

Development of age-friendly cities and communities: a case study from the coastal belt in Gdańsk

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Received: 15.07.2025; Revised: 18.11.2025; Accepted: 18.11.2025; Available online: 31.03.2025

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Abstract:

The growing proportion of older adults in the population requires modernizing public spaces to better address their needs. Seaside beaches serve as significant recreational areas for seniors, underscoring the importance of evaluating effective design practices in these settings. This study analyzed 11 pedestrian routes in Gdańsk that link public transportation nodes with beach access points. The research area encompassed primary access routes to the seaside zone, pedestrian and cycling paths, and recreational spaces within the districts of Jelitkowo, Przymorze, Brzeźno, Stogi, and Sobieszewo Island. Field observations evaluated the quality of infrastructure in relation to its adaptation for older adults, focusing on beach accessibility, public transport connections, walking route lengths from bus stops to the beach, the quality of small-scale architectural elements such as benches, toilets, and drinking fountains, as well as features of walking trail development related to user safety, including lighting, signage, and architectural barriers. The findings informed the development of guidelines for designing age-friendly coastal urban spaces and highlighted the necessity for continued research in this field.

Keywords:

elderly people; public space; coastal city; architecture of public space; physical activity

1. Introduction

One of the major challenges facing modern society is the aging of the population. This is a global phenomenon, resulting both from the increasing average life expectancy and the declining fertility rate [1]. Population aging is a rapid process, clearly observable in developing countries such as Poland. Polish society is among the fastest-aging populations in Europe [2]. According to data from the Central Statistical Office, in 2017, people aged 60 and above accounted for over 24% of the population in Poland. It is projected that by 2050, this share will rise to as much as 40%. A steady increase is also expected in the number of people qualifying as being in "late old age"—those aged 80 and over.

The issue of an aging population is closely tied to the phenomenon of urbanization. In Poland, cities are aging faster than rural areas [3]. An example of a city with a growing percentage of residents over 60 is Gdańsk, where in 2022, 28.1% of the population were older adults [4]. This figure is 2.2% higher than the national average and 0.2% higher than the average for other Polish cities [5].

Such dynamic demographic changes should prompt extensive research on the lifestyles and public spaces dedicated to seniors, so that findings may support the creation of age-friendly cities. Public spaces adapted to the needs of older adults motivate them to leave their homes and engage in outdoor physical activity, which plays a key role in maintaining mental, physical, and social health [6-8]. A crucial element in ensuring

comfort and a sense of social belonging is raising social awareness and culture around the aging phenomenon. These efforts would also reduce age-related discrimination and enhance intergenerational solidarity [2].

In 2007, the World Health Organization (WHO) published a guide highlighting eight key areas of action for improving the quality of life for older people [2]. These include physical environments such as public space (encouraging people to go outdoors through adapted small architecture, infrastructure, and buildings), transport (ensuring independent mobility, including accessible public transport), and housing (ensuring a sense of safety and comfort at home). Social aspects include social participation (involvement of seniors in urban life), civic engagement and employment (opportunities for extended work or volunteering), as well as respect and social inclusion (how society views older adults). Maintaining contact and access to information helps facilitate daily life and reduce social exclusion. The final area includes community support and health services that help maintain physical and mental well-being and reduce stress.

It is now widely accepted that regular physical activity can significantly impact the aging process by slowing the decline in physical and mental abilities [9,10]. Recent scientific studies confirm that older adults should engage in regular physical activity to support healthy aging [8,11-13]. Beyond the obvious benefit of improved physical condition, additional benefits include mental well-being, cognitive support, increased independence, and enhanced social connections. The most

important forms of physical activity for seniors are: gymnastics, dance, movement-to-music exercises, walking, aquatic exercises and swimming, active games and agility activities, Nordic walking, cycling, Tai Chi, yoga, and light jogging or power walking [8,9,14].

An aspect frequently associated with increased physical activity among seniors is access to green and waterfront areas [10,15,16]. Coastal areas are particularly unique environments that promote relaxation and a meditative, calming state for the body. For this reason, seaside regions have long been used to support rehabilitation and general health. Large bodies of water influence people by enhancing the sense of belonging and encouraging greater exposure to outdoor activities, which supports socialization more effectively than other natural settings [16-18].

According to demographic data from 2023, the coastal districts of Gdańsk with the highest proportion of elderly residents are: Żabianka-Wejhera-Jelitkowo-Tysiąclecia, Przymorze Wielkie, Zaspą Młyniec, Zaspą Rozstaje, and Młyniska. In these districts, individuals aged 60 and above make up 35.8%–38.5% of the population. Some of these districts border the coastline of the Gulf of Gdańsk. Other districts with high percentages of elderly residents are located between Oliwa and the districts of Stogi and Rudniki, stretching along nearly the entire coastal zone of the city. Excluding Letnica, the share of senior residents in these districts ranges from about 30.2% to 34.7% [4]. These statistics suggest that Gdańsk's coastal belt has strong potential to be a space frequently used by seniors.

Urban strategies regarding the accessibility of Gdańsk aim to improve the quality of life for older adults by creating urban environments that are safe, convenient, and easily accessible. Like many cities, Gdańsk faces challenges posed by an aging society that require specialized actions in transport infrastructure and public services.

As part of the "Gdańsk 2030 Plus City Development Strategy," the "Accessible City" program was created to improve urban accessibility for all residents, with a focus on older adults and people with special needs. The program includes, among others: pedestrian infrastructure modernization, installation of elevators and ramps, and placement of benches in public areas [19].

Gdańsk also developed a Sustainable Urban Mobility Plan, which aims to improve pedestrian infrastructure and ensure safe pedestrian crossings [20].

The city undertakes a range of initiatives to enhance mobility and access to public spaces for the elderly. In addition to infrastructure improvements, Gdańsk implements programs like the "Senior Support Corps," which offers help with daily functioning – for example, transportation services for seniors with mobility difficulties [21].

Gdańsk's beaches are a popular leisure destination for older adults. Activities for seniors along the coastal belt are available year-round. Nordic walking sessions take place throughout the year, and in spring, summer, and fall, activities such as regular walks, themed walks, and cycling are held. In winter, some seniors even participate in cold-water swimming. The highest number of senior-oriented activities takes place in the summer, with events such as beach picnics, outdoor cinema, sea bathing,

dance parties, and outdoor yoga. Accessibility accommodations are also available for people with disabilities (PwD) [22].

This article presents an analysis of the main pedestrian routes leading to the beach in the Gdańsk municipality, focusing on how well the infrastructure is adapted to the needs of older adults. The study aims to identify key urban and architectural elements that could ensure a comfortable and ergonomically supportive walk to the seaside for senior citizens.

2. Materials and methods

2.1. Design

The study on the development of age-friendly cities and communities, using the example of the seaside area in Gdańsk, employed both quantitative and qualitative methods. The aim was to assess the extent to which the seaside environment supports mobility and physical activity among older adults, taking into account infrastructure, safety, and access to public transportation.

The core elements of the study included a detailed analysis of the pedestrian and cycling route leading to the beach, as well as an evaluation of the distribution and functionality of small-scale architecture located at beach entrances. The research findings were used to assess the age-friendliness of the seaside area for seniors and to formulate recommendations aimed at improving the quality of public space and enhancing the accessibility of urban infrastructure for older individuals.

2.2. Case study setting

The seaside area in Gdańsk is an extensive coastal zone stretching along the shoreline of the Gulf of Gdańsk, located in the northeastern part of the city (Fig. 1). It encompasses areas with diverse urban and landscape characteristics, including beaches, seaside parks, recreational zones, and residential developments. Geographically, the area extends from the border of Gdańsk with Sopot in the north, through districts such as Żabianka-Wejhera-Jelitkowo-Tysiąclecia, Przymorze Wielkie, Brzeźno, Nowy Port, Przeróbka, Stogi, Krakowiec-Górki Zachodnie, and Sobieszewo Island, reaching as far as the mouth of the Vistula River. Due to its location, it is characterized by a high level of tourist appeal and plays an important recreational and leisure role for both residents and visitors.

The seaside area of Gdańsk forms an integral part of the larger coastal zone of the Tricity (Gdańsk, Sopot, and Gdynia), which collectively constitutes a continuous coastal strip distinguished by landscape and functional coherence. As a result, both locals and tourists benefit from unified recreational infrastructure, including cycling paths, promenades, and walking routes, enabling seamless movement along the Tricity shoreline.

For the purpose of the infrastructure audit, pedestrian routes leading directly from public transport stops to beach entrances were selected. Eleven points of interest (POIs) were chosen: entrances no. 72 and 63 in the district of Żabianka-Wejhera-Jelitkowo-Tysiąclecia; entrances no. 60, 58, and 56 in Przymorze Wielkie; entrances no. 50 and 41 as well as the pier in Brzeźno; entrance no. 26 in the district of Stogi; and entrances no. 16 and 11 on Sobieszewo Island (Fig. 2).

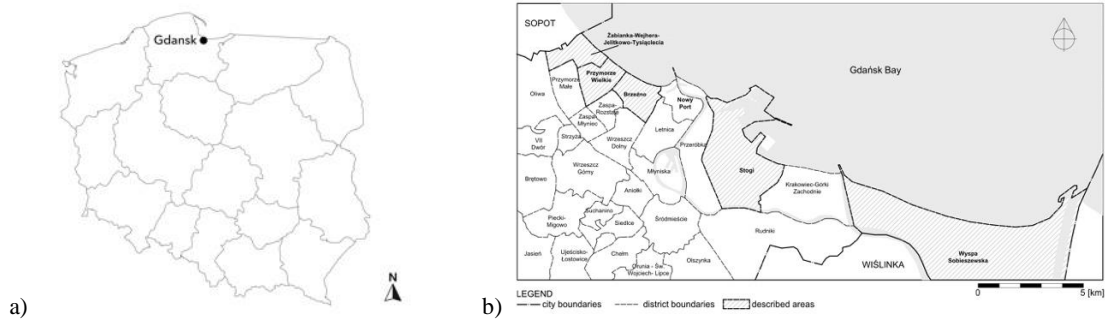


Fig. 1. Maps showing, from left: the location of Gdańsk within Poland, and highlighting the districts currently under development within the city. Source: own study based on Google Maps

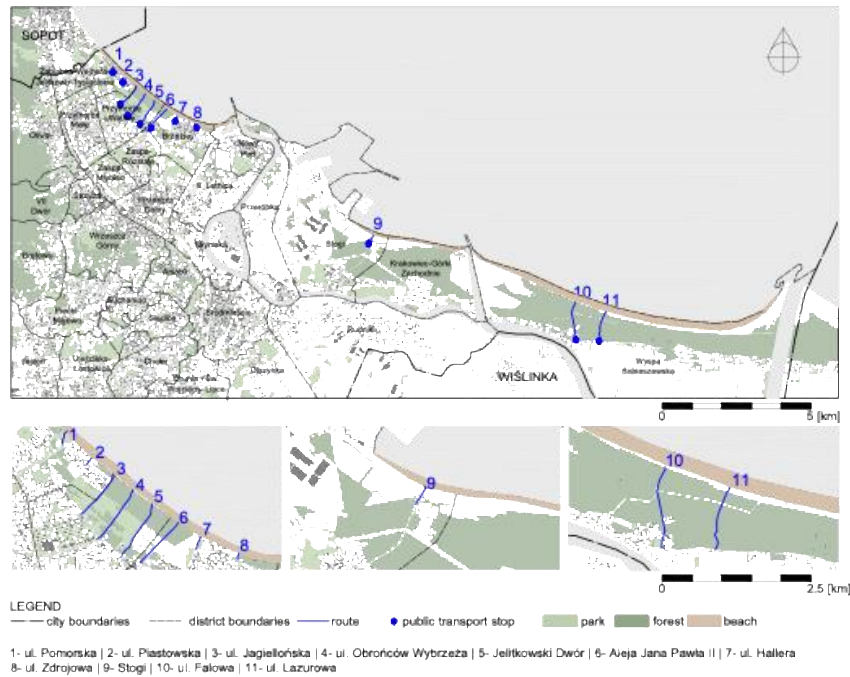


Fig. 2. Pedestrian routes analysed in the study. Source: own study based on Google Maps

2.3. Methods

In order to collect data, field research was conducted. The information obtained was continuously recorded in a pre-prepared observation sheet. This approach ensured consistency in the observation method and facilitated the comparability of results. The field observation included an assessment of pedestrian and cycling infrastructure, route length, surface quality, availability of small urban elements (benches, toilets,

water fountains), and safety conditions (lighting, signage, barriers, and overall order).

The field research was executed from November 2024 to March 2025, during different seasons to account for varying weather conditions. The study area included main access routes to the seaside zone, pedestrian and cycling paths, and recreational spaces in the districts of Jelitkowo, Przymorze, Brzeźno, Stogi, and Sobieszewo Island (Fig. 3).



Fig. 3. Example photos from pedestrian routes leading to the beach, from the left: beach entrance no. 72 - POI 1; President Ronald Regan Park – POI 5; Forest areas – POI 10; Authors: Anna Zapiec, Dawid Grabski, Paulina Jesionowska, Michaela Sigmanska

The research presented in the article did not directly address catering outlets adjacent to hiking trails or other facilities that enable active recreation, such as outdoor gyms or playgrounds.

Access to public transportation at the end of the routes was also examined, along with an analysis of the activity patterns of older adults in the seaside area of Gdańsk. In addition, documents were reviewed, including municipal strategies and guidelines from the World Health Organization regarding age-friendly cities.

3. Results

3.1. Availability of beaches in Gdańsk

Gdańsk's beaches are a popular walking destination for older adults. To examine the accessibility of the main beach entrances, the lengths of pedestrian routes leading from public transportation stops were analyzed. A walking distance of 15 minutes was adopted as optimal for an older person – within this

time, an individual aged 65 can cover approximately one kilometre at an average walking speed of 4.2 km/h [23]. All of the analyzed routes begin at public roads, with lengths ranging from 160 meters to 1.1 kilometers. Most of the route's pass-through green areas – urban parks or forested zones – which increases their overall appeal. The shortest routes are located in the Żabianka-Jelitkowo district (beach entrances no. 63 and 72). The longest routes are found on Sobieszewo Island and in the Przymorze Wielkie district (entrances no. 16, 56, 58) (Tab. 1).

Available public transportation options were also analyzed. In five cases – representing 45% of the locations – bus or tram stops were located within 50 meters of the start of the pedestrian route. In 36% of the locations, stops were situated between 50 and 150 meters away, while in 18% of the cases, they were located at a distance of over 150 meters. The highest service frequency (less than 5 minutes) was recorded at tram stops in the Jelitkowo and Brzeźno areas. The lowest frequency of service (over 30 minutes) was observed at bus stops serving Sobieszewo Island and Piastowska Street (Tab. 2).

Table 1. Length of the pedestrian route leading to the beach entrance

POI	Beach entrance (municipal numbering)	District of Gdańska	Nearby park or forested area	Starting point of the pedestrian route	Length of the pedestrian route
1	Beach entrance No. 72	Żabianka-Wejherta-Jelitkowo-Tysiąclecia	Park Jelitkowski	Pomorska Street	0.21 km
2	Beach entrance No. 63	Żabianka-Wejherta-Jelitkowo-Tysiąclecia	President Ronald Regan Park	Piastowska Street	0.16 km
3	Beach entrance No. 60	Przymorze Wielkie	President Ronald Regan Park	Jagiellońska Street	0.85 km
4	Beach entrance No. 58	Przymorze Wielkie	President Ronald Regan Park	Obrońców Wybrzeża Street	1.0 km
5	Beach entrance No. 56	Przymorze Wielkie	President Ronald Regan Park	Jelitkowski Dwór Street	1.0 km
6	Brzeźno Pier	Brzeźno	President Ronald Regan Park	Jana Pawła II Street	0.95 km
7	Beach entrance No. 50	Brzeźno	President Ronald Regan Park	Gen. Józef Haller Avenue	0.24 km
8	Beach entrance No. 41	Brzeźno	Jan Jerzy Haffner Brzeźno Park	Zdrojowa Street	0.2 km
9	Beach entrance No. 26	Stogi	forested areas	Nowotna Street	0.25 km
10	Beach entrance No. 16	Wyspa Sobieszewska	forested areas	Falowa Street	1.1 km
11	Beach entrance No. 11	Wyspa Sobieszewska	forested areas	Lazurowa Street	0.8 km

Table 2. Distance from public transportation and accessibility to its means (as of 13.04.2025)

POI	Available public transport	Distance from the beginning of the pedestrian route to the nearest stop	Lines serving the stop	Average arrival frequency
1	bus	<50m	117, 143	>30 min
	tram	>150m	2, 4, 6, 8	<5 min
2	bus	<50m	117, 143	>30 min
3	bus	50-150m	199	20-30 min
4	bus	50-150m	127,148	10-20 min
5	-	-	-	-
6	bus	50-150m	124, 127, 148, 149, 158, 258	5-10 min
7	tram	50-150m	3, 5	5-10 min
8	bus	<50m	148	20-30 min
	tram	<50m	3, 5	5-10 min
9	bus	<50m	T8	20-30 min
	tram	<50m	9	access suspended until July 2027
10	bus	>150m	112, 212, 512	>30 min
11	bus	<50m	112, 212	>30 min

A detailed analysis was conducted on 13 public transportation stops (bus and tram) located near the starting points of the pedestrian routes under study. The presence of features important for accessibility and comfort for older adults was assessed. The most commonly observed elements included a timetable (100%), shelter and seating (85%), three-sided enclosures, and tactile warning surfaces (69%). Less frequently observed features included seating with backrests, armrests, low-curb access, and a public transport route map, which was present at only one stop (7.7%). Passenger information system displays

were found at three stops (23.1%), and ticket purchase was available at four stops via ticket machines (31%) (Tab. 3).

The width of the analysed pedestrian routes was between 2 and 3 meters in 64% of cases, which ensures comfortable movement. Only 36% of the routes had a width between 1 and 2 meters. A bicycle path accompanies the pedestrian route in 64% of cases, most often with a width ranging from 1 to 3 meters. No obstacles narrowing the pedestrian path were found along any of the analysed routes. Significant elevation changes were observed in only 18% of the routes (Tab. 4).

Table 3. Start of the pedestrian route leading to the beach – characteristics of the adaptation of bus and tram stops to the needs of elderly people (as of 13.04.2025)

Analyzed parameter	bus stops										tram stops				%
	1	2	3	4	6	8	9	10	11	1	7	8	9		
POI:															
Is the stop sheltered?	YES	YES	YES	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	84,6 %	
Is the stop enclosed on three sides?	YES	YES	YES	YES	YES	NO	NO	YES	NO	YES	YES	YES	NO	69,2%	
Is the stop equipped with seating?	YES	YES	YES	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	84,6 %	
Does the seating have a backrest?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	7,7 %	
Does the seating have armrests?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	7,7 %	
Is the stop equipped with a raised curb, allowing for comfortable entry into the vehicle?	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	7,7 %	
Does the surface of the stop have tactile warning indicators?	NO	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	YES	69,2 %	
Is the stop equipped with a timetable?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	100 %	
Is the stop equipped with a public transport network map?	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	7,7 %	
Is the stop equipped with Passenger Information System boards?	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO	15,4 %	
Is there an option to purchase tickets at the stop?	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	TAK	TAK	NO	30,8 %	

Table 4. Characteristics of the pedestrian route leading to the beach

POI	Is there a bike path alongside the pedestrian path?	Average width of the pedestrian route	Average width of the bike route	Are there obstacles narrowing the pedestrian pathway?	Are there significant height differences?	Are there stairs, and are the ramps equipped with handrails?	Construction material used for the pedestrian route surface	Construction material used for the bike route surface
1	NO	2-3m	-	NO	NO	NO	concrete slabs	not applicable
2	YES	2-3m	2-3m	NO	NO	NO	concrete slabs	cobblestones
3	YES	2-3m	2-3m	NO	NO	NO	cobblestones	cobblestones
4	YES	2-3m	2-3m	NO	NO	NO	cobblestones	cobblestones
5	YES	1-2m	1-2m	NO	NO	NO	cobblestones	cobblestones
6	YES	>3m	2-3m	NO	YES	YES	cobblestones	cobblestones
7	YES	2-3m	1-2m	NO	NO	NO	concrete slabs	asphalt
8	NO	1-2m	-	NO	NO	NO	cobblestones	not applicable
9	YES	1-2m	1-2m	NO	YES	YES	concrete slabs, asphalt	concrete slabs, asphalt
10	NO	1-2m	-	NO	NO	NO	concrete slabs	not applicable
11	NO	2-3m	-	NO	NO	NO	jumbo slabs	not applicable

3.2. Small architectural elements

The analysis of small architectural elements (Fig. 4a-b) located along the pedestrian routes revealed significant variation in the provision of public space amenities. Street lighting was present along 100% of the routes, ensuring basic illumination and enhancing user safety. Waste bins were found in 91% of the locations, supporting the maintenance of cleanliness. Benches were identified along 82% of the routes, serving as an important

convenience for older adults. Drinking fountains were present in 55% of the routes. Toilets were available in only 36% of cases, and facilities adapted for people with disabilities were found in just three of the analysed locations (27%). In most cases, sanitary facilities accessible to individuals with limited mobility were lacking. Sheltered areas were not present along any of the surveyed segments, which may reduce user comfort during adverse weather conditions (Tab. 5).

Table 5. Types of small-scale architecture present along the analysed pedestrian routes

POI	toilets	toilets for person with disabilities	benches	sheltered areas	drinking fountains	trash bins	streetlights
1	NO	NO	YES	NO	NO	YES	YES
2	YES	YES	NO	NO	YES	YES	YES
3	YES	YES	YES	NO	YES	YES	YES
4	NO	NO	YES	NO	NO	YES	YES
5	NO	NO	YES	NO	YES	YES	YES
6	YES	NO	YES	NO	YES	YES	YES
7	YES	YES	YES	NO	YES	YES	YES
8	NO	NO	YES	NO	YES	YES	YES
9	NO	NO	YES	NO	NO	YES	YES
10	NO	NO	YES	NO	NO	YES	YES
11	NO	NO	NO	NO	NO	NO	YES
	36%	27%	82%	0%	55%	91%	100%



Fig. 4. Examples of small-scale architecture accompanying the analysed pedestrian routes, from the left: a) Drinking fountain – POI 2; b) Toilets at the beach entrance – POI 2; c) Defibrillator – POI 6. Authors: Anna Zapiec, Dawid Grabski, Paulina Jesionowska, Michaela Sigmanska

Rest areas located along the pedestrian routes leading to the beaches are, in the vast majority of cases, equipped with at least basic recreational infrastructure. However, the degree to which these areas are adapted to the needs of older adults varies. Benches were present along 91% of the routes, with the exception of entrance no. 11. Natural shading for rest areas was provided in nearly all cases (91%). Armrests to assist with sitting down were found on benches at only two entrances, representing just 18% of the analysed cases. The possibility to park a walker was available at only one location (beach entrance no. 56), accounting for 9%. The average distance between benches generally ranged from 30 to 50 meters, or more than 50 meters. The most senior-friendly entrances in terms of bench frequency were entrance no. 26 and no. 41, where the distance between benches was up to 30 meters.

Bench placement varied – some were located directly along the main route, while others were set slightly apart (more than 80 cm from the main path). In most cases, however, they were easily accessible (Tab. 6).

3.3. Quality of pedestrian routes

Lighting continuity was maintained in 82% of the locations (except for entrances no. 11 and 16). Adequate lighting, providing full visibility of the surrounding area, was present in 91% of the routes, except at entrance no. 11. Defibrillators were available along 36% of the routes (at beach entrances no. 60, 58, 41, and near the pier in Brzeźno). During the site visit, cleanliness was observed in 82% of the locations (excluding entrances no. 11 and 16).

The analysis of the surface condition of pedestrian routes leading to the beaches showed that in 73% of cases, the pavement was in good condition, with no noticeable unevenness that could hinder walking, especially for older adults or wheelchair users.

In all analyzed points (100%), the pavement was rated as good in terms of slip resistance, and in 100% of cases, it was confirmed that winter maintenance (such as snow removal or salting) is regularly carried out (Fig. 5; Fig. 6).

Table 6. Characteristics of resting places along the pedestrian route

POI	Are they shaded?	Do they have space to park a stroller?	Do they have armrests to assist with sitting down?	Average distance between benches	Bench location
1	Yes, naturally	Some of them	No	More than 50 m	Along the pedestrian route
2	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
3	Yes, naturally	No	No	30-50 m	Along the pedestrian route
4	Yes, naturally	Some of them	No	30-50 m	In the vicinity of the pedestrian route (more than 80 cm)
5	Yes, naturally	Yes	No	More than 50 m	In the vicinity of the pedestrian route (more than 80 cm)
6	Yes, naturally	No	No	30-50 m	Along the pedestrian route
7	Yes, naturally	No	No	More then 50 m	Along the pedestrian route
8	Yes, naturally	No	Yes	do 30 m	In the vicinity of the pedestrian route (40-80 cm)
9	Yes, naturally	No	Yes	do 30 m	Along the pedestrian route
10	Yes, naturally	No	No	More then 50 m	Along the pedestrian route
11	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

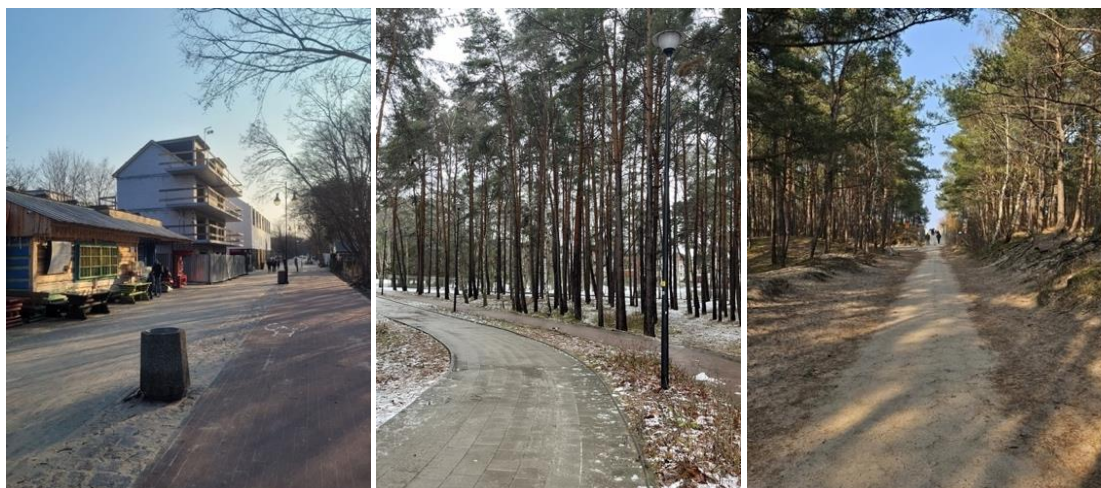


Fig. 5. Example surfaces on pedestrian routes leading to the beach, from the left: a) POI 2; b) POI 3; c) POI 10. Authors: Anna Zapiec, Dawid Grabski, Paulina Jesionowska, Michaela Sigmanska



Fig. 6. Condition of the surfaces on the analyzed pedestrian routes depending on weather conditions, from the left: a) POI 11; b) POI 1; POI 2. Authors: Anna Zapiec, Dawid Grabski, Paulina Jesionowska, Michaela Sigmanska

The attractions available along the analysed pedestrian routes are varied. In the vicinity of these routes, additional amenities are frequently found, including dog parks and deckchairs (in 22% of locations), outdoor chess tables and souvenir shops (33%), as well as playgrounds and arcade machines (36%). Small food outlets are present in as many as 88% of the locations, while mobile sales points were observed in 55%. Less commonly found features, present in only 11% of the areas, include ponds, outdoor games, table tennis, barbecue areas, mini field games, piers, and rope parks.

4. Discussion

Well-organised public transport plays a crucial role in encouraging older adults to make more frequent use of seaside areas. Bus and tram stops should be equipped with features that improve accessibility and comfort for senior users, such as benches with backrests and armrests, lowered curbs for easier boarding, Passenger Information System displays, and ticket vending facilities. The variety in distance from public transport stops, as well as the condition and arrangement of coastal spaces, allows individuals to choose pedestrian routes according to their personal capabilities and preferences.

Properly designed and constructed pedestrian routes leading to the beach are of fundamental importance. Benches should be placed at intervals of no more than 30 metres along the entire route and be equipped with armrests to assist with sitting down. Ideally, benches should be located near the main path, more than 80 cm away, with sufficient space beside them for a walker or wheelchair. At least some benches should be situated in shaded areas. Continuity of public lighting is also essential, and streetlamps should provide full visibility of the surrounding environment. Regular snow removal and salting of these routes by the city contribute positively to both safety and comfort, encouraging their use even during winter months.

Additional attractions along pedestrian routes increase the area's overall appeal and motivate older adults to engage in physical activity. In locations with changes in terrain, railings should be installed along stairs or ramps to improve accessibility and stability.

It is also important that a designated cycle path runs alongside the pedestrian route. Without it, cyclists, skaters, and similar users tend to use pedestrian paths, causing discomfort and potential danger – particularly for older adults.

Older individuals require frequent resting places, supported by appropriate small-scale infrastructure. At beach entrances, there should be sheltered areas that provide protection from sun, rain, or snow conditions to which older adults are especially vulnerable. Drinking fountains should also be available, as seniors are particularly sensitive to dehydration in warmer weather and may be less inclined to purchase beverages from nearby commercial outlets. Waste bins should be installed along pedestrian routes, ideally spaced every 30–50 metres to ensure accessibility and reduce littering. Installing defibrillators at beach entrances is also considered good practice.

It is crucial to clearly mark spaces to ensure safety for all participants during seaside walks. Many solutions designed for seniors also benefit individuals with physical disabilities. Gdańsk and other cities are currently implementing the guidelines of the Accessibility Plus 2018-2025 program, which aims to make public spaces more user-friendly [24].

This research is based on the idea that beaches and coastal promenades are popular recreational spots for older adults. This notion is supported by a review conducted in 2024 by Lixin

Wang and Norazmawati Md Sani [17]. The appropriate adaptation of public spaces has been a focus of research in countries with warm climates, such as Brazil [25] and Australia [26], as well as in regions with cooler climates, including various Asian countries [27] and Northern Europe [28].

Given the significant social implications of this topic, it is essential to examine it within the context of the climatic characteristics and preferences of seniors in Poland. Statistical studies should be carried out to gauge the interest of Gdańsk residents (or other coastal cities) in participating in local sports and recreational clubs that offer activities for older adults, such as yoga, dancing, or swimming. The research highlights the need to develop design guidelines for senior-friendly seaside public spaces further.

In-depth studies are necessary to address issues such as the ergonomics of rest areas (including benches and shelters) and the creation of additional facilities along walking trails that cater to food service needs and promote social engagement among walkers. A topic not covered in this article but deserving of exploration in future research is access to free Wi-Fi and the use of modern technologies.

An important aspect of walks for seniors is the companionship of animals, particularly dogs. Research suggests that this factor should also be considered when developing guidelines for friendly public spaces [29,30].

Walking trails, as public spaces, play a significant role in urban environments by serving as multifunctional platforms that concentrate pedestrian traffic and facilitate a range of interpersonal interactions, including intellectual, professional, social, and educational exchanges [31]. For older adults, these trails offer dedicated spaces for daily activities such as walking, Nordic walking, and running.

5. Conclusions

The study's results indicate a growing awareness in modern cities regarding the needs of older adults. Current solutions for constructing promenades leading to urban beaches typically focus on factors such as accessibility to public transportation, short path lengths, and safe walking surfaces. However, there should be increased attention to incorporating small-scale architectural features along these pedestrian paths, including benches, watering stations for both people and animals, covered rest areas, and restrooms.

The findings suggest that similar analyses should be conducted in other cities, particularly in Sopot and Gdynia (cities that together with Gdańsk form the Tricity agglomeration). These studies could help develop standard optimization measures aimed at enhancing the comfort and accessibility of seaside public spaces for older adults. Consequently, design guidelines should be established for seaside public spaces to standardize their quality and adaptability to the needs of older adults. These guidelines should take into account both functional and aesthetic aspects, creating a welcoming and visually appealing environment for all users.

References

- [1] Lechowska E., "Miasto przyjazne starzeniu w kontekście dostępności przestrzennej na przykładzie Łodzi", *Biuletyn Komitetu Przestrzennego Zagospodarowania Kraju PAN* 272 (2018) 216-229. (in polish)
- [2] World Health Organization: *Global age-friendly cities: a guide*. France, 2007.

- <https://www.who.int/publications/i/item/9789241547307> {Available: 9 April 2025}
- [3] Główny Urząd Statystyczny: *Informacja o sytuacji osób starszych na podstawie badań Głównego Urzędu Statystycznego*. Warszawa, 2018. <https://stat.gov.pl/obszary-tematyczne/osoby-starsze/osoby-starsze/informacja-o-sytuacji-osob-starszych-na-podstawie-badan-glownego-urzedu-statystycznego,1,2.html> {Available: 9 April 2025}. (in polish)
- [4] *Gdańsk dla Seniorów. Informator 2023/2024*. https://download.cloudgdansk.pl/gdansk-pl/d/202408235761/seniorzy/publikacja_2024_web.pdf {Available: 9 April 2025}. (in polish)
- [5] Ministerstwo Rodziny i Polityki Społecznej: *Informacja o sytuacji osób starszych w Polsce za 2022 r.* Warszawa, 2023. https://rops.pomorskie.eu/wp-content/uploads/2023/11/Informacja_o_sytuacji_osob_starszych_w_Polsce_za_2022_r.pdf {Available: 9 April 2025}. (in polish)
- [6] Ulrich R. S., Simons R. F., Losito B. D., Fiorito E., Miles M. A., Zelson M. “Stress recovery during exposure to natural and urban environments”, *Journal of Environmental Psychology* 11(3) (1991) 201–230. [https://doi.org/10.1016/S0272-4944\(05\)80184-7](https://doi.org/10.1016/S0272-4944(05)80184-7)
- [7] Hartig T., Kahn P. H., “Living in cities, naturally”, *Science* 352(6288) (2016) 938–940. <https://doi.org/10.1126/science.aaf3759>
- [8] Gębczyńska-Janowicz A., Janowicz R. “Public Space As a Place of Rehabilitation for the Elderly – a Systematic Literature Review”, *Medycyna Pracy* 75 (2024) 255-267. <https://doi.org/10.13075/mp.5893.01514>
- [9] Klimek-Piskorz E., “Aktywność fizyczna osób starszych. Physical activity of the elderly”, *Physical Activity and Health* 17 (2022) 23-31. <https://www.wskfit.pl/PDF/artykuly/19/Klimek-22099.pdf> {Available: 9 April 2025}.
- [10] Szarejko W., “The possibility of fulfilling the needs of senior individuals through the activation of waterfront areas using mobile architectural-urban elements”, *Medycyna Pracy* 75(3) (2024) 211–222. <https://doi.org/10.13075/mp.5893.01519>
- [11] Langhammer B., Bergland A., Rydwick E., “The Importance of Physical Activity Exercise among Older People”, *BioMed Research International* (2018) 7856823. <https://doi.org/10.1155/2018/7856823>
- [12] White M. P., Alcock I., Grellier J., Wheeler B. W., Hartig T., Warber S. L., Bone A., Depledge M. H., “Fleming L.E. Spending at least 120 minutes a week in nature is associated with good health and wellbeing”, *Scientific Reports* 9(1) (2019) 7730. <https://doi.org/10.1038/s41598-019-44097-3>
- [13] Huang W. Y., Huang H., Wu C. E., “Physical Activity and Social Support to Promote a Health-Promoting Lifestyle in Older Adults: An Intervention Study”, *International Journal of Environmental Research and Public Health* 19(21) (2022) 14382. <https://doi.org/10.3390/ijerph192114382>
- [14] Kasperczyk T., “Physical activity of the elderly as a condition for health and high quality of life”, *Journal of Clinical Healthcare* 1 (2014) 8–47. http://www.jchc.eu/numery/2014_1/201412.pdf {Available: 9 April 2025}.
- [15] Othman A., Al-Hagla K., Hasan A. E., “The impact of attributes of waterfront accessibility on human well-being: Alexandria Governorate as a case study”, *Ain Shams Engineering Journal* 12(1) (2021) 1033–1047. <https://doi.org/10.1016/j.asej.2020.08.018>
- [16] Chang P. J., Ho L. C., Suppakitpaisarn P., “Investigating the interplay between senior-friendly park features, perceived greenness, restorativeness, and well-being in older adults”, *Urban Forestry and Urban Greening* 94 (2024) 128273. <https://doi.org/10.1016/j.ufug.2024.128273>
- [17] Wang L., Md Sani N., “The impact of outdoor blue spaces on the health of the elderly: A systematic review”, *Health & Place* 85 (2024) 103168. <https://doi.org/10.1016/j.healthplace.2023.103168>
- [18] Pytel S., Piechota A., “Are Coastal Cities Senior-Friendly?”, *Studia Marima* 27 (2023) 253-279. <https://doi.org/10.18276/sm.2023.36-13>
- [19] *Gdańsk 2030 Plus Strategia Rozwoju Miasta*. Załącznik do Uchwały Nr LIV/1363/22 Rady Miasta Gdańska z dnia 29 września 2022 roku. Gdańsk (2022). <https://www.gdansk.pl/strategia-rozwoju-miasta-gdansk-2030#strategia> {Available: 3 April 2025} (in polish)
- [20] *Plan Zrównoważonej Mobilności Miejskiej dla Gdańska*. Gdańsk, 2018. <https://gzdz.gda.pl/drogi/plan-zrownowazonej-mobilnosci-miejskiej-sump,a,3059> {Available: 3 April 2025} (in polish)
- [21] *Program „Korpus Wsparcia Seniorów” na rok 2025*. <https://www.gov.pl/web/rodzina/program-korpus-wsparcia-seniorow-na-2025-rok> {Available: 3 April 2025}. (in polish)
- [22] *Portal Senioralny Miasta Gdańska*. <https://www.gdansk.pl/gdancscy-seniorzy> {Available: 9 April 2025}. (in polish)
- [23] Willberg E., Fink C., Toivonen T., “The 15-minute city for all? – Measuring individual and temporal variations in walking accessibility”, *Journal of Transport Geography* 106 (2023) 103521. <https://doi.org/10.1016/j.jtrangeo.2022.103521>
- [24] The Ministry of Investment and Economic Development. „Program Dostępność Plus 2018-2025 (Accessibility Plus Programme 2018-2025)”, 2018. https://www.funduszeuropejskie.gov.pl/media/97588/Dostepnosc_angielski.pdf {Available: 3 April 2025}.
- [25] Melo P. F. C., Brambilla A., “Sun and beach tourism, senior citizens and accessibility: a study at the coast of the city of João Pessoa, PB”, *Applied Tourism* 5(3) (2020) 42-55. <https://doi.org/10.14210/at.v5n3p42-55> .
- [26] Job S., Heales L., Obst S., “Tides of Change-Barriers and Facilitators to Beach Accessibility for Older People and People with Disability: An Australian Community Survey”, *International Journal of Environmental Research and Public Health* 20(9) (2023) 5651. <https://doi.org/10.3390/ijerph20095651>
- [27] Huang B., Feng Z., Pan Z., Liu Y., “Amount of and proximity to blue spaces and general health among older Chinese adults in private and public housing: A national population study”, *Health & Place* 74 (2022) 102774 <https://doi.org/10.1016/j.healthplace.2022.102774>
- [28] Zingmark M., Ankre R., Wall-Reinius S., “Promoting outdoor recreation among older adults in Sweden – a theoretical and empirical foundation for the development of an intervention”, *Archives of Public Health* 79(232) (2021). <https://doi.org/10.1186/s13690-021-00762-6>
- [29] Koohsari M. J., Nakaya T., McCormack G. R., Shibata A., Ishii K., Yasunaga A., Liao Y., Oka K., “Dog-walking in dense compact areas: The role of neighbourhood built environment”, *Health & Place*, 61 (2020) 102242. <https://doi.org/10.1016/j.healthplace.2019.102242>
- [30] Trojanowska M., “A universal standard for health-promoting places. Example of assessment – on the basis of a case study of Rahway River Park”, *Budownictwo i Architektura* 20(3) (2021) 057–082. <https://doi.org/10.35784/bud-arch.2715>
- [31] Seruga W., “Pedestrian areas in the space of a city”, *Budownictwo i Architektura* 17(4) (2018) 193–206. https://doi.org/10.24358/Bud-Arch_18_174_16