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Has the COVID-19 pandemic led to permanent persistent changes in recreational activity? A case study of a municipal beach

Adam Senetra[1, CDPMR], **Agnieszka Szczepańska**[2, CDFMR]

[1,2]*University of Warmia and Mazury in Olsztyn,* Department of Socio-Economic Geography, 10-724 Olsztyn, Poland, e-mail: adam.senetra@uwm.edu.pl (*corresponding author*); e-mail: aszczep@uwm.edu.pl

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Abstract. Recreational areas in cities deliver numerous social, health and environmental benefits for local communities. They are a desirable element of the urban structure that influences the quality of life. The response to the COVID-19 pandemic, an unprecedented health crisis on a global scale, initially prevented and then significantly limited the use of recreational areas. The pandemic decreased daily activity levels, induced changes in lifestyle and significantly compromised people's ability to engage in outdoor recreation. In the process of lifting lockdown restrictions, recreational areas play a special role in combatting the consequences of social isolation and restoring access to public spaces. The present study was undertaken to assess the recreational activities of urban dwellers during the COVID-19 crisis. The pandemic's effect on the leisure behaviour of residents in the Polish city of Olsztyn was evaluated on the example of a sports and recreational centre on Lake Ukiel. The visitor traffic register and the centre's financial performance were analysed, and a diagnostic survey targeting local residents was conducted online. The results point to a clear decline in the local community's recreational activities as well as changes in the form and place of recreation.

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1. Introduction

Leisure time is a reflection on quality of life and level of civilisational advancement, and it is one of the factors that drive the demand for recreational areas in cities. Green and blue spaces are the main suppliers of recreational services in urban areas (Subiza-Pérez et al., 2020). Urban recreational areas include parks, municipal forests, sports facilities, beaches and playgrounds (Mokras-Grabowska, 2018; Li et al., 2017). Daily recreation enhances well-being, physical and mental health, and human relations. It is also a source of entertainment that caters to the preferences of various user groups.

The supply of recreational functions and facilities that enable freedom of movement, enhance life satisfaction and well-being, improve mental regeneration, and provide a sense of local identity is on the rise in cities (Addas et al., 2021; Ernstson, 2013; Subiza-Pérez et al., 2020; Maciąg et al., 2018). These services and facilities cater to the growing demand for active recreation that does not require travel outside the place of residence (Rung, 2011; Suárez et al., 2020). In modern societies, people spend most of the day at work, which is why recreation, personal development, and physical and mental regeneration are essential for the maintenance of a healthy work–life balance. Recreational areas are highly desirable components of the urban structure that deliver numerous environmental, social and economic benefits.

The COVID-19 pandemic is an unprecedented global health crisis (Stier et al., 2020). Restrictions were implemented in numerous countries to limit virus transmission and protect public health (Hall, 2021; Musselwhite et al., 2020). This global biological threat has compromised the sense of security, which is a fundamental human need (Bogacka, 2021; Kang et al., 2021; Bao et al., 2020; Maslow, 1954). The pandemic dealt a severe blow to the tourist industry, whose performance declined during successive lockdowns (Bustos et al., 2021). Citizens' rights to active recreation, including tourism and sports, were violated on an unprecedented scale for peacetime (Baum & Hai, 2020). The world became embroiled in a social and economic crisis, and in many countries, attempts are being made to revive the tourist sector without abandoning sanitary measures (Gössling et al., 2021).

The behaviour of urban residents visiting recreational areas has changed considerably during the COVID-19 pandemic. Remedy measures were implemented on an unprecedented scale, and they inhibited all types of human activity, including in recreational areas (Ugolini et al., 2020). Public spaces became deserted in the early phases of the lockdown. Access to recreational areas was restricted, which decreased daily activity levels (Rexhepi et al., 2021). Travel restrictions limited access to recreation, work and other daily destinations (Nikitas et al., 2021). The amount of time people spent outdoors decreased visibly during the pandemic, especially in cities (Rice et al., 2020). The above poses serious cause for concern, because outdoor physical activity plays a very important role in the prevention of health problems associated with a sedentary lifestyle (Kane et al., 2021; Sallis et al., 2020).

The lockdown limited the role of public green spaces and recreational areas in promoting a healthy lifestyle and restoring urban residents' physical and mental health during the crisis (Samuelsson, 2020). Over time, people grew accustomed to the new reality, and many of them are gradually returning to pre-pandemic levels of activity. According to the literature on combatting the global health crisis, the risk of virus transmission is lower in outdoor than indoor environments. In outdoor areas, regular air flow disperses and dilutes infectious respiratory aerosols (Nishiura et al., 2020; Qian et al., 2020). Therefore, open spaces play a very important role in combatting the negative consequences of social isolation. The closure of sports and recreational facilities in densely populated cities has spurred the search for new forms of physical activity. Public green spaces, parks, pocket parks, beaches and other recreational areas create ample opportunities for physical activity. The initial stages of the lockdown caused major lifestyle disruptions, but recent months have witnessed a massive increase in outdoor activities (Venter et al., 2020). The pandemic has induced changes in the use of urban public spaces, and these processes will influence the design and use of open areas in the future (Fabisiak et al., 2020; Honey-Roses et al., 2020; Sallis et al., 2020).

The present study contributes to the research on the recreational activities of urban residents

during the lockdown. The aim of the study was to assess the influence of the COVID-19 pandemic on the recreational behaviour and activities of urban dwellers on the example of the Polish city of Olsztyn. Olsztyn is a medium-sized city and a regional capital whose natural beauty and unspoiled landscapes promote all types of recreational activities. The pandemic's effects on the use of public spaces were analysed on the example of a municipal beach and in the social and economic context.

Coastal zones along the shores of seas and inland waters are ecosystems that are subjected to the highest levels of tourist pressure. Tourist amenities, recreational areas and sports facilities occupy large swathes of land in highly urbanised tourist destinations (Aguilera 2020). Roads, car parks and tourist services (restaurants, equipment rentals, amphitheatres) lead to considerable fragmentation of natural habitats (Burak et al., 2004). Public beaches are vastly transformed areas that contribute to soil degradation. However, attractive recreational facilities that meet tourists' needs and expectations are a source of income for cities with municipal beaches (Aragonés et al., 2017; Davenport and Davenport, 2006).

Municipal beaches attract both tourists and local residents on account on their aesthetic appeal and variety of recreational options. These sites have to be provided with the necessary infrastructure. The structure of visitor traffic and the visitors' needs are analysed by public site administrators to determine infrastructure requirements and to promote the growth of urban areas and tourist destinations (Teles da Mota & Pickering, 2021). Urbanisation transforms coastal landscapes, and municipal beaches are among the most popular recreational sites (Luijendijk et al., 2018; Zhang et al., 2015). The availability of service and sports infrastructure determines the type of tourist attractions offered by municipal beaches (Dodds & Holmes, 2019; Maguire et al., 2011). These improvements not only induce changes in coastal landscapes, but they also require effective strategies for planning recreational activities (Retka et al., 2019; Dominguez-Tejo et al., 2018).

During the COVID-19 pandemic, a new threat to public health emerged in overcrowded beaches in large cities. Plastic waste on beaches has been studied extensively (Gao et al., 2021; Razeghi et al., 2021; Acosta-Coley & Olivero-Verbel, 2015). However, the current health crisis has created a new health hazard associated with discarded personal protective equipment such as face masks. Medical waste has a highly negative impact on aquatic ecosystems (De-la-Torre, 2021), and it also affects inland beaches and groundwater (Ryan et al., 2020; Eriksen et al., 2018).

2. Materials and methods

2.1. Research site

Olsztyn is a medium-sized city in north-eastern Poland, and it is the capital of the Region of Warmia and Mazury (Fig. 1). In 2020, Olsztyn had an area of 8,833 ha and a population of 171,853.

Olsztyn has a unique land-use structure, where green and blue infrastructure accounts for more than 33% of the city's area, including water bodies (approx. 10%), forests, wooded areas and shrubs (more than 23%). Recreational areas occupy around 3% of the city's area, and farmland (mostly allotment gardens) accounts for 24% of the urban land-use structure. As a result, Olsztyn has a vast potential to develop tourist and recreational services for local residents and tourists.

Eleven lakes each larger than 1 ha (with a combined shoreline length of 54,361 m and a combined area of 725 ha) and three rivers (the Łyna, the Wadąg and the Kortówka) are located within Olsztyn's administrative boundaries, and they are highly valuable landscape components that enhance the city's tourist appeal. Olsztyn also abounds in small permanent and seasonal water bodies (approx. 200). Urban forests, including the Municipal Forest, and small forest patches in downtown Olsztyn occupy a total area of 1,283 ha. The Municipal Forest spans an area of 1,054.7 ha within Olsztyn's administrative boundaries and constitutes a unique urban habitat on the European scale. According to statistical data, the city also features 18 recreational parks (with a combined area of 103 ha), 66 pocket parks (33 ha), roadside greenery (177 ha) and residential greenery (214 ha). Unmanaged green spaces include meadows in river valleys and around lakes, as well as allotment gardens

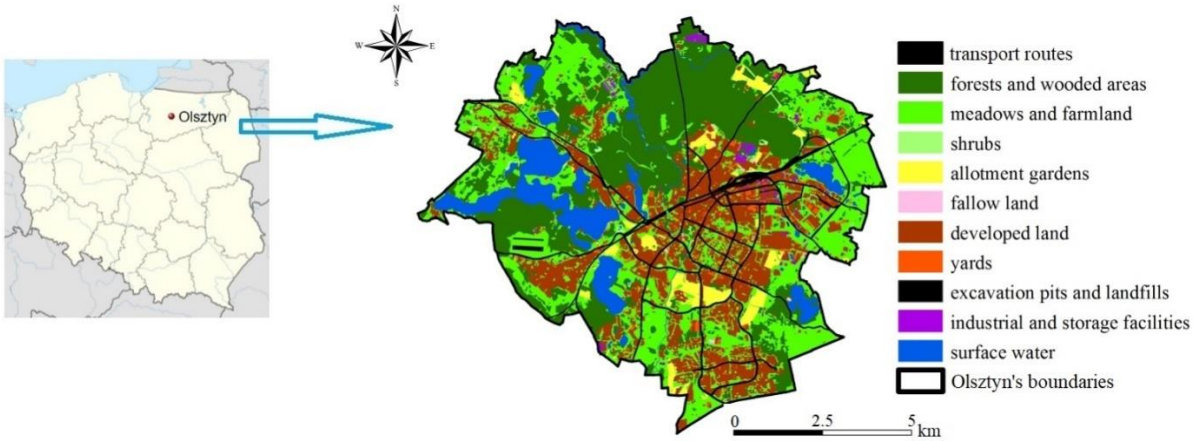

Fig. 1. Location of Olsztyn on a map of Poland and the spatial distribution of structure of land use
Source: own elaboration

Fig. 2. Lake Ukiel in Olsztyn
Source: own elaboration

that form green enclaves between residential areas. The largest number of lakes is found in the western part of the city, and northern Olsztyn is most abundant in forests (Fig. 1).

Lake Ukiel is the largest water body in Olsztyn (Fig. 2). The lake has an area of 412.0 ha, a maximum depth of 43 m and a shoreline length of 22.5 km. Lake Ukiel belongs to water quality class II.

According to the Resolution of the Olsztyn City Council No. XX/348/20 of 29 April 2020 on public bathing areas in Olsztyn Municipality, there are two organised public beaches on Lake Ukiel. The Municipal Beach on Lake Ukiel was established in 1928 or 1932 (Gadomska, 2006), and it is the only historical public bathing area that has survived to this day.

In 1942, a local plan for managing the area around Lake Ukiel was developed to harness the lake's considerable tourist and recreational potential (Gadomska, 2006). Public facilities on the lake shore were overhauled in modern times as part of a comprehensive development plan. The project entitled "Construction of year-round sports and recreational infrastructure on Lake Ukiel in Olsztyn" received financial support from the European Regional Development Fund under the *Regional Operational Program of the Voivodeship of Warmia and Mazury for 2012–2014* (Measure 2.1. Promotion of tourism). The total cost of the project was PLN 63,022,976.61, and the EU contribution was PLN 22,108,374.85.

In December 2009, an architect studio was selected in a competition to design tourist infrastructure for the municipal beach on Lake Ukiel. The winning design had to feature:

- a cohesive urban development plan for the area around Lake Ukiel that creates safe and convenient access to the lake for Olsztyn residents and tourists;

- a spatial development concept for recreational and sports facilities around Lake Ukiel, with special emphasis on water sports infrastructure for members of the general public as well as sports clubs and training centeres;
- solutions for designing attractive buildings and recreational architecture on the lake shore;
- design solutions for managing the surface of the lake.

On 27 January 2010, Olsztyn City Council passed a resolution implementing the development project on Lake Ukiel. These efforts gave rise to the year-round Ukiel Sports and Recreation Centre, the Kayaking Centre, and the Water and Ice Sailing Centre. The municipal beach features restaurants, recreational facilities (beach volleyball courts, playgrounds, promenades, cycle paths, a pier, an indoor volleyball court, a squash court, a gym, equipment rental, viewing platforms, sailboat docks, recreational platforms), a marina with water-sports equipment rental, a kayaking centre, a harbourmaster's office, city guard and police stations, lifeguard stations and car parks. Numerous sports events (such as the FIVB Beach Volleyball World Tour 2015) and cultural events (such as Olsztyn Green Festival) are staged on Lake Ukiel. Hotels have been built along the shoreline (the 4-star Przystań Hotel & Spa, the 4-satr Tiffi Boutique Hotel, the 3-star Hotel Omega, Pensjonat u Jacka).

Due to the implementation of the above project, the Sports and Recreation Centre in Olsztyn was required to monitor daily visitor traffic (number of people entering and leaving the municipal beach) between 2015 and 2020. Photographs illustrating the evolution of the municipal beach on Lake Ukiel over the years are presented in Figure 3.

Besides the subject of the study, activities that aim at managing the coastal shore were taken concerning the other lakes (Lake Skanda and Lake Długie) as well as the Łyna River. A beach at Lake Skanda, also in Olsztyn, has been also upgraded. The project, which was implemented in 2018, was financed with funds from Olsztyn's Participatory Budget. According to the project documentation, the investment aimed at developing the City Beach

Fig. 3. Municipal Beach in Olsztyn in 2021
Source: own elaboration

area and tidying up the area in order to obtain a clean urban-planning design that exploited the topography, the scenic features, the existing greenery complexes, and the opening to the beach area and picturesque lake. The works covered the following issues: transport of sand to the beach, allocation of a bathing area for children and swimmers, construction of a floating platform, construction of a beach volleyball court including viewing tribunes, construction of transport routes with stairs, construction of a camping shelter with barbecue, installation of land development components, installation of lighting and monitoring systems, and greenery plantings. Furthermore, the development of the Lake Długie shores is another example of an upgrading project. In 2012, around the lake, a walking and cycling route was established, owing to which footpaths, benches, deckchairs and a footbridge across the lake are now available to inhabitants. Another example of water management is the development of the Łyna River financed by the *Regional Operational Programme for Warmińsko-Mazurskie Voivodeship*. The project included the construction of a system of recreational paths with accompanying infrastructure on the Łyna River banks, within the boundaries of and just outside the Central Łyna River Valley Protected Landscape Area, or the so-called "Łynostrada" (Szczepańska et al., 2021).

2.2. Methodology

The research included several basic stages. In the first stage, data concerning visitor traffic and the financial report connected with the management of the municipal beach on the Lake Ukiel were taken from the Sport and Recreation Centre in Olsztyn. In the meantime, an online survey was conducted among the inhabitants of Olsztyn. Having collected the data from the above-mentioned sources, basic statistical analyses were conducted. The analyses concerned the frequency of occurrence of the analysed phenomena, the correlation between them, and the distribution of variables. The results have been presented in graphic form.

2.2.1. Diagnostic survey

An online survey was carried out between 10 March 2021 and 12 April 2021 with the use of the Microsoft Forms survey creator. A total of 158 respondents, including 120 women and 38 men, participated in the survey. Questionnaires were distributed randomly on social media platforms.

The aim of the survey was to determine local users' preferences regarding the municipal beach, and particularly:

- frequency of visits to the municipal beach (before and during the pandemic),
- means of transport to reach the municipal beach (before and during the pandemic),
- the influence of lockdown restrictions on the form and frequency of visits, selected activities and attractions (restaurants, bathing area, water sports equipment rental, sports courts and facilities),
- changes in the respondents' recreational activities,
- other activities, lifestyle changes and financial decisions (resettlement to a suburban area, purchase of a holiday home) resulting from lockdown restrictions and anxiety-related behaviours during the pandemic.

The questionnaire was designed to evaluate changes in local residents' behaviours linked with epidemic risks. The results were processed to formulate conclusions about anxiety levels in the local population and their impact on the use of the most popular recreational area in the city.

2.2.2. Linear correlation coefficient

The correlations between the number of visitors, month, day of the week and temperature were analysed. Significant correlations were determined by calculating Pearson's linear correlation coefficient with the use of Equation 1:

$$r = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2}\sqrt{\sum_i (y_i - \bar{y})^2}} \quad (1)$$

where: x, y – random variables.

The linear correlation coefficient measures the strength of the relationships between variables. The strength of the evaluated relationship is gauged from the absolute value of the correlation coefficient. The sign of the correlation coefficient (+/-) defines the direction of the relationship.

2.3. Data sources

2.3.1. Visitor traffic records kept by the Sports and Recreation Centre

Visitor traffic was monitored by the Sports and Recreation Centre in Olsztyn, which manages the municipal beach on Lake Ukiel. Visitor traffic was monitored between 1 August 2015 and 12 June 2020, i.e. for a total of 1,778 days (1,665 days, excluding public holidays and mass events). Before the first lockdown was implemented, visitor traffic had been monitored for 1,688 days between 1 August 2015 and 14 March 2020 (1,580 days, excluding public holidays and mass events). These records are a valuable source of information about the activity levels of Olsztyn residents. The monitoring programme was discontinued in mid-2020, when the number of COVID-19 infections peaked. The system's continued operation could have provided highly interesting data about local residents' recreational behaviour during the pandemic.

Visitor traffic records include the daily number of visitors who entered and left the municipal beach and the maximum daily temperature.

2.3.2. Financial performance of the Sports and Recreation Centre in Olsztyn

The financial report of the Sports and Recreation Centre in Olsztyn for 2019 and 2020 was analysed to determine changes in the number of people visiting the municipal beach on Lake Ukiel. The report lists the revenues generated through different types of recreational activities based on, among others, ticket sales data and the number of concluded rental contracts. The revenues generated by both indoor (sports courts, gym) and outdoor facilities (sports courts, ice-skating rink, water-sports equipment rental shop) were analysed. The financial report presents the revenues generated through: ticket sales; hiring of sports and service facilities; advertising; mass events; rental of sports equipment; and lease of land, piers, recreational platforms and sailboat docks.

3. Results and discussion

3.1. Analysis of visitor traffic

In Poland, the first confirmed case of COVID-19 infection was reported on 4 March 2020. A state of epidemic threat was declared between 14 and 20 March, and pursuant to a Regulation of the Minister of Health, Poland was in a state of epidemic emergency as of 20 March 2020. The Regulation of the Minister of Health of 24 March 2020 imposed restrictions on travel, public gatherings and access to public spaces, and it limited direct human contact. The most stringent restrictions were in place before 20 April, and most public spaces remained closed during that period. The restrictions were gradually lifted, and public spaces were reopened without abandoning sanitary measures.

The number of people visiting the municipal beach on Lake Ukiel is presented in Figure 4 and Table 1. Visitor traffic had been fairly stable before the lockdown, and it was generally highest in spring and summer months. However, a clear decrease in the number of visitors was noted in the corresponding months of 2020.

In 2020, visitor traffic was very low relative to the corresponding months in previous years. In April 2020, fewer than 3,000 people visited the municipal beach, whereas the average for that month usually exceeded 65,000 before the lockdown. Visitor traffic was somewhat revived in May (12,000), but it was still very low relative to the pre-pandemic average. The decline in visitor traffic resulted not only from lockdown restrictions, but also from fear of infection. The results of the questionnaire indicate that many respondents chose not to visit recreational sites that attracted large groups of people. Similar observations were made in other studies that have demonstrated a decline in the distance travelled to participate in outdoor recreation and changes in recreational activity patterns during the lockdown (Rice et al., 2020; Tufan & Kayaaslan, 2020).

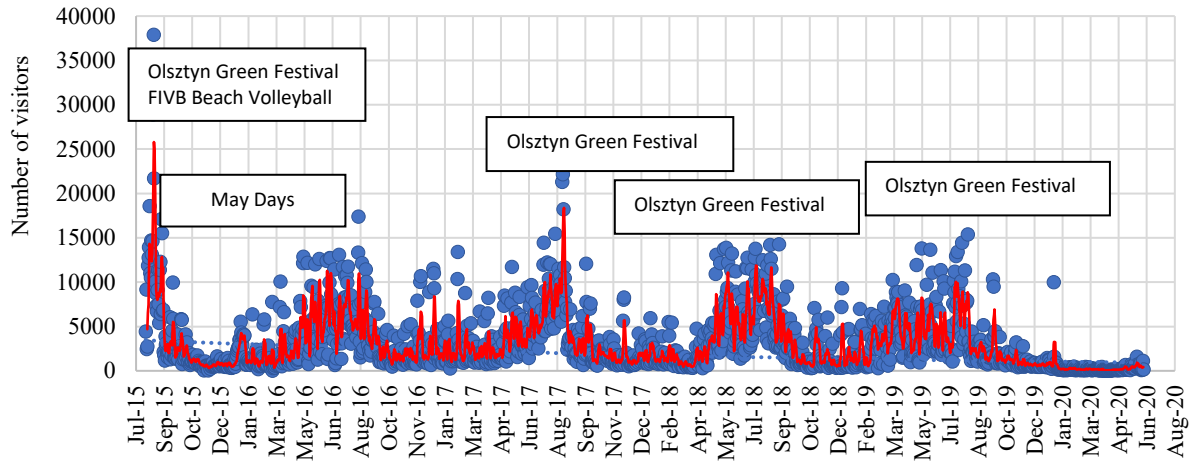

Fig. 4. Visitor traffic at municipal beach between 2015 and 2020
Source: own elaboration based on data from the Sports and Recreation Centre in Olsztyn

Air temperature directly influenced the frequency of visits to the Ukiel Sports and Recreation Centere (Fig. 5). Temperature affects the use of tourist and recreational facilities, and exerts an impact on recreational behaviours.

An analysis of tourist traffic on different days of the week did not reveal significant correlations between day and visitor turnout (Fig. 6). The number of visitors was only somewhat higher on weekends (Saturday and Sunday) and Mondays than on other days of the week.

A monthly analysis demonstrated that visitor traffic was most highly correlated with the day of the week in June and September (Fig. 7). This observation indicates that recreational behaviours are more likely to be linked with the day of the week in warm seasons of the year (visitor traffic was highest on Saturdays, Sundays and public

Table 1. Monthly visitor traffic to municipal beach between 2015 and 2020

	2015	2016	2017	2018	2019	2020	Mean 2016-2019	Median 2016-2019	Standard deviation 2016-2019
Jan.		65 184	64 932	55 191	60 915	21 471	61 556	62 924	4 046
Feb.		43 552	84 328	47 818	77 904	5 725	63 401	62 861	17 924
Mar.		51 101	66 353	27 188	144 217	5 722	72 215	58 727	43 852
Apr.		68 414	73 287	53 174	129 210	2 647	81 021	70 851	28 794
May		177 378	140 535	174 167	163 468	11 910	163 887	168 818	14 432
June		209 601	134 935	180 873	138 235		165 911	159 554	31 057
July		200 741	237 793	229 704	199 807		217 011	215 223	16 983
Aug.	375 051	187 276	252 202	229 058	100 182		192 180	208 167	57 988
Sept.	88 246	93 282	98 300	126 238	75 356		98 294	95 791	18 249
Oct.	58 395	54 343	58 422	32 096	41 737		46 650	48 040	10 413
Nov.	18 658	65 233	61 449	62 573	24 500		53 439	62 011	16 764
Dec.	22 902	106 129	39 688	45 958	21 677		53 363	42 823	31 742

* mean, median and standard deviation were calculated for 2016–19. These parameters were not computed for 2015 (when the beach was opened and mass events were organised) and 2020 (when lockdown restrictions were imposed and the traffic monitoring programme was discontinued).
Source: own elaboration based on data from the Sports and Recreation Centre in Olsztyn

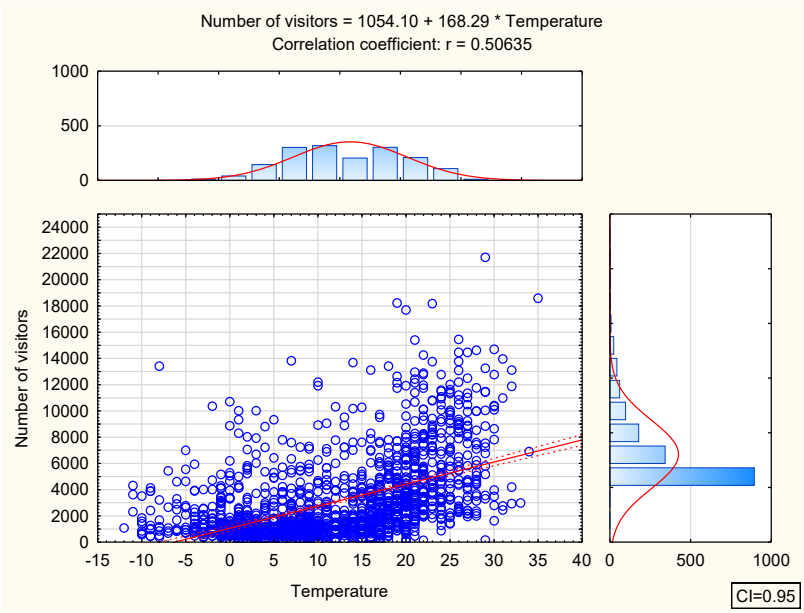

Fig. 5. Correlations between air temperature and number of visitors at municipal beach
Source: own elaboration

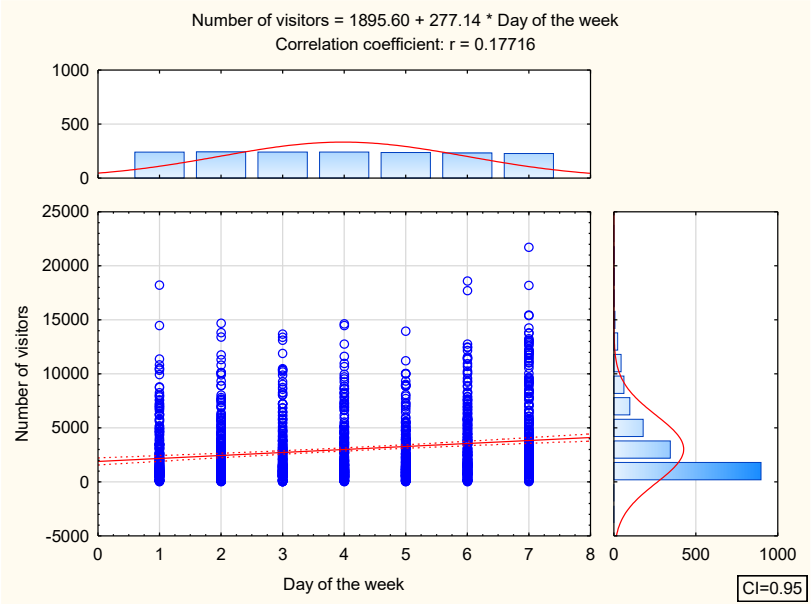

Fig. 6. Correlations between day of week and visitor traffic at municipal beach
Source: own elaboration

holidays). This correlation was much weaker in colder months (when visitor traffic declined) and during the summer holiday months (July and August). In summer, during the holiday season, weekends and public holidays play a less important role. The highest values of the correlation coefficient were noted in June (0.44) and September (0.40), which are the warmest months of the year outside the summer holiday season.

3.2. Analysis of financial data

In 2020, the total revenue of Ukiel Sports and Recreation Centre decreased by around 6%, and ticket sales decreased by around 30% relative to 2019 (Fig. 8). The greatest decline was noted in the proceeds from renting conference rooms, training facilities, the squash court, the volleyball court, and cross-country skiing equipment (first due to

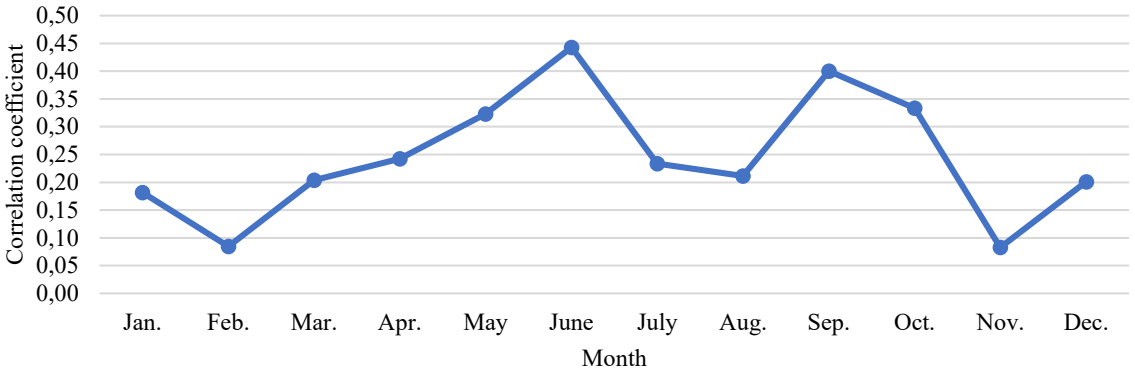

Fig. 7. Correlations between day of week and visitor traffic in different months, 2015–2020
Source: own elaboration

the lack of snow, and later due to the lockdown). However, the centre reported an increase in revenues from other rental services, including recreational platforms (visitors preferred to remain outdoors), commercial space, sailboat docks, water sports equipment (kayaks, sailboats, pedal boats) and outdoor game equipment. In a quantitative approach, the greatest increase was observed in rental fees for commercial space, outdoor sports courts and water sports equipment, i.e. recreational activities that take place outdoors.

The sale of tickets to the ice-skating rink, squash court, playground and volleyball court declined by around 20%. A similar decrease was noted in equipment rental proceeds (Fig. 9), which directly resulted from the lower number of visitors. Ticket prices and rental fees increased to cover the cost of disinfecting facilities and equipment after each use. Restrictions were imposed on the number of people renting boats or facilities; therefore, prices and fees were increased to compensate for the decline in the number of sale and rental transactions.

3.3. Analysis of questionnaires

A total of 158 respondents participated in the survey. The respondents were divided into the following age groups: 18–25 – 44 persons, 26–35 – 38 persons, 36–45 – 32 persons, 46–55 – 32 persons, and 56–65 – 12 persons. None of the respondents was older than 65, which could be attributed to the fact that

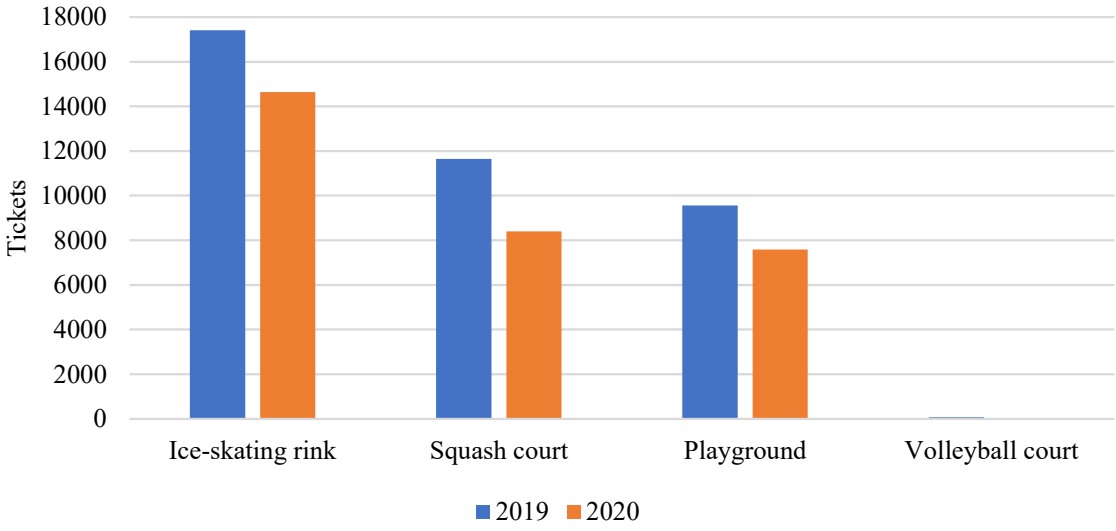

Fig. 8. Ticket sales at sports facilities
Source: own elaboration based on data from Sports and Recreation Centre in Olsztyn

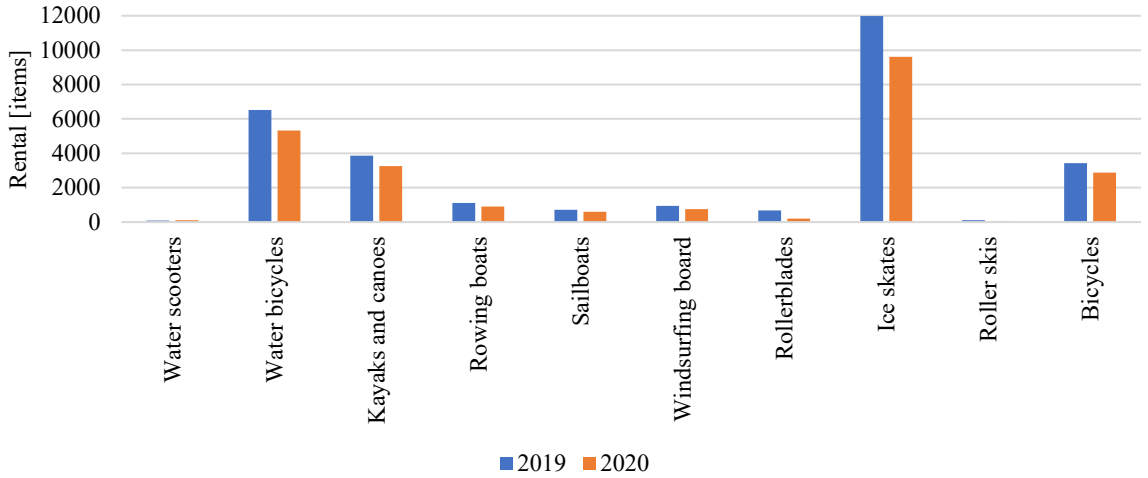

Fig. 9. Rentals of sports and recreational equipment
Source: own elaboration based on data from Sports and Recreation Centre in Olsztyn

the majority of Polish seniors do not access the Internet or electronic forms of communication.

An analysis of the questionnaires revealed that the frequency of visitors to the municipal beach decreased considerably, particularly in autumn and winter months. The percentage of respondents who ceased visiting the analysed site increased markedly (Fig. 10). The greatest decline was observed during the lockdown, which indicates that members of the public were aware of the existing health risks and that their recreational behaviours and choice of recreational activities changed during the pandemic (which was also confirmed by the analysis of visitor traffic records). The pandemic exerted similar, negative effects on various forms of active recreation, including fishing (Horwath et al., 2020), visits to public green spaces and playgrounds (Slater et al., 2020; Razani et al., 2020; Freeman & Eykelbosh, 2020), walking and cycling (Musselwhite et al., 2020), and wildlife observation (Randler et al., 2020) around the world.

Considerable changes were also observed in the means of transport used to reach the municipal beach (Fig. 11). Public transport ridership rapidly declined, and more people switched to bicycles as a safer mode of transport during the pandemic. Cyclists can adhere to social distancing rules and cross long distances without coming into contact with other people in the confined space of public transport (Musselwhite et al., 2020; Freeman & Eykelbosh, 2020).

The responses to the question regarding the manner and frequency of using the facilities and

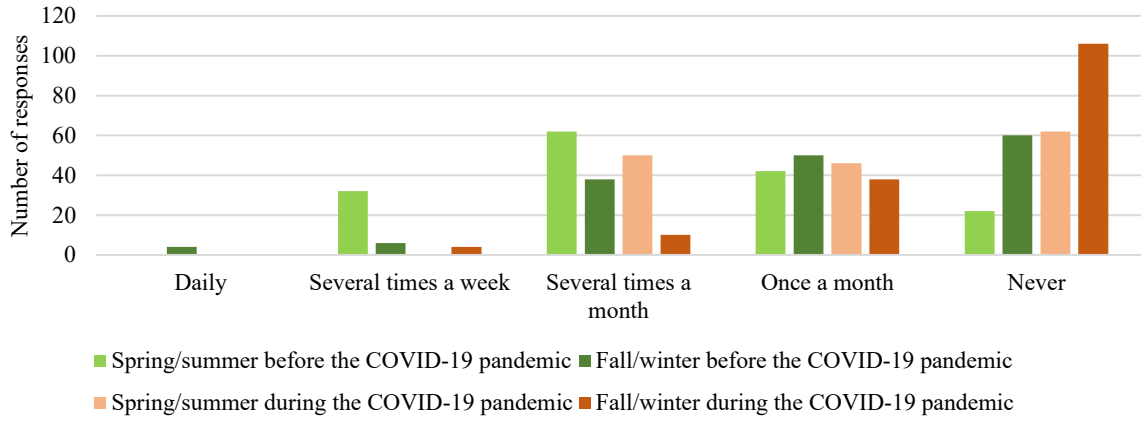

Fig. 10. Frequency of visits to municipal beach
Source: own elaboration

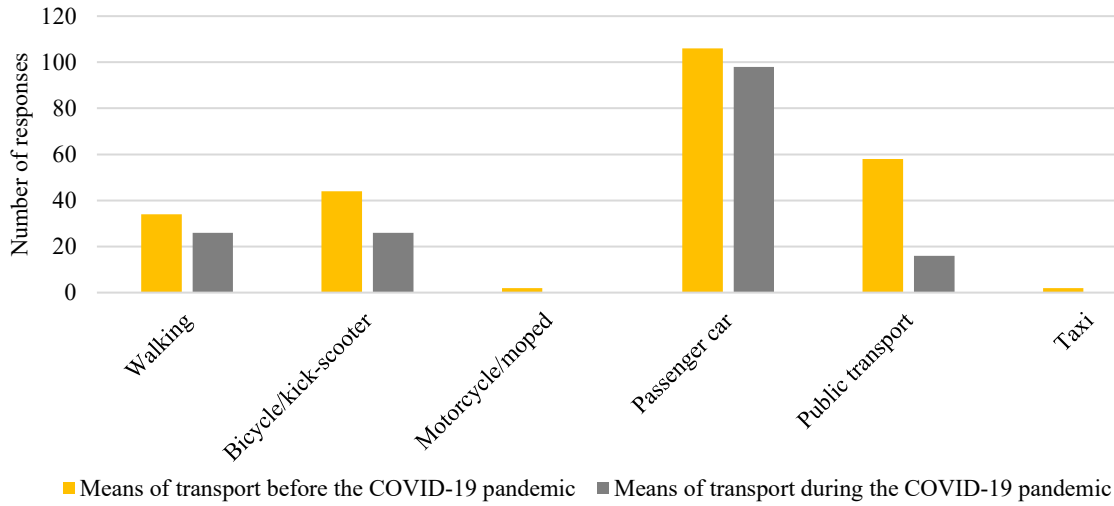

Fig. 11. Means of transport to municipal beach
Source: own elaboration

attractions at the municipal beach were graded on a scale of 1 to 5 points, where 1 point implied that the pandemic had no influence, and 5 points denoted that the pandemic had a strong influence on the manner and frequency of using these facilities. Therefore, the grading scale enabled the respondents to subjectively evaluate the pandemic's effect on recreational choices. The results indicate that the COVID-19 pandemic strongly influenced the respondents' recreational behaviours, particularly visits to restaurants (Fig. 12). According to 13% of the surveyed subjects, the pandemic had no influence on how often they used the facilities at the municipal beach, and according to 62%, it had a strong or very strong impact. The overall results suggest that epidemic risks significantly affected the respondents' recreational choices and behaviours in the studied site. These findings can be used to formulate recommendations for managers of municipal beaches. By introducing sanitary measures, recreational facilities could improve public perceptions of safety, attract more visitors and aid financial recovery from the pandemic (Milanes et al., 2021; Pereira et al., 2021).

It should be noted that the safety measures introduced and user behaviours significantly influence decisions to visit the municipal beach and visit frequency (Fig. 13). In this question, the respondents also gave their answers on a scale of 1 to 5 points. This observation clearly indicates that sanitary measures and clear signage in outdoor recreational facilities can help the authorities and site managers to effectively minimise health threats (Clark, 2020). At the same time, these efforts should promote the return to pre-pandemic normalcy (Kane et al., 2021).

The pandemic exerted the most profound effect on the frequency of visits to restaurants. This observation can be attributed to lockdown restrictions, government recommendations, and reluctance to visit indoor premises and come into direct contact with catering equipment and furnishings. The health crisis had an equally strong impact on outdoor activities involving equipment that is disinfected after each use. It should also be noted that temperatures during the summer months significantly minimise the risk of COVID-19 transmission (Carducci et al., 2020) (Fig. 14).

The respondents who ceased visiting the municipal beach during the lockdown pursued recreational activities at home (home, allotment garden, holiday cottage – 40%) and other quiet and less visited destinations in natural surroundings (30%). Other leisure time activities involved trips to rural areas (20%) and other destinations, including forests and lakes (2%). It should be noted that 4% of the respondents purchased land plots for building a house or for recreational purposes. The pandemic encouraged many people to invest in land, and to change their lifestyle and place of residence. The movement to suburban or rural locations was also intensified in other countries during the pandemic.

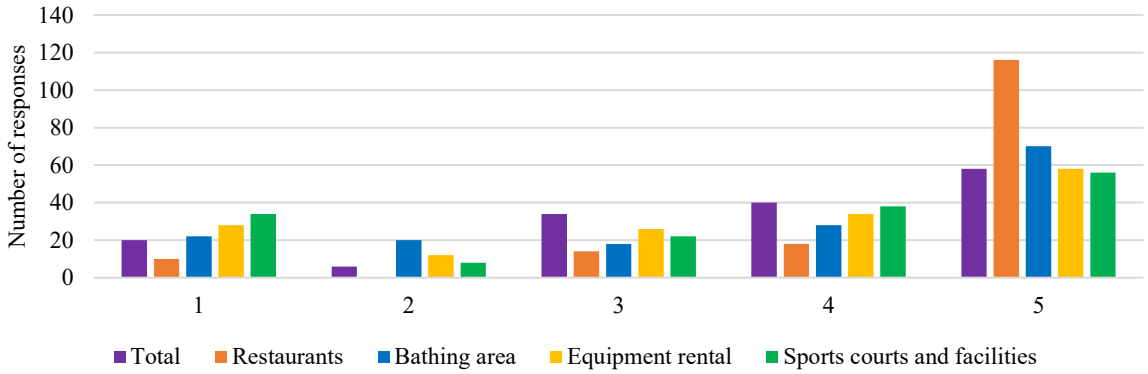

Fig. 12. Manner and frequency of use of facilities and attractions at municipal beach
Source: own elaboration

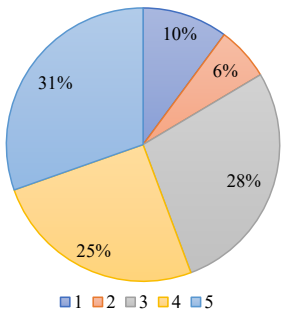

Fig. 13. Influence of implemented safety measures and user behaviours on decisions to visit municipal beach and on visit frequency
Source: own elaboration

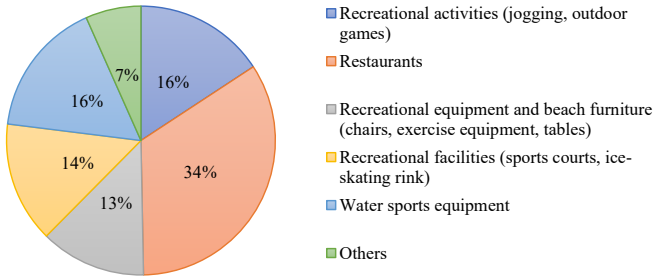

Fig. 14. Changes in recreational activities and the use of recreational facilities.
Source: own elaboration

The prices of construction and recreational land and of suburban homes increased, and the supply of these types of property decreased (Balemi et al., 2021; D'Lima et al., 2020). The epidemiological crisis prompted an interest in safer and more user-friendly environments. These trends are likely to persist after the pandemic, and more people will work, study and spend their free time outside their urban homes. The interest in open spaces and atypical work schedules will persist when the pandemic ends (De Toro et al., 2021). The trends

Table 2. Average prices of construction plots in Polish regional capitals

City	Q3 2019 [PLN/m²]	Q3 2020 [PLN/m²]	Quarter-over-quarter [%]	Year-over-year [%]
Wrocław	384.1	383.4	+0.3	-0.2
Lublin	279.4	288.1	+2.8	+3.1
Łódź	221.4	236.6	+6.0	+6.8
Kraków	428.7	495.8	+5.4	+15.7
Warsaw	697.7	775.0	+4.5	+11.1
Gdańsk	558.0	551.8	+0.9	-1.1
Olsztyn	**291.4**	**323.3**	**+6.3**	**+10.9**
Poznań	369.6	362.3	-5.5	-2.0

Source: Report on real- estate prices, Bankier.pl, PulsBiznesu, Cenatorium.
https://www.bankier.pl/wiadomosc/Ceny-transakcyjne-dzialek-budowlanych-III-kw-2020-r-Raport-8018057.html

noted on the Polish real-estate market confirm this observation (Table 2).

The respondents were also asked to indicate the locations where they pursued recreational activities during the lockdown. Forty percent of the surveyed subjects relaxed at home, allotment garden or holiday cottage, and 30% - in other quiet and less visited destinations in natural surroundings.

4. Conclusions

The results of the study indicate that the COVID-19 pandemic has induced significant changes in many aspects of social life. The pandemic not only led to a health, economic and social crisis, but it has also irreversibly transformed personal habits and the behaviour of entire societies. Travel restrictions, sanitary measures, social isolation, closure of industrial plants and public service facilities, and omnipresent health risk messages significantly increased anxiety levels in the initial stages of the pandemic. Outdoor recreation and sports were among the most affected daily activities. Active recreation requires equipment and facilities that are accessible to the general public, and it often takes place indoors.

The pandemic-induced changes in the way people use public spaces are likely to persist after the current health crisis, and they will influence public space design in the future, particularly in cities. The popularity of outdoor recreation and sports increased, but social distance is difficult to maintain in crowded urban areas. Many people live in fear of the next global pandemic and another lockdown. The current health crisis will probably permanently change people's perceptions of public spaces as oases of active recreation and sports (Florida, 2020; Choi, 2021). The results of this study confirm that urban dwellers and authorities are eager to return to pre-pandemic normalcy. Attempts are being made to increase social distance by limiting the number of visitors at tourist attractions and introducing changes in the management of recreational facilities. The pandemic has also affected the financial performance of recreational service providers. Higher prices and service fees have decreased visitor pressure on public spaces and recreational equipment, and they enable entrepreneurs to avoid financial bottlenecks. The implemented solutions can prevent the loss of jobs and financial problems in the sports and recreation sector, and they can help revive the catering industry, which suffered most during the lockdown.

According to many scientists, the next pandemic is only a matter of time (Honey-Roses et al., 2020). Therefore, the behaviours associated with public space use have to be radically changed in order to effectively cope with future health crises. Such changes are also required in workplaces, public administration offices, common areas in residential estates, sports facilities, retail outlets, restaurants, tourist facilities and public transport. Despite lockdown restrictions having been temporarily lifted on several occasions, public perceptions of safety have been enduringly compromised. The present study demonstrated that the pandemic prompted many people to limit social interactions and change their daily routines. Public health awareness increased in cities. Many urban dwellers moved to suburban or rural locations, purchased construction and recreational land outside cities, and pursued recreational activities in less crowded parts of the city.

The management and organisation of the municipal beach in Olsztyn require further changes. Olsztyn features several dozen lakes and extensive forests (including the Municipal Forest with an area of 1,415.87 ha), most of which are deficient in tourist and recreational facilities. Many of the existing facilities are outdated and do not meet modern requirements. These sites should be upgraded and provided with recreational and sports equipment similar to that introduced on the municipal beach. This solution will decrease human pressure on the most popular recreational sites, but it will also contribute to the protection of natural habitats in unmanaged locations. Olsztyn is a city with unique natural and scenic value, and it has considerable potential for tourism development. The results of this study can assist the local authorities in protecting the residents against the consequences of the COVID-19 pandemic and future health crises.

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