https://doi.org/10.54141/psbd.1395985

PAMUKKALE JOURNAL OF SPORT SCIENCES
ISSN: 1309-0356 dergipark.org.tr/en/pub/psbd

Pamukkale J Sport Sci, 15(1) 88-114, 2024 Research Article

Promoting Awareness of Sedentary Behavior and Physical Activity Awareness Among Rural Youth Through Bocce Game: A Qualitative Study

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Keywords
Bocce game,
Physical activity awareness,
Rural,
Sedentary behavior awareness,
Youth

Article History
Received 15 August 2023
Revised 06 February 2024
Accepted 23 February 2024
Available Online 14 March 2024

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ABSTRACT

In youth, it is important to promote physical activity habits. The multifactorial nature of rural areas affects individuals' physical activity habits, and sustainable strategies are needed to promote sedentary behavior and physical activity awareness among rural youth. The research data consists of qualitative interviews with healthy rural youth after the bocce game activity. In-depth interviews were conducted with 11 volunteers who participated in the activity using a semi-structured interview form. Qualitative findings are divided into nine main themes: Thoughts on bocce game activity; meaning of physical activity and thoughts on the topic; physical activity and its effect on health; thoughts on the frequency, duration, intensity, and type of physical activity; meaning of sedentary behavior and thoughts on the topic; sedentary behavior and its effect on health; thoughts on the frequency and duration of sedentary time and the type of sedentary behavior; promoting awareness of sedentary behavior and physical activity through bocce game; expectations from institutions. The findings highlight that bocce is a vital strategy to encourage physical activity and sedentary behavior awareness among youth in rural areas. Local authorities have a critical role in supporting physical activity and sedentary behavior awareness in rural areas.

Citation: Erol, B. N., Kırışık, H., Gülle, H., İpar, M., Kaşıkçı, E. and Küpçüoğlu, C. (2024). Promoting Awareness of Sedentary Behavior and Physical Activity Awareness Among Rural Youth Through Bocce Game: A Qualitative Study. *Pamukkale Journal of Sport Sciences, 15*(1), 88-114. https://doi.org/10.54141/psbd.1395985

INTRODUCTION

Excessive sedentary time is increasing among young individuals worldwide (LeBlanc et al., 2017). Among children and youth aged 5-17, it has been reported that they spend more than 2.25 hours per day engaging in sedentary activities such as watching TV/DVDs or playing electronic games, indicating higher sedentary behavior (SB) levels than recommended in guidelines (Australian Bureau of Statistics, 2013; Australian Government Department of Health, 2021). Increased SB and high screen time in youth have negatively affected body composition, cardiometabolic risk, fitness, behavior, and self-esteem (Carson et al., 2016). Physical inactivity, a leading cause of non-communicable diseases, remains widespread globally (Katzmarzyk et al., 2022). Increased physical activity (PA) and reduced SB have positive health effects on youth, including improved physical fitness, cardiometabolic health, bone health, mental health, and adiposity reduction (Carson et al., 2016; Chaput et al., 2020). Despite the known health benefits, most youth worldwide do not meet PA recommendations (Steene-Johannessen et al., 2020).

Initiating PA is closely related to the environment one lives in. People living in rural areas have limited opportunities for PA participation (Meyer, Moore, Abildso, et al., 2016). Some studies emphasise the inadequate physical activity levels of young people living in rural areas in Türkiye (Esatbeyoğlu & Kin İşler, 2018). The presence of safe areas for PA, easy access to exercise equipment, the availability of recreational places such as parks and gyms, and the presence of individuals engaging in PA in the surroundings can increase participation in PA (Meyer, Moore, Abildso, et al., 2016). Supporting young individuals in adopting an active lifestyle is crucial for long-term individual and community health (Guthold et al., 2020). PA programs should encompass planned, curriculum-defined, cognitive-enhancing indoor and outdoor school activities that promote young individuals' learning experiences (Hodge et al., 2008). Safe, engaging, developmentally appropriate PA programs are recommended to support young people in being active for at least 60 minutes daily (Chaput et al., 2020). Bocce, a special Olympics sport, is frequently chosen by young individuals and offers opportunities for social interaction, physical development, and building self-confidence (Sood et al., 2016). There are different types of bocce game. Petanque is one of them and is a game played by hand using iron balls. Petanque is a game that can be played regardless of gender and age. This game aims to make the closest shot to the pallino (target ball) with the thrown iron ball (Phytanza et al., 2022). Bocce involves individual and team competitions, traditional strategic games against rival teams, as well as timed competitions that involve speed, endurance,

strength, hand-eye coordination, aerobic and anaerobic power capacity, flexibility, balance, and body composition components, making it a sport with physical performance characteristics (Türkmen et al., 2013).

In addition, the suitability of the bocce game for implementation in rural areas, its potential to increase PA and decrease sedentary time, its known health benefits, its suitability for individuals with different health issues, its ease of play, its ability to be played regardless of age and gender, its ease of organization, its enjoyable nature, and its ability to be played individually or in teams contribute to making the game appealing (Gündüz & Keskin, 2019; Sood et al., 2016; Türkmen et al., 2013, 2018).

Supporting strategies that reduce SB and increase PA in individuals (Chaput et al., 2020) and developing intervention programs to enhance PA and SB awareness are recommended (Tassitano et al., 2020; Van Sluijs et al., 2007). Despite the existing recommendations, very few studies focus on individual perceptions and interpretations of individuals. Therefore, presenting the effects of bocce on PA and SB in rural areas through individuals' perceptions and presenting the intention and motivation of individuals towards behavior change together with these perceptions and comments is crucial to inform future studies for different intervention programs that could be developed in rural areas.

As a result of the literature review, it has been seen that there is a need for sustainable practices to be developed to support the awareness of SB and PA in young individuals living in rural areas. In this context, this research seeks answers to the following questions: (1) What is the role and importance of the bocce game activity in supporting the awareness of SB and PA among young people living in rural areas? (2) What are the participants' thoughts on SB and PA? (3) What are the expectations of the participants from the institutions regarding the awareness of SB and PA?

The conceptual framework of this research is based on the concepts of SB and PA awareness. In this context, the research draws from the World Health Organization's (WHO) guidelines on SB and PA (Chaput et al., 2020) and behavior change theories that encompass intention to change or motivations (Ajzen & Schmidt, 2020; DiClemente & Graydon, 2020). The WHO guidelines cover issues related to PA (the relationship between PA and health outcomes, dose-response relationship, relationship between type or domain of PA and health outcomes) and SB (the relationship between SB and health outcomes, dose-response relationship, the relationship between type or domain of SB and health outcomes) that have been addressed by the WHO Youth Work Group (World Health Organization, 2020).

According to many commonly used theoretical models, intention to change or motivation is a crucial determinant of behavior change (Ajzen & Schmidt, 2020; DiClemente & Graydon, 2020). Whether an individual intends to change their behavior depends on their belief that changing the behavior will reduce health risks and how much they perceive their behavior as "unhealthy" (Schuman-Olivier et al., 2020). In the context of this research, the physical, cognitive, and social activity of the Bocce game is based on increasing PA, reducing sedentary time, and promoting behavior change potential in individuals, thus supporting awareness of SB and PA.

METHODS

Study Design

In this study, a phenomenological approach, a qualitative research design that aims to investigate individuals' life experiences and daily experiences deeply, was employed (Creswell & Poth, 2016). Phenomenological research aims to achieve saturation by focusing on in-depth and specific data from a small sample (Bhattacharya, 2017). Given the practical nature of the research question and to better understand the effects of interventions and inform future studies, the study aimed to explore the personal perceptions, interpretations, and experiences of rural youth's awareness of SB and PA through the activity of the bocce game. These factors were the driving factors behind choosing a qualitative phenomenological approach. Published guidelines for qualitative phenomenological research were applied in the scope of this research (Cypress, 2018). The Standards for Reporting Qualitative Research checklist guided reporting (Brien et al., 2014). Qualitative interviews were conducted after obtaining research ethics approval from the Ankara University Ethics Committee (Approval Number: 56786525-050.04.04/580730). The research adhered to the Helsinki Declaration (Human, 2001), and in addition to obtaining verbal consent from voluntary participants, informed consent was obtained from the parents/guardians of the participants to allow their children to participate in the research.

Study Group

Healthy young men and women living in the rural district of Haymana in Ankara, whose parents/guardians gave informed consent to allow their children to participate, were included in the study. Individuals between the ages of 15-18, which is the "youth category" representing young individuals in the bocce game of the Türkiye Bocce Bowling and Dart Federation, and individuals who had never played bocce before were included in this study

(Türkiye Bocce Bowling and Dart Federation, 2022). Based on self-report, individuals with serious neurological or orthopedic problems that could hinder playing bocce or those with advanced cardiovascular disease that significantly affected their mobilization were not included in the study. A total of 20 young individuals who met the inclusion criteria for the bocce game activity participated in the research, and among these individuals, those who volunteered for qualitative interviews (n = 11) were included in the research. Participants agreed to complete an in-depth interview as part of their general participation. Interviews were concluded when saturation was reached (Bhattacharya, 2017).

The research team consisted of individuals (BNE, HK) who had previously worked in clinical practice on bocce game, PA, and SB topics and integrated them, as well as individuals (HK) with expertise in qualitative research methods. Members of the research team (BNE, HG, Mİ, EK, CK) had received expert training in qualitative data collection and analysis methods before the research. The research team contributed jointly to the coordination of intervention activities, intervention design, and data collection. Participants knew that the research team was interested in their intervention experiences, SB and PA awareness perceptions, as part of the study evaluation.

Data Collection Tools

The data for the study consisted of qualitative interviews conducted after the bocce game activity designed to support SB and PA awareness among young rural individuals. The research used a commonly used interview technique to reveal individuals' feelings, thoughts, perceptions, and experiences (Bhattacharya, 2017). In-depth interviews were conducted with 11 volunteers participating in the bocce game activity. Semi-structured interview forms were used in the interviews. The interview form prepared by the authors (BNE, HK) included adapted questions for the bocce activity based on the guidelines for SB and PA for children and adolescents by the WHO (Chaput et al., 2020), as well as demographic questions. After review for clarity and appropriateness, the prepared interview form was administered. A purposeful sampling technique was used in the research. This technique involves examining rich information cases to effectively use limited resources (Duan et al., 2015).

Considering the facilitator factors necessary for the adoption, implementation, and sustainability stages of PA and SB interventions in real-world settings mentioned by Cassar et al., the availability of these factors in the bocce game was one of the reasons for choosing the bocce game (Cassar et al., 2019). The bocce game activity implemented in the research was carried out in collaboration with Ankara University, the Türkiye Bocce Bowling and Dart

Federation, Haymana District Directorate of National Education, Haymana District Directorate of Youth and Sports, and Haymana Municipality. Information about the participants' location, date, time, and age was conveyed through posters and verbal announcements prepared for the bocce game activity. The activity took place outside of school hours. On the day of the game, participants registered and received player numbers from the researchers when they arrived at the game area. A total of 20 individuals, including ten women and ten men, participated in the activity. Before the activity, a field inspection was conducted by a referee appointed by the Turkish Bocce Bowling and Dart Federation to ensure the suitability of the field. Six fields were created with a length of 15 meters and a width of 4 meters. Player matches were made randomly by drawing lots by the referee, and female and male participants were assigned randomly. Before the activity, warm-up exercises were performed for about 15 minutes, accompanied by a physiotherapist (BNE), in order to minimize the risk of injury to the participants. Participants competed as a player (solo) against a player. The activity was played in the "petanque" type of bocce game. Since the petanque is a game that can be played regardless of gender and age, male and female participants competed in the same category.

At the end of the activity, which progressed in quarter-finals, semi-finals, and final games, the participants were given medals. In addition, qualitative interview appointments were obtained from volunteer participants whose parents/guardians had ethical approval for the research at the end of the activity. One-on-one, face-to-face, semi-structured in-depth interviews were conducted with 11 volunteers participating. The interviews lasted an average of 30-50 minutes and were recorded using a voice recording device. The digitally recorded data were transcribed verbatim using a professional service. The interview transcripts were reviewed for accuracy and anonymized before thematic analysis. Participant names were replaced with codes. The participants were coded in order of registration on the list as "P01, P02, P03, P04, P05, P06, P07, P08, P09, P10, P11". The transcripts were analyzed and transferred to a computer environment.

Data Analysis

Thematic and descriptive qualitative analysis was performed using the NVivo 10.0 program. Frame themes were established based on the literature review and the semi-structured question form. Interview transcripts were coded separately by the researchers (BNE, HK). The codes were then brought together and matched, and a consensus decision was made for each code. The codes were placed under framework themes and then categorized

into thematic categories using the thematic analysis method. The responsible researcher (BNE) reviewed the codes and themes. Then, the themes were reorganized and revised, focusing on the perceptions of the bocce game and the relationships between SB and PA awareness perceptions and intervention experiences. All research team members met again to review, discuss and improve the themes. The themes were discussed and refined with all team members until a consensus was reached. The researchers identified the emerging findings and supporting participant quotes (BNE, HK). The reliability and validity of the data were tested using kappa analysis. According to the results of the kappa analysis, there was a 100% agreement in scoring. Discussions and decisions made during data collection and analysis were documented to ensure an audit trail. Participant quotes were directly transcribed from their own words during the analysis to enhance the reliability of the data. After interpreting the research findings, an expert researcher in the field of qualitative research evaluated the study to avoid bias and provided expert opinions. Preliminary findings of the research were presented at an academic conference in September 2022.

RESULTS

Participants

Qualitative interviews were conducted with 11 volunteers participating in the bocce game activity. Among the volunteers, five were female (45.5%) and six were male (54.5%). The age range of the participants was 15-17 years old, with an average age of 15.9. Most participants (72.7%) were born and raised in Haymana, and the participants with the shortest duration of residence had been living there for one year. Young individuals maintain at least one and up to three PA routines. In the participants' PA routines, it was observed that they engage in activities such as playing volleyball (54.5%), walking (36.3%), playing soccer (27.2%), running (27.2%), playing basketball (18.1%), playing table tennis (9%), and riding bicycles (9%). The majority of female participants prefer playing volleyball (60%), while the majority of males prefer walking (50%) and playing volleyball (50%). Participants mentioned that they engage in volleyball, basketball, soccer, and table tennis activities both during and after school, while they engage in walking, running, and cycling activities outside of school hours (during the day or in the summer). The demographic information of the participants is provided in Table 1.

Qualitative findings

After conducting the interviews, nine themes were identified based on the participants'

responses. These themes cover various aspects of PA, SB, and perceptions of the bocce game activity. The themes and their corresponding codes are presented in Table 2. The code tree is not created.

Table 1
The Demographic Information of the Participants

Participant ID	Age (Years)	Sex	Class (High School)	Physical Activity Routine (Type/Frequency)	Duration of Residence
01	15	Male	1st	Walking/Daily	Local
02	15	Female	1st	Walking/Daily	Local
03	16	Female	2th	Volleyball/Sometimes Football/Sometimes	Local
04	17	Female	3rd	Running/Daily	1 year
05	15	Male	1st	Walking/Daily Running/Daily Basketball/Sometimes	Local
06	17	Male	3rd	Football/Daily Volleyball/Daily	Local
07	15	Male	1st	Walking/Daily Cycling/Sometimes Volleyball/Sometimes	7 years
08	15	Female	1st	Volleyball/Sometimes	Local
09	17	Female	3rd	Volleyball/Sometimes	Local
10	17	Male	3rd	Table tennis/Sometimes Volleyball/Sometimes Basketball/Sometimes	Local
11	16	Male	3rd	Running/Daily Football/Daily	6 years

Thoughts on the bocce game activity

Most participants stated that they played the bocce game for the first time. In their thoughts about the bocce game activity, they generally mentioned that playing bocce with their peers made them feel good and enjoyable. One participant (P05), even though they did not particularly enjoy sports, thought that bocce pleased them, and they believed that enjoying the activity made them play well. Another participant (P04) compared bocce to a marble game they played as a child, which evoked positive feelings. Participants with code name P08 supported the idea that even people who have not dealt with this sport before can quickly grasp bocce, saying, "It was my first time playing, I learned.". Participants expressed their thoughts about the game with the following words:

"To be honest, I thought it would be boring at first. But as I played, I realized that I enjoyed it. I used to like playing marbles when I was little. I also really like bocce now." (P04)

"I played Bocce for the first time in my life. I am not really someone who is deeply involved in such sports, but I had fun for the first time in a sport like this. I think I played quite well and enjoyed it. I had a great time." (P05)

"I had a fun time playing with my peers. It made me feel good. I got interested. It was my first time playing, I learned." (P08)

Table 2
Themes and Codes

	Themes	Codes
1	Thoughts on the Bocce Game Activity	Enjoyable game, pleasant game, fun game, exciting game.
2	Meaning of Physical Activity and Thoughts on the Topic	Beneficial activity, developmental activity, sports, movements related to the body.
3	Physical Activity and Its Effect on Health	It positively impacts health, prevents excess weight, and prevents physical problems that may arise in old age.
4	Thoughts on the Frequency, Duration, Intensity, and Type of Physical Activity	Consistency and continuity, body capacity.
5	Meaning of Sedentary Behavior and Thoughts on the Topic	Inactivity, laziness, examples of sedentary behavior.
6	Sedentary Behavior and Its Effect on Health	Affects health negatively and adversely, currently doesn't affect, leads to illnesses.
7	Thoughts on the Frequency and Duration of Sedentary Time and the Type of Sedentary Behavior	Pain, fatigue, sluggishness, adverse effects of technology.
8	Promoting Awareness of Sedentary Behavior and Physical Activity Through Bocce Game	Awareness was achieved, awareness was not achieved, partially achieved.
9	Expectations from Institutions	Encouraging, organizing tournaments, increasing courses.

The bocce game positively affects individuals physically, socially, mentally, and cognitively. Some participants (P09, P10) mentioned that the bocce game supports them socially and highlighted its emotional, mental, and cognitive effects on individuals.

"It developed social activities. It improved our feelings among us. It made us focus more." (P09)

"Well, you also need to think strategically a bit. It is not just about getting points, but it is also fun because you need to move your opponent's ball away." (P10)

When asked if they would like to get together and play bocce again in the future, 9 participants (P02, P03, P04, P05, P06, P08, P09, P10, P11) responded positively, one participant (P07) expressed uncertainty, and one participant (P01) did not provide an opinion. Some participants' views on this matter are as follows:

"I would come again if it is played again. I had fun." (P08)

"Well, most likely I want to because, you know, interactions like these among us are very nice. Playing bocce is a fun activity." (P09)

Young individuals mentioned that the enjoyable nature of the bocce game and the pleasure of playing with peers motivated them and made them want to play bocce again. The motivational contributions of the bocce game on individuals and their desire to play bocce again could be seen as essential steps for behavioral changes in individuals (Ajzen & Schmidt, 2020; DiClemente & Graydon, 2020).

Meaning of physical activity and thoughts on the topic

PA is any bodily movement carried out by skeletal muscles that requires energy expenditure (World Health Organization, 2019). For individuals to participate in PA, they must understand the meaning of PA and perceive how active they are in their daily lives. In response to questions about their perceptions and interpretations of PA, six participants (P04, P05, P06, P07, P10, P11) consider themselves physically active, while four participants (P02, P03, P08, P09) do not consider themselves active, and one participant (P01) did not express an opinion.

Participants mainly associate the meaning of PA with sports activities and physical actions in daily life. Participants provided examples of PAs such as walking, running, playing volleyball, soccer, basketball, table tennis, and cycling. Some of their statements related to the meaning of PA include:

"*In my opinion, physical activity includes activities that allow you to develop physically. Sports like volleyball, soccer, bocce, and the like...*" *(P03)*

"*I think physical activity encompasses all the tasks a person does in a day. But from a sports perspective, things like volleyball, basketball, soccer can be examples.*" *(P06)*

Since Haymana is a small district, participants usually walk to the places they go. Apart from that, participants mainly participate in school team practices within the school and engage in sports activities in the schoolyard after school. Therefore, it can be observed that participants mainly engage in PA within the school premises. Some statements from participants regarding this topic are as follows:

"I usually do it daily. There is a long walking distance between my home and school. Walking, running, these are things that are part of my life. But whenever I get a chance, I do training with my friends because they are in the volleyball team." (P05)

"For example, I ride my bike when I am in the city, especially during summers. We play volleyball with friends on school days. And walking, I do that every morning when I come to school." (P07)

In participants' interpretations of PA, walking, riding a bike, and playing volleyball, soccer, and basketball seem to be highlighted. Individuals mostly view activities that involve relatively high energy expenditure in skeletal muscles as physical activities. However, only one participant (P03) mentioned playing bocce as an example of PA. Some participants' definitions of PA also included daily activities and broadened the scope of the definition. Considering the participants' opinions, it can be suggested that the geographical, economic, and cultural characteristics of their region might have influenced their PA behaviours and perceptions.

Physical activity and its effect on health

The beneficial effects of PA on health are supported by evidence in the literature (Chaput et al., 2020). Nevertheless, inadequate levels of PA among young people are a significant concern (Steene-Johannessen et al., 2020). Therefore, participants' thoughts regarding the effects of PA on health are important in the context of participation in PA and behavior change. When asked about the effects of PA on health outcomes, participants indicated that engaging in PA positively and effectively influences health. They mentioned that PA prevents obesity, helps maintain a healthy weight, prevents physical problems that may arise in old age, and enhances endurance. Some participants expressed the effects of PA on health outcomes with the following statements:

"I believe it prevents obesity in the first place. Generally, lazy people tend to be overweight." (P04)

"I think diseases like osteoarthritis occur in the elderly. To prevent these from developing in advance, it is necessary to make the body move, or I think physical activity is important to prevent things like hunchback." (P10)

One participant (P03) thinks that they tire less quickly than their peers because they are interested in different sports branches compared to their peers.

"When my friends get tired quickly from doing a sport, I tire more slowly than them. I have been interested in other sports as well. Not just volleyball. That has an impact too, of course." (P03)

Participants' general thoughts are consistent with the literature, emphasizing the positive effects of PA on health. In addition to the contributions of PA to current physical well-being, the idea that specific future issues can be prevented through PA is also present in participants' opinions.

Thoughts on the frequency, duration, intensity, and type of physical activity

Participants believe consistency and continuity in engaging in PA are important to achieve positive health outcomes related to PA frequency, duration, and intensity. Some participants have the following thoughts about the impact of the frequency, duration, and intensity of PA on these health outcomes:

"Definitely. For instance, a person who engages in sports once a year cannot turn around and say, 'I am constantly doing sports.' And that sport will not have any effect on them. It is necessary to do it at least every two or three days." (P04)

"Of course, there is an effect. If a person plays volleyball all day long for one day and then does not play volleyball for 100 days, it will not be of any benefit to them." (P05)

P10 emphasizes the importance of performing activities without excessive fatigue, taking into account the body's capacity regarding activity intensity with the words, "There's something in the human body, there is endurance, so it should be done according to that.".

P06 points out the importance of engaging in PA in a way that will not harm the body and doing so regularly. P06 also highlights the role of PA in weight control and maintaining health:

"So, we should do it regularly, in a way that will not exhaust us too much won't exaggerate. We should do it according to a regular schedule, at the same time every day. For example, at least we can maintain our weight and health." (P06)

Regarding the impact of activity type on health outcomes, one participant (P05) believes that the effects will not be the same since different body movements lead to different muscle activations:

"Each sport has its challenges in its field, after all. I think, as I said, since each sport affects different parts of the body that influence health, of course, it has an impact." (P05)

Overall, participants emphasize the concepts of consistency, continuity, body capacity, and type of activity in engaging in PA to achieve positive health outcomes.

Meaning of sedentary behavior and thoughts on the topic

When examining PA's effects on young people's health, it is evident that SB should also be considered an important factor alongside PA (Katzmarzyk et al., 2019). SB is characterized by activities such as sitting, lying down, or reclining that expend ≤1.5 metabolic equivalents (METs) of energy while an individual is awake (Tremblay et al., 2017). Common SBs include smartphone/tablet use, watching TV, playing video games, computer use, driving a car or riding in a car, and reading/studying while sitting (LeBlanc et al., 2017).

When participants were asked about the meaning of SB, they associated it with inactivity, technology use, not going outside, not engaging in PA, not participating in social activities, not walking, and laziness. Some participants' statements about this issue are as follows:

> "*Is it the other name for laziness? Most likely, it is what people who do not go out and do not do sports do.*" *(P04)*
>
> "*Doing nothing all day, eating and sleeping. Also, it is like avoiding cleaning the house. It is like going home and lying down, sleeping. This is an example of sedentary behavior.*" *(P09)*

Some participants associate SB with living inactively, shutting themselves in at home, and spending a significant portion of their time on phones and computers.

> "*Some people cannot leave their homes. This could be an example of living inactively. That is, they are not moving, not doing sports. Like that. Looking at the phone, using the computer. For 3-4 hours.*" *(P03)*

Participants mostly provided examples of spending more than 3-4 hours per day using computers and phones as sedentary behavior.

> "*My sedentary behaviour is probably being on the phone. I usually do this to communicate with my friends and occasionally play games. I spend about 3-4 hours a day on the phone at home.*" *(P05)*

Participants' perceptions of SB and their examples are similar to the literature. However, it was observed that the participants' general statements about their own SB were above the SB durations recommended in the guidelines (Australian Government Department of Health, 2021; Chaput et al., 2020; Tremblay et al., 2011). While some participants use technology for non-entertainment purposes, it is noteworthy that the majority use it for entertainment purposes due to the lack of alternatives, as seen in the statement of the participant coded P06, "...out of boredom, you know."

Sedentary behavior and its effect on health

Participants generally believe that SB has adverse effects on health, causing obesity, musculoskeletal problems, sleep issues, headaches, and problems in social relationships. Some participants' views on the impact of SB on health are as follows:

> *"Inactivity, as I said at the beginning of this conversation, significantly affects weight gain. So, when you gain extra weight, your body becomes sluggish. When you want to do something, you get tired quickly. I also think it has a significant impact on relationships. Because a person shuts themselves in at home and forgets about the outside world when they go out." (P05)*
>
> *"It can cause laziness, bone pain, sleep problems, and headaches. It can lead to many things." (P07)*

One participant (P03) mentions that SB could lead to health problems in older ages and emphasizes the negative aspects of entertainment-oriented technology use among the types of SB:

> *"It does not affect me right now. Haymana is a small place, after all. We walk everywhere. It does not affect me now, but I think it will affect me in the future. This is one of the negative aspects of technology." (P03)*

It is known that preserving and maintaining health at a young age will have positive contributions to health in later years. In this context, P03's statement, "It does not affect me right now, but I think it will affect me in the future" indicates that the individual perceives their SB as "unhealthy." Furthermore, due to the conditions where P03 lives, engaging in walking activities frequently, they believe this behavior will help prevent the adverse effects of SB in their youth. Looking at participants' statements, it can be observed that they generally believe that SB will negatively affect health both physically and socially.

Thoughts on the frequency and duration of sedentary time and the type of sedentary behavior

When participants were asked about the impact of the frequency and duration of sedentary time on health outcomes, most participants (81.8%) believed that an increase in the duration and frequency of SB would lead to negative health outcomes. For example, P04 discusses the negative health consequences of not engaging in regular PA, such as pain, weight gain, and muscle atrophy. They emphasize the importance of gradually increasing PA and maintaining the current level.

> *"Definitely. When the body does not move, your bones start to collide with each other. For instance, athletes' bodies get stiff after they quit sports, and they constantly struggle*

with pain. Because the body has gotten used to movement, it wants more, but when you do not satisfy it, you will experience more pain and gain more weight. Moreover, muscle wasting can also occur." (P04)

While it is believed that spending 4-5 hours or more in entertainment-oriented technology use would harm endurance, there is an opinion that breaking SB into specific periods is important. P05's thoughts on this matter are as follows:

"Of course, a person needs to sit and be inactive when they are tired, but they need to do it without exaggerating. If you do this for 4-5 hours a day, your body will become completely sluggish. But if it is done with intervals of 1-1.5 hours, to have fun, meet friends, I do not think there will be any problems." (P05)

Participants generally believe that an increase in the frequency and duration of entertainment-oriented technology use, a type of SB, would negatively affect health outcomes. There is also a notion that the type or domain of SB might have varying effects on health outcomes. One participant (P10) advocates the contribution of reading books during SB to personal development and cognitive functions while highlighting additional negative effects of entertainment-oriented phone use, such as radiation exposure.

"Because there are factors like radiation in phones, which are not present in books. They can be more harmful or beneficial to the human body. When reading a book, you can improve your brain to some extent. I do not think the same is possible with a phone. So, it exists." (P10)

"In general, participants reported that entertainment-oriented technology use could have negative effects on overall health, eye health, and endurance, with examples such as "For example, playing on the phone all day negatively affects health." (P08) and "If there is too much technology, our eyesight may deteriorate." (P11).

Participants particularly mentioned the negative consequences of increased frequency and duration of entertainment-oriented technology use while adopting a more positive stance toward types of SB like reading books. All these findings reflect young people's perception and awareness regarding SB potential negative health outcomes.

Promoting awareness of sedentary behavior and physical activity through bocce game

Participants mentioned that playing bocce contributes to SB and PA by promoting physical and mental activity and enjoying time with peers. These findings, along with the statement from participant P05, "I had a great time with my friends... it was the most enjoyable game for me after bodybuilding," indicate that the bocce game enhances individuals' desire

and motivation. Participants used the following statements to discuss whether playing bocce contributes to increasing PA and reducing SB and its impact on health outcomes:

> "*Absolutely. We constantly change the rings (bocce balls). We throw them by moving ourselves.*" *(P03)*
> "*It does. Since we are constantly in motion, it contributes to us both mentally and physically.*" *(P06)*

When participants were asked if playing bocce contributes to awareness about SB and PA, seven participants (P03, P04, P05, P06, P08, P10, P11) stated that it does, while two participants stated that it does not (P02, P07), and one participant (P09) said it partially does. One participant (P01) did not provide an opinion. Participants mentioned that playing bocce helped raise awareness about SB and PA by recognizing the benefits and necessity of PA, the importance of warm-up exercises, and using time for playing bocce instead of computer use. Thus, they could utilize a time that could have been spent sedentarily for PA. Additionally, the statement from participant P04, "Yes, I might even be licensed," reflects their intention and willingness to play bocce again.

Among the seven participants who believed that playing bocce contributes to awareness about SB and PA (P03, P04, P05, P06, P08, P10, P11), two participants (P03, P08) we were stated that they did not consider themselves physically active in other statements. Five participants (P04, P05, P06, P10, P11) described themselves as physically active. Among those who considered bocce not to contribute to awareness about SB and PA (P02, P07), participant P02 considered themselves not physically active, while participant P07 considered themselves physically active. The participant (P09) who did not consider themselves physically active stated that playing bocce partially developed awareness in them. These findings indicate that playing bocce contributes to awareness about SB and PA for most participants, regardless of whether they consider themselves physically active or not. Furthermore, when looking at the other statements of participants, among the six participants who described themselves as physically active (P04, P05, P06, P07, P10, P11), five (P04, P05, P06, P10, P11) expressed a desire to play bocce again. One participant (P07), who considered themselves physically active, remained undecided about playing bocce again. In light of these findings, we can also say that individuals' intention and motivation to change their PA behavior positively developed through the bocce game.

Expectations from institutions

Local governments, policymakers, and funding providers have essential roles in supporting young individuals to increase PA and reduce SB (Klepac Pogrmilovic et al., 2020). Therefore, one of the topics addressed in this research is the expectations of young people from local governments (municipalities, village leaders) and other institutions (universities, government, etc.) regarding the development of SB and PA awareness and the reduction of SB while increasing participation in PA. Expectations related to this issue primarily include demands for demand-driven courses for young people in Haymana, increasing the number of existing courses, organizing fun and different tournaments like bocce, and ensuring their continuity. The opinions of the participant coded P05 on this matter are as follows:

> *"Yes, encouraging is important. Because every person, well, they must be following a sport or have an interest in it. I think courses can be opened for young people based on their interests. Or games or nice things can be organized for them. In Haymana, we have one public sports hall where, as far as I know, table tennis is closed, there is a volleyball course, and now a Muay Thai course. I think they can bring different games like basketball or bodybuilding like I am interested in or new games like bocce to encourage people to try new things." (P05)*

Some participants believe that it's important to encourage individuals to engage in these activities due to lack of information or motivation for activities. For example, P09 mentions that there are opportunities for sports in Haymana for those who want to do sports, but people are not enthusiastic about participating:

> *"It would be great if many young people played, but they can get bored easily. It varies from person to person because these people choose to be active or sedentary, or there are already many sports that can be done in Haymana, but they are not choosing them, you know." (P09)*

Additionally, some participants perceive certain aspects of living in rural areas as disadvantages for PA, noting that they lack suitable physical conditions to spend their day engaging in PA and lack facilities with adequate equipment. In addition, P11 expresses how these kinds of opportunity disparities force them to engage in entertainment-related sedentary activities:

> *"We try to do things ourselves more, but there is not much available. There's an indoor sports hall, but there are not enough things we can do there, like equipment or such things, they could be provided... We are forced to resort to technology for entertainment.*

I could utilize that time better if I had the opportunity, but since we do not really have many opportunities, we are forced to use what we have." (P11)

The statement "I could utilize that time better if I had the opportunity" from participant P11 reflects their intention to change. In participants' statements, it is evident that living in rural areas poses disadvantages in terms of accessing various opportunities, and there are expectations from institutions to improve these opportunities.

DISCUSSION

This study sheds light on the perspectives, perceptions, and interpretations of young individuals in rural areas regarding enhancing SB and PA awareness through the game of bocce. Structured settings (such as after-school programmes, summer camps and PA/sports programmes) have been reported to be necessary for PA participation as they have the infrastructure and resources to promote PA and reduce SB, and young people spend most of their time in these environments. After-school programs and routine practices at school have been reported to provide significant amounts of PA and limit SB for young individuals. Additionally, non-structured periods outside of school, like vacation periods, have been defined as critical times associated with adverse effects on youth's health due to reduced exposure to structured environments and lack of routine (Tassitano et al., 2020). Economic factors that influence the resources and quality of environments that facilitate participation, such as available transportation options for reaching school, and cultural factors, such as common beliefs regarding the importance of PA for health, can lead to variations in levels of out-of-school PA. Therefore, it is considered essential to expand PA interventions to encompass both in-school and out-of-school settings (Bann et al., 2019). For these reasons, supporting activities in structured environments during school and non-school periods and creating awareness for SB and PA through activities like bocce seem essential. The statements of the young participants in our study also support the idea that bocce is an effective tool to increase awareness of SB and PA in rural areas.

WHO PA guidelines state that young individuals can engage in PA in various settings, such as recreational and leisure activities, physical education, transportation, or household chores. It is crucial to encourage all young individuals to have access to safe and equitable opportunities and motivate them to participate in enjoyable, diverse, age-appropriate PA. In WHO reports, numerous beneficial health outcomes have been linked to higher quantities and intensities of PA, including improved cardiorespiratory, muscle, bone, and cardiometabolic health. Furthermore, positive impacts of PA on mental health, cognitive function, adiposity,

and academic outcomes have been reported (World Health Organization, 2020). In our study, participants similarly described the effects of PA on health outcomes as seen in the literature. It can be inferred from participants' responses that they perceive PA behavior as "healthy." While WHO guidelines do not precisely determine the optimal PA dose associated with improved health outcomes, a daily minimum of 60 minutes of moderate-to-vigorous intensity PA is recommended. Evidence shows that aerobic PA enhances cardiorespiratory fitness in youth, and resistance exercises increase muscle fitness, with some evidence indicating more significant benefits from engaging in both. Young individuals are advised to engage in muscle and bone-strengthening activities at least three days per week. However, no definitive evidence in the literature indicates how health outcomes might vary based on the type or domain of PA (Chaput et al., 2020; World Health Organization, 2020). The frequency of PA suggested by participants is similar to the literature's recommendations, and we believe this might positively influence participation, especially among those who perceive themselves as not engaging in sufficient PA.

Over the past decade, the issue of increasing SB has gained recognition through extensive public health guidelines. Given the high exposure to SB and its adverse effects on public health, this has led to the implementation of intervention studies aiming to reduce SB across various contexts and populations (Australian Government Department of Health, 2021). Guidelines recommend that recreational sedentary screen time for youth should not exceed 2 hours per day (Tremblay et al., 2011). However, it is worth noting that many participants' sedentary times, especially those involving entertainment-related technology use exceeded the recommended durations. In our study, participants believe increasing SB would have adverse health effects. Regarding whether these relationships vary based on the type or domain of SB, some participants believe that activities involving sitting while reading might impact personal and cognitive development, whereas SB, like entertainment-related phone use, might have adverse health effects due to radiation exposure. Participants' statements indicate that they perceive their own SB as "unhealthy". WHO guidelines state that there is insufficient evidence to define dose-response relationships between SB and health outcomes fully, and whether these relationships vary based on the type or domain of SB (Chaput et al., 2020). A systematic review examining interventions' effectiveness in reducing sitting and screen time found that interventions resulted in small but significant changes in sedentary time (Nguyen et al., 2020). Given that different strategies can yield comparable benefits and considering individuals who struggle with moderate-intensity PA might need to replace SB with light-intensity PA (Nguyen et al., 2020; Stamatakis & Gill, 2019), bocce appears to be a

promising alternative for young individuals. Engaging in bocce allows individuals to reduce SB and increase PA levels without necessitating strenuous effort.

Bhuiyan et al. suggest enhancing knowledge and awareness about how rurality affects health and behavior to promote the expansion of PA interventions in rural communities and reduce health-related inequalities linked to rural areas (Bhuiyan et al., 2019). Furthermore, public health policy agendas in rural communities emphasize the need to diversify PA environments, encourage school-based physical education classes, and promote access to team sports during out-of-school hours (Patterson et al., 2015). Similarly, the opinions of participants in our study suggest the need to increase the number of various activities and their promotion among young people. Among rural youth, lack of motivation and self-confidence, distance to activities, and lack of preferred options are identified as the key barriers to PA. In contrast, peer acceptance of activities, prioritisation by family, more education about activities and more excellent gender equality opportunities in activities are highlighted as facilitating factors for PA (Chen et al., 2018). Our study shows that rural youth desire more skills and self-confidence for PA participation, peer acceptance, and a greater variety of activities. Among youth who receive positive peer support for PA, the built environment was reported to have stronger facilitating effects on PA (Loh et al., 2019). This suggests that participation in activities like bocce, which can be played with peers and enjoyed, could help weaken environmental barriers for rural youth. Additionally, motivational factors related to engaging in activity have been shown to influence SB (Kamath et al., 2008). Converting interventions into practice, especially in complex environments with limited resources like rural communities, can be challenging (Meyer, Perry, Sumrall, et al., 2016). Due to its nature, bocce becomes a highly advantageous PA option for rural youth, as it can be played with a small number of inexpensive and easily accessible equipment and does not require highly equipped game facilities or extensive training. The participants' statements further validate this perspective. Additionally, considering participants' perceptions of the health benefits of PA, adverse health effects of SB, their perception of SB as "unhealthy," the awareness effects of playing bocce on SB and PA among youth, and the willingness of most participants to play bocce again, it can be observed that there is an intention for change and motivation for behavior change in the context of behavior change (Ajzen & Schmidt, 2020; DiClemente & Graydon, 2020). We believe bocce could be a preferred option to reduce SB and increase PA among rural youth.

Furthermore, inadequate PA is globally associated with a significant economic burden. The worldwide cost of this situation to healthcare systems is estimated to be around 53.8

billion dollars (Ding et al., 2016). Evidence linking substantial public health benefits and economic gains achievable by increasing PA across populations encourages governments to develop PA policies (Klepac Pogrmilovic et al., 2018). Local governments, policymakers, and funding providers also play important roles here. Supporting cost-effective activities like bocce highlights that with potentially lower investment, these activities might reach even more individuals. Additionally, the feasibility of SB policies is generally lower than PA policies (Klepac Pogrmilovic et al., 2020). This is due to public awareness of potential adverse health outcomes of SB that have only recently started to develop. Steps need to be taken to enhance this awareness. Policies can only be effective when implemented; therefore, national governments should invest in mechanisms that facilitate the better implementation of PA and SB policies and promote their adoption (Klepac Pogrmilovic et al., 2020). Given the significant public health impacts that bocce and similar low-cost and easily accessible activities can bring, supporting them seems essential.

CONCLUSION

To the best of our knowledge, this research is the first qualitative phenomenological study in the literature that investigates the potential of bocce game to enhance PA and SB awareness among rural youth. The research findings indicate that engaging in bocce game during leisure time outside school can effectively promote PA and SB awareness among rural youth. This suggests that bocce game could be an encouraging intervention to foster participation in PA and reduce SB in this population. Consequently, it is believed that bocce game could mitigate potential adverse health outcomes and alleviate a significant burden on public health.

Furthermore, based on the results of our research, we believe that the contribution of bocce in reducing SB and promoting PA among young people living in rural areas should be further disseminated with the support of local governments and policymakers. It is evident that sustainable services supporting PA and targeting to reduce SB are necessary, as young people tend to spend more time in SB compared to active behavior.

Limitations

This study follows a qualitative phenomenological research design, deeply exploring individuals' subjective views. While individuals' perceptions and interpretations of SB and PA are crucial, it can be argued that solely evaluating them might fall short in awareness. Therefore, it might be necessary to complement qualitative data with quantitative data. One

limitation of our research is that we did not conduct objective measurements of young individuals' actual PA and SB levels, relying solely on their perceived levels, including their perceived PA and SB levels during bocce game. Another limitation of the study is that we do not know the current PA levels of the participants. Another limitation is the absence of validated scales in the native language of our chosen population for assessing these measurements.

Given the limited research on SB and PA awareness, many questions remain unanswered. In future studies, it is recommended to conduct mixed-methods research where individuals' objective PA measurements are taken using wearable technologies during bocce game, and subjective qualitative data support these measurements. We also recommend that future research investigate the potential for awareness to lead to behaviour change, investigate different strategies to reduce SB and increase PA awareness among rural youth, and find ways to disseminate these strategies. Particularly in rural areas, it is paramount for local authorities and policymakers to take steps toward providing services that support SB and PA awareness, and to incentivize their promotion.

PRACTICAL IMPLICATIONS

- In young people, reducing sedentary behavior and increasing participation in physical activity remains a critical issue.
- The multifactorial nature of rural areas affects individuals' physical activity habits and sustainable strategies are needed to promote sedentary behavior and physical activity awareness among rural youth.
- This research covers various aspects of physical activity, sedentary behavior, and perceptions of the bocce game activity that may affect sedentary behavior and physical activity awareness.
- The study results indicated that out-of-school time bocce for rural youth is an intervention that improves awareness of sedentary behavior and physical activity and encourages participation in physical activity and reduction of sedentary behavior.
- It seems essential for local authorities and policymakers to produce and promote services that support sedentary behavior and physical activity awareness, especially in rural areas.

Acknowledgements

The authors extend their gratitude to TÜBİTAK and the participants of this study. This study was funded by the TÜBİTAK (The Scientific and Technological Research Council of Türkiye) under Grant (Number: B.14.2.TBT.0.06.01.00-221-249164). The funding organization had no role in the study design, data collection, analysis, interpretation of data, writing of the manuscript, or decision to publish.

Authors' contribution

Author BNE conceptualized and designed the study, analyzed and interpreted the data, critically revised the manuscript, and wrote the article. Authors (BNE, HK, Mİ, EK, and CK) conducted interviews and reviewed interview transcripts. All authors (BNE, HK, HG, Mİ, EK, and CK) approved the final manuscript. Furthermore, BNE and Mİ provided funding, and HK entered the data into NVivo. HG translated the article into English.

Conflict of interest declaration

The authors have no conflicts of interest to report.

Ethics Statement

This study was reviewed and approved of by the Ankara University Ethics Committee (Approval Number: 56786525-050.04.04/580730)

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