facilitator because it gives a feeling of competency which is one of the three basic psychological needs described in self-determination theory (Schneider & Kwan, 2013). The commonality of decreased self-esteem and lack of motivation in FEP (Larsen et al., 2019) may explain why in the present study, goal-accomplishment as a reason for playing sports increased during FEP. Thirdly, an individually tailored intervention satisfies the heterogeneous preferences and needs of individuals. The need for an individually tailored intervention was also stressed in previous research (Brooke et al., 2019; Larsen et al., 2019) and was found especially important in young adults, i.e., the age group of FEP (Carter et al., 2015). Heterogeneity in symptoms (Irving et al., 2021) further underscores the need for an individualized intervention. Moreover, an individually tailored intervention motivates to play sports (Firth et al., 2016; Brooke et al., 2019). This, because an individually tailored intervention enables guidance of sports activities by individuals' opinions and needs. An individually tailored intervention thereby satisfies the need for autonomy, as described within self-determination theory (Schneider & Kwan, 2013). Fourthly, psychomotor therapy gives the opportunity to familiarize with social situations and increase endurance. Brooke et al. (2019) found that growth experiences, such as increases in endurance, increase self-esteem. Thereby, psychomotor therapy may take away feelings of insufficiency and prepare individuals to play sports outside the mental healthcare institution.

The present study confirms many findings from previous research. However, some of the present findings do not correspond with previous research. For example, previous studies stress that participating in sports reduces self-stigma (Larsen et al., 2019; Brooke et al., 2018; Schouten & Vellekoop, 2015). In the present study, group psychomotor therapy reduced self-stigma, but this was not mentioned for sports outside of the mental healthcare institution. The significant barriers to playing sports outside the mental healthcare institution, like symptoms and self-stigma, may explain the absence of this finding.

Furthermore, previous research found that belonging to a group increases feelings of obligation towards the group. This enhances motivation to play sports within the group (Larsen et al., 2019; Halse, 2018). In the present study, group sports facilitated recognition and belonging, but only a few participants mentioned group sports as a motivator. Symptoms such as sensory sensitivity and suspicion make it difficult to play group sports, for which playing group sports may not motivate individuals with these symptoms.

Clinical implications

Our findings regarding needs, barriers, and facilitators of sports in individuals with FEP are relevant for healthcare providers. Knowledge about these facets guides the development of a sports-based intervention. Following the spirit of the human-centered design model, potential users actively contribute to the development of the sports-based intervention. Active contribution of individuals with FEP leads to improved care (LUMA Institute, 2021). The present study thus helps creating the blueprint for an intervention that facilitates social inclusion in the critical life period. The intervention may thereby improve care for individuals with FEP. The sports-based intervention may serve as a preparation for playing sports outside the mental healthcare institution. The intervention can benefit from a goal-component and a skilled and knowledgeable trainer or sports partner to increase safety, self-esteem, and motivation. Furthermore, the intervention should be individualized by being flexible and allowing individuals graded participation.

Strengths, Limitations, and Future Directions

The present study has four important strengths. Firstly, qualitative interviews captured the heterogeneity and relationship between different barriers and facilitators and thereby deepened insight into these facets. Furthermore, asking open questions gave participants the feeling their view mattered and may thereby directly increase self-esteem. Some participants even indicated the interview had an immediate positive consequence on their intentions to play sports again. Secondly, involving individuals in the development of an intervention follows the spirit of the human-centered design model. This is shown to improve care (LUMA Institute, 2021). Furthermore, if individuals contribute to the development of an intervention they may eventually use themselves, they satisfy their need for autonomy (Schneider & Kwan, 2013). Thirdly, including participants with comorbidity gives a more inclusive view of the needs of the FEP-population as half of the individuals with FEP have a comorbid psychiatric disorder (Heitz et al., 2017). Furthermore, it enables the development of an intervention that also fits individuals with comorbidities. The present study thereby stresses the potential role of comorbid ASD and anxiety disorders in barriers to playing sports. Future studies may increase sample size to deepen knowledge of comorbidities influencing individuals' views on sports. Fourthly, the broad inclusion criteria allowed the inclusion of views of women and individuals without interest in sports. The present study thereby gave an indication of the heterogeneity within the FEP population and the present differences in needs, barriers, and facilitators.

Besides the abovementioned strengths, three limitations should be considered and guide future research.

Firstly, the present sample is not fully representative of the FEP population. The ability to generalize findings to the whole FEP population was also not the aim of the present study and

focus lay on obtaining an indication of the heterogeneity in views based on a small sample. Nevertheless, a representative sample may help the development of a sports-based intervention that suits a broader population. To obtain a representative sample, several sample characteristics should be considered. These include the percentage of women, the risk associated with immigration, and the level of activity. Needs regarding sports may differ per gender since symptoms differ per gender (Irving et al., 2021) and symptoms influenced needs and barriers in the present study. Including more women allows a thorough investigation of such potential gender effects. Literature regarding the percentage of women with psychosis is mixed and estimates range between 33 and 50% (Department of Health, 2010; McGrath, 2008; Perälä, 2007; Seeman, 2012). This is caused by methodological and sample differences (Ochoa, 2012). Taking this incidence rate into consideration, a representative sample should at least consist of 30% women. In the present study, all individuals were Caucasian, whereas immigration is a risk factor for FEP (Tarricone et al., 2014). A representative sample should therefore include individuals from different backgrounds. Furthermore, most participants in the present study were physically active. This activity level is not representative of the FEP population. Only half of the general Dutch population achieves the activity level of individuals in the present study (CBS, 2020) and previous research shows individuals with FEP are less physically active than the general population (Larsen et al., 2019). The high activity level in the present study may be explained by increased interest in participating in a study about sports in individuals with interest in sports. Future studies should make participation in the study more appealing to individuals without such interest.

Secondly, participants in the present study did not perceive changes in cognition due to playing sports. This indicates that either cognition did not improve by playing sports in these

individuals, or qualitative investigating is not suitable to assess changes in cognition. The latter explanation of findings is plausible given that individuals were surprised by questions about cognition and these questions needed further explanation. Furthermore, the few participants who indicated changes gave vague explanations or did not know whether changes were caused by playing sports. Future research could quantitatively investigate changes in cognition via a longitudinal study. Individuals may participate in a sports-based intervention for several weeks and do cognitive tasks before, during, and after this intervention to examine if their cognition improves. Hallgren et al. (2019) did a similar study using an individually based exercise intervention. They used the Cogstate Brief Battery and the Trailmaking A and B to assess processing speed, attention, visual learning, working memory, and task shifting. Future longitudinal studies can increase knowledge by including a social component like group sports into the intervention to investigate the improvement in cognition due to group sports instead of individual exercise.

Thirdly, the interview questions were organized across the topics ‘before FEP’ and ‘during FEP’. Nevertheless, many individuals could not state exactly when symptoms started and there was no clear distinction for them between these two topics. Chen et al. (2019) stress that initial symptoms are often present two years before the onset of FEP and gradually increase. Therefore, the distinction ‘before and during FEP’ is blurry for individuals with FEP and may not be relevant. Future studies should organize the interview differently by asking individuals to talk about their sports experiences over time and after that zooming in on each experience to find changes in the duration, type, and causes of such changes.

Conclusion

This is the first study that broadly investigated needs, barriers, and facilitators regarding sports in a heterogeneous sample of Dutch individuals with first-episode psychosis (FEP). To summarize, our findings correspond to previous findings and go beyond them by showing needs, barriers, and facilitators in a heterogeneous sample of individuals with first-episode psychosis (FEP). Our study shows the need for a sports-based intervention to increase social inclusion and fitness in the critical life period in individuals with FEP. This intervention should be developed in dialogue with individuals with FEP to tailor it to their specific needs. Ideally, the intervention is individually tailored by being flexible and permitting graded participation. Safety, self-esteem, and motivation can be increased by creating a safe environment, incorporating a goal-component, and involving a skilled and knowledgeable trainer or sports partner who considers individuals' symptoms and needs.

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Appendix

Topic List (translated)

This is only a guiding list. Topics 1 through 7 should be asked. The questions underneath the topics are suggestions and should be supplemented with questions using clinical and research expertise.

Introduction (small talk to make the participant feel at ease)

- Briefly introduce yourself, what you do, what the participant can expect, if he or she has questions in advance, etc.
- What experiences do you have with sports? If none, do you have experience with any other forms of exercise?
- What is your motivation to help us?
- Why are you currently in treatment? (Use the answer as guidance to name the symptoms of psychosis during the interview)

Pre-psychosis

Need for sports pre-psychosis

- What role did sports play before your complaints? (if the participant remains quiet: in primary school, secondary school, higher vocational education)
 - Did you exercise before your first psychosis? What kind of sport was this?
 - Ask questions about the intensity of sports, the social component of sports, what they liked about it, their motivation to choose this sport, etc.
 - Did you experience changes in emotions due to sports? (if a participant remains quiet: for example, some people become very happy and others experience

frustration because they are competitive. Did you ever experience something like this?)

- If yes: can you give an example of this?
- Can you concentrate well on the ball/shuttle etc. or are you easily distracted? Have you noticed other aspects of concentration change during or after exercise?
- Could you give an example of that?
- Did you experience changes in memory due to sports? (if the participant remains quiet: can you, for example, remember exercises?)
- Can you give an example of that?
- Do you feel different before exercising compared to afterward? If so, in what way?
 - Can you give an example of that?
- Did you experience changes through sports in other areas, such as at work or school?

Helping factors regarding sports pre-psychosis

- If the participant plays sports
 - Were there aspects that helped you to exercise at the time? If so, what were these? (if the participant remains quiet: obligations, social components, etc.)
 - Did sports benefit you? If yes, in which way?
- If the participant does not play sports
 - You mentioned you did not play sports in the past, what made you not participate in sports?

- What would you have needed to play sports at the time?

Barriers regarding sports pre-psychosis

- Did sports have any disadvantages for you? If yes which were those?
- If the participant plays sports
 - Were there ever difficult situations or factors that made exercise more difficult in the past?
 - Can you give an example of that?
- If the participant does not play sports
 - In the past, were there any factors that made sports not enjoyable or difficult (if a participant remains quiet: you may think of bullying, distance from sports, injuries, etc.
 - Can you give an example of that?

Changes in sport pre- to post-psychosis

- Did the role of sport in your life recently change?
 - In what way? (less, more, kind of sport, stopped at sports club etc?)
 - What played a role in this change? (why did you exercise mor /less? Why did you stop at the sports club? etc.)
 - Did the psychosis/your complaints/symptoms play a role in this change? How did they play a role? (symptoms, treatment, stigma, medication, etc.)

With/after the first-episode psychosis

Need for sports in general with/after first psychosis

- What do sports currently mean to you?
 - What do you think about sports?

- Why do you think that?
- Do you currently play sports or exercise? (supporting further questions: What kind of sport, competition, how intensive, why/why not? Etc.)

Helping factors regarding sports in general with/after first-episode psychosis

- If the participant plays sports
 - Are there things that motivate you to play sports? If so, which are these?
- If the participant does not play sports
 - You currently don't play sports, what would you need to play sports?

Experiences with barriers regarding sports in general with/after first psychosis

- Do you ever find sports difficult? (Do you ever experience barriers/difficulties in sports? Are there things that withheld you from playing sports? Do you ever experience difficult moments or situations in sports?)
 - If yes
 - Why do you sometimes find sports difficult?
 - What are difficult moments or situations in sports?
 - Can you give an example of that?
 - What withholds you from doing what you would like to do?
 - (if someone does not play any sport) What makes it you cannot play sports at the moment?
 - If no
 - Did you experience problems at the time/earlier/when you had complaints?
 - Why do you experience no difficulties with sports?

- What helps you with that?

Sports within the GGZ

Need for sports within mental health care

- What do you think of sports as part of mental health care treatment?
- Is sport part of your treatment?
 - If yes:
 - How do you feel about sports being part of your treatment?
 - Why do you think that?
 - If no:
 - How do you feel about sports not being part of your treatment?
 - Why do you like this?

Helping factors regarding sports within mental health care

- If sports is part of the treatment
 - Why do you exercise in your treatment?
 - What helps you to exercise within the treatment?
 - Does sport as part of the treatment benefit you? If yes, in what way?
- If sports is not part of the treatment
 - How should a sport look like to make it fun for you?
 - Would sports within mental health care benefit you? If yes which one?
 - What would help you with exercise during your treatment?
 - What would make sports easier for you?

Barriers regarding sports within mental health care

- Do sports within mental health care have disadvantages for you? If yes, what kind of disadvantages?
- Do you ever find sports difficult within your treatment? (Do you ever experience barriers/difficulties during sports within mental health care? Are there things that prevent you from exercising during your treatment? Do you ever experience difficult moments or situations in sports during your treatment?) (If a person remains quiet: you can think of changes in symptoms of the psychosis, changes in emotion, memory, the influence of social interaction, etc.)
 - If yes
 - What kind of barriers/situations do you experience?
 - When were these situations?
 - Could you describe such a situation?
 - If no
 - Why do you not experience any difficulties with sports?
 - What helped you with this?

Sport outside mental health care

Need for sports outside mental health care

- Already asked, see ‘*Need for sports pre-psychosis*’ and ‘*Need for sports in general with/after first psychosis*’
- Would you like to do the sports you played earlier, or would you like to start a new sport?
 - Which one would that be?
 - Why?

Helping factors regarding sports outside mental health care

- What helps you/would help you to exercise outside the treatment? (if the participant remains quiet: the environment, coach, etc?)
- Can you describe what a fun sport would look like outside of mental health care for you?

Barriers regarding sports outside mental health care

- Imagine, you will soon be leaving treatment and you choose to start playing sports outside mental health care. What would that look like for you?
- Do you have certain positive or negative expectations when you exercise at a sports club or at home?
- Do you expect difficulties or barriers?
 - If yes:
 - What things are these? (if the participant remains quiet: time, energy, medication, it may be difficult to start again after not playing sports for a longer period of time etc.)
 - If no:
 - What keeps you from seeing any barriers?

Individual and team sports

Need for individual and team sports

- What do you think about individual sports?
- What do you think about team sports?
 - Do you currently exercise in a group or individually?
 - Do you prefer to exercise individually or together in a group?
 - What makes you prefer to exercise together/individually?

Helping factors regarding individual and team sports

- You indicate that you exercise individually,
 - What makes that you exercise individually? (If the participant remains quiet: location, crowds, social interaction, etc.)
 - Do you experience benefits from individual sports?
 - If someone indicates that they would like to exercise in a group; Suppose you were going to play sports in a group, what would help you to do that?
- You indicate that you exercise in a group,
 - What makes you exercise in a group?
 - What do you think of exercising in a group?
 - Do you experience benefits from exercising in a group?
 - Does this group know about your diagnosis/treatment?
 - Do you experience support from the group? How?
 - If someone indicates that they would like to exercise individually; Suppose you were to exercise individually, what would help you do that?

Barriers regarding individual and team sports

- If the participant exercises individually:
 - Do you experience disadvantages of exercising alone? If yes, what kind of disadvantages did you experience?
 - Would you consider exercising in a group as an option? Why/why not? What do you think you will run into?
- If the participant plays sports in a group:
 - Do you experience disadvantages in group sports? If yes, what kind of disadvantages did you experience?

- Would you consider individual sports an option? Why/why not? What kind of problems do you foresee?

Overarching (only if the above did not provide a complete picture):

- Would you like to play sports less/more?
- What role do you expect sports to play when you are out of treatment?
 - Why do you think that?
- Provide your own summary per subcategory and ask whether this is consistent with what the participant has said and whether the participant has anything to add.
- Are there other things you would like to add or say?

Closure

- How did you experience this interview?
- Did this interview help you? Have you gained new insights/learned new things?
- Take time to thank the participant