



Standards and the demand for adapting apartments for better accessibility for older adults in Poland

Maria Heldak¹ · Alina Kulczyk-Dynowska¹ · Katarzyna Przybyła¹ · Agnieszka Stacherzak¹ · Jakub Szczepański¹ · Magdalena Michalik¹ · Monika Płuciennik¹ · Olgierd Kempa¹

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Abstract

The process of Polish population aging is gaining momentum. In Poland there is a large number of people aging in place, and their physical environment and how well it is adapted to their physical needs, is linked to their health and satisfaction with their home. The purpose of the study is to identify the current state of adapting apartments to the needs of people with mobility limitations in Poland, and also to present their current standard of residence. The following aspects were analysed: access to cold water, hot water, access to sewage, toilet in the apartment or on the staircase. The study aims at providing answers regarding the degree of readiness to change the resided apartments into the ones adapted to the needs of people with mobility impairments among people over 50 (a total of 208 respondents). The authors' aim was to find out the public mood among people aged 50 and over and their propensity to change apartments in the future. The work used a public opinion research based on the performed survey and the conducted statistical analyses. The research revealed, e.g., that the respondents most often indicated the need to adapt bathrooms or toilets in their apartments or houses to facilitate mobility (52%). The respondents residing in the buildings constructed in the period 1945–1975 were most willing to change their current apartment into the one adapted to limited mobility. This is usually due to the poor technical condition of the buildings constructed in this period as well as the structural limitations that do not allow for the modernization of a bathroom or the installation of an elevator in the building.

Keywords Housing standards of older adults · Adapting apartments for people with disabilities · Changing an apartment to the one adapted for people with mobility limitations

✉ Maria Heldak
maria.heldak@upwr.edu.pl

¹ Institute of Spatial Management, Wrocław University of Environmental and Life Sciences, Norwida 25, Wrocław 50-375, Poland

1 Introduction

In Poland, the population of aging individuals is increasing and this has led to a requirement for better housing for aging in place. Polish society is aging, which also reflects the occurring European trends (van Hoof, et al., 2018, 2021; van Hoof & Kazak, 2018). There are many reasons for the current demographic situation. According to numerous scientific studies including, e.g., Długosz and Biały (2013); Alders and Broer (2005); van de Kaa (2003), the progress and changes in the economic sphere are accompanied by an increase in the standard of living and social awareness, as well as the achievements in medicine, the transformations in the population age structure are becoming visible in particular phases of the demographic transition.

Such an age structure of the society forces the implementation of new solutions. However, it would be easier to adapt an apartment to the changing needs of people along with age, because older adults definitely prefer to stay in their surroundings, in their apartment, but also in their housing estate, district or city. It is consistent with the “ageing in place” theory. Remaining in the community, with a certain level of independence, rather than in a social care home is a more favourable solution for an older adult and also cheaper for the state (Lawrer, 2001; Davey, de Joux, 2004; Sixsmith and Sixsmith, 2008; Hwang, et al., 2011; Wiles, et al., 2011; Kazak, et al., 2017; Przybyła, et al., 2019; van Hoof i Kazak, 2018; van Hoof, et al., 2021). Many studies addressing this problem see “aging in place” as an advantage in terms of a sense of attachment or connection and feelings of security and familiarity in relation to both homes and communities (Wiles, et al., 2011).

The changes initiated in Western European countries in the 1960s currently cover the entire Western world, but the trend has also been observed in Latin America (Esteve, Lesthaeghe and Lopez-Gay, 2012, Lesthaeghe, 2020), and in the industrialized countries of the Far East (i.e. Japan, Taiwan), and it also affects China (Tsuya, 2006; Raymo, et al., 2009).

The process of population aging will result in social and economic consequences. The fate of seniors (persons over 85) will depend, on the one hand, on the infrastructure serving this social group and, on the other, on the model of care developed in individual countries (Lesthaeghe, 2020). Due to the necessary reorganization of the social policy carried out in individual countries, major changes are expected in the system of supporting housing standards of both the elderly and the people with disabilities. The research conducted among older people, addressing various types of barriers in their everyday functioning, confirmed that in relation to older age groups, the living space of a person with disabilities is increasingly limited to their home and its surroundings (Bartkowski, 2012; Frąckiewicz, 2001). It is usually associated with an overall deterioration in their health condition. The research conducted by Kurtyka-Marcak et al. (2019) revealed that a group elderly people includes a large part of the formally “able” individuals (without appropriate disability certificates), however, suffering significant health limitations. They predominantly represent the so-called “biologically” people with disabilities. For this group, an important issue is to help them meet their daily needs. Older people, especially those who live alone, need special conditions and facilities (Przybyła, et al., 2019).

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An extensive obstacle for meeting everyday needs, much stronger felt than in earlier periods of life, are the encountered barriers of various types. They limit mobility and the

possibility of social participation (Heldak, et al., 2018; Gąciarz & Bartkowski, 2014; Raszowski & Bartniczak 2019). Unfortunately, older adults living in Poland belong, at the same time, to the social group characterized by a significantly lower income and resources, reduced ability to meet their needs, and frequently living at the risk of poverty (Piatkowski, 2018; Przybyła, et al., 2014). Simultaneously, it is worth highlighting the problem of spatial differentiation in terms of meeting social needs which determine the population standard of living, including the elderly (Henderson, 2002; Przybyła, et al., 2014; Colombo, et al., 2014; Twardzik & Wrana, 2017). Therefore, changing an apartment/house should be considered more often than the purchase of a new one, or even a renovation consisting in the elimination of architectural and technical barriers, than the replacement of the current apartment into the one adapted to the mobility needs.

Poland is facing a serious challenge of reorganizing the housing support system addressed to the people with mobility limitations. One of the support forms could be the organization of a formalized exchange of apartments into those adapted to the actual needs of this age group as well as people with mobility impairments, another option is the system for supporting the adaptation of apartments which, in a way, is currently implemented by PFRON [*State Fund for Rehabilitation of the People with Disabilities*].

The purpose of this research is to provide an answer regarding the status of the current housing equipment in utilities as well as the existing needs of people with mobility limitations in the area of removing architectural and technical barriers. The authors also aimed at determining the respondents' readiness to move into an apartment adjusted to their current and future physical condition.

The motive for undertaking the research is the mobility problem of an aging society and the assessment of readiness to change the place of residence into an apartment adapted to the needs of the person with mobility limitations. The authors analyse the degree of apartments' adaptation for this people.

The research was carried out based on the analyses conducted by Heldak et al. (Heldak, et al., 2018) covering the elimination of architectural and technical barriers in Poland and also the studies by Kurtyka-Marcak et al. (2019) and Przybyła et al. (2019) addressing the actual demand for construction works, as well as changes in interior finishing aimed at removing mobility limitations among the retirement age people in the entire Lower Silesia Voivodship. As it was established in the course of the aforementioned studies, this part of the society rarely applies for the status of a people with disabilities, and the actual need for the elimination of mobility barriers is, in fact, larger than the number of people with a disability certificate. The presented research results refer to city residents, the existing equipment of their dwellings, measures taken to eliminate their mobility problems and also the demand for mobility facilities.

The purpose of the study is to identify the current adaptation status of council, cooperative and owned housing for persons with mobility limitations in Poland residing in the cities of Wrocław and Jelenia Góra, and also to show the current housing equipment in utilities, including, e.g., access to cold water, hot water, access to sewage, gas, toilet in the apartment or on the staircase and the intensity of adaptation and renovation works in the apartment and its surroundings. The study aims at providing answers regarding the degree of readiness to change the resided apartments into the ones adapted to the needs of people with mobility impairments in people over 50. The authors aim was to find out the public mood among people aged 50 and over and their propensity to change apartments in the future.

In the course of the conducted analyses, the following research questions were formulated:

1. Does the standard of finishing and equipping an apartment with utilities actually depend on the construction year of the building in which the apartment is located?
2. Does the demand for adapting apartments to the needs of the elderly and the people with disabilities constitute a significant problem for the respondents?
3. Is it possible to identify significant differences between the finishing standard and the demand for the elimination of architectural and technical barriers in the analysed cities, according to the opinion of the residents?
4. Can the year of the building construction and the apartment standard have impact on the decision to change the apartment?

2 Research methodology

The research covered the area of two cities located in Poland, in the Lower Silesia Voivodship: Wrocław and Jelenia Góra (Fig. 1).

The city of Wrocław is the capital of the voivodship and, at the same time, a significant administrative, academic and service centre. The city of Jelenia Góra had the status of a voivodship city until the end of 1998. Currently, since 1999, only Wrocław has retained the status of a voivodship city in Lower Silesia (Kulczyk-Dynowska, 2017).



Fig. 1 Location of Wrocław and Jelenia Góra at the background of Poland

After the administration reform, Jelenia Góra lost its importance, which was reflected not only in a noticeable decrease in the number of its residents, but also in the total workers number (Przybyła, 2015).

According to the data provided by GUS [*Statistics Poland*], Wrocław was inhabited by 642,687 residents at the end of 2021, while Jelenia Góra by 77,366 people [*Statistics Poland*]. In terms of age structure, the situation was better in Wrocław, where the population in pre-working age accounted for 17.50%, whereas in Jelenia Góra the share was 14.70%. In relation to working age, the indicators in both cities were similar and amounted to 57.60% in Wrocław and 55.30% in Jelenia Góra, respectively. Significant disproportions were recorded in the number of retirement age population, which in Wrocław constituted 24.80%, while in Jelenia Góra as much as 30.00% of the total population. Unfortunately, the forecasts provided by Statistics Poland show that these changes will continue to deepen and in 2050 result in 12 children aged up to 14 and 34 persons aged 65 and older falling per 100 inhabitants of the Lower Silesia Voivodship. The aging process remains one of the most important challenges and demographic problems of the voivodship (Wojtkowiak-Jagacka, 2017).

In view of the higher number of post-working age residents, the direction and purpose of the presented research are even more justified.

people with disabilities The study required involving many people and conducting multithreaded analyses.

The individual stages of the conducted research:

- I. Source literature review and defining the research purpose;
- II. Preparing the survey (questionnaire);

- III. Conducting surveys in the cities of the Lower Silesia Voivodship: Wrocław and Jelenia Góra;

- IV. Analysis of the findings using descriptive method as well as statistical methods and searching for correlations:

- facilities in the apartment and its equipment with technical infrastructure devices vs. the year of the building construction (in total and in the analysed towns),
- the demand for devices facilitating mobility in the apartment vs. respondent's age (in total and in the analysed towns),
- renovations performed in the apartment,
- mobility facilities outside the apartment (in the immediate environment) vs. the respondent's age,
- tendency to change the current place of residence into an apartment adapted to the person's mobility needs (free from architectural or technical barriers) vs. the respondent's age;

- V. Determining the readiness to change the apartment into the one adapted to the person's physical needs;

- VI. Providing answers to the formulated research questions.

To achieve the intended purpose of the study, a survey was carried out among the people 50 and over. A significant amount of time was devoted to conducting direct interviews. The reason was respondents' hardware limitations, which precluded conducting the surveys using IT techniques. The respondents were distrustful and reluctant to agree to an interview.

The survey, conducted in the period between February and June 2022, covered random people, a total of 208 respondents, in the indicated age group. The authors did not establish guidelines for the number of people by sex, but the number of respondents in a given age group was important. The selection of respondents for the study used the random-purposive sampling method. The purpose criterion was the age of the respondent and the place of residence: Wrocław and Jelenia Góra. Source materials were collected based on the survey method using a questionnaire (Kopeć, 1983; Stachak, 1978).

In order to answer the research questions, statistical analyses were performed using IBM SPSS Statistics, version 25. The analysis of differences in the cross-tabulation of qualitative characteristics was performed using Pearson's chi-squared test (χ^2 test of independence). For all analyses, the maximum allowable type I error was adopted $\alpha=0.05$, while $p \leq 0.05$ was considered statistically significant.

It was established that over 82% of the respondents were up to 75 years of age. The remaining respondents were aged 76 to 80 (9%), 81 to 85 (4%) and over 85 (4%). Most of the respondents did not have a disability certificate (80%).

A general description of the respondents participating in the research sample is presented below (Table 1).

Table 1 Characteristics of the respondents participating in the study in terms of their place of residence, age, sex and the certificate of disability

Characteristics of the respondents		Place of residence						<i>p</i>
		Total		Jelenia Góra		Wrocław		
		<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	
Place of residence	Jelenia Góra	93	44.7%	93	100.0%	0	0.0%	-
	Wrocław	115	55.3%	0	0.0%	115	100.0%	
Sex	no answer	1	0.5%	1	1.1%	0	0.0%	0,319
	Female	127	61.1%	60	64.5%	67	58.3%	
Age	Male	80	38.5%	32	34.4%	48	41.7%	0,065
	no answer	1	0.5%	0	0.0%	1	0.9%	
	50–55	49	23.6%	32	34.4%	17	14.8%	
	56–60	29	13.9%	15	16.1%	14	12.2%	
	61–65	32	15.4%	10	10.8%	22	19.1%	
	66–70	33	15.9%	13	14.0%	20	17.4%	
	70–75	29	13.9%	11	11.8%	18	15.7%	
	76–80	19	9.1%	6	6.5%	13	11.3%	
	81–85	8	3.8%	3	3.2%	5	4.3%	
	86 years and over	8	3.8%	3	3.2%	5	4.3%	
Certificate of disability	No disability certificate	167	80.3%	82	88.2%	85	73.9%	0,015
	Light	16	7.7%	3	3.2%	13	11.3%	
	Moderate	16	7.7%	5	5.4%	11	9.6%	
	Significant	9	4.3%	3	3.2%	6	5.2%	

N – number; *p* – significance level

Taking into account the floor on which the respondents were living, it was found that 21% of the respondents stayed on the ground floor, 25% of them resided on the 1st floor, 14% on the 2nd floor, 21% on the 3rd floor, 7% on the 4th floor, and 10% on the 5th or a higher floor.

The terms used in the study are explained below (Table 2).

The research was conducted in such a way as to show the existing condition of the equipment and the standard of the respondents' apartments (current status), this section also shows the facilities installed by them in the apartments to eliminate barriers in moving around (sub-point 3.1), next the need for works aimed at removing barriers in moving around the apartment was presented (sub-Sect. 3.2), in the final phase, the facilities neces-

Table 2 The basic and specialist definitions of the terms used in the study

Name	Explanation
The degree of disability	In Poland, there are three degrees of disability: severe, moderate and mild. Statutory definitions of the above terms refer to the ability to work and the ability to perform social roles (including independent existence). Disability to a severe degree applies to a person incapable of work or able to work only in sheltered work conditions and requiring permanent or long-term care and assistance of other people due to the inability to live independently. A moderate degree of disability applies to a person incapable of work or able to work only in sheltered work conditions or requiring temporary or partial assistance of other people in order to perform social roles. A mild degree of disability applies to a person whose impairment of body functions results in reduced ability to perform work, or who has limitations in performing social roles that can be compensated by becoming equipped with orthopaedic items, aids or technical means – (Act on Vocational and Social Rehabilitation ..., 2023).
Certificate of disability	In Poland the disability assessment system is a two-instance procedure. The certificate is issued by poviats or municipal disability assessment teams (the first instance) and voivodship disability assessment teams (the second instance).
Voivodship	a unit of the basic three-tier territorial division of Poland and a unit of local self-government. It is the largest basic unit of the state established to perform public administration tasks. By virtue of legislation, on January 1, 1999 16 voivodships were established in Poland (Zieliński, 2013).
Poviat	a unit of the basic three-tier territorial division of Poland and, at the same time, a local self-governing community appointed to perform independently a part of the tasks of the state and equipped with material resources to implement these tasks. In Poland there are 314 poviats and 66 cities with poviat rights. Poviats are the second-largest local self-government structures and perform public tasks of supra-municipal nature, as defined by law (Dolnicki, 2012; Izdebski, 2014).

sary for the respondents to leave the building where the apartment is located were presented (sub-Sect. 3.3).

3 Results

3.1 Information about the respondent's living conditions

The survey also asked about the year of the building construction in which the apartment was located. The analysis of the provided responses revealed that the buildings constructed before 1945 were inhabited by 26% of the respondents, the buildings built in the period 1945–1975 were occupied by 21% of the respondents, the buildings erected between 1976 and 1990 were resided by 33% of the respondents, those built in the years 1991–2000 by 14% of the respondents, the remaining participants of the survey lived in dwellings constructed after 2000 (7%). The respondents living in Jelenia Góra most often lived in the buildings erected between 1976 and 1990 (44%), more than half of the respondents from Wrocław lived in older buildings.

The questionnaire included questions designed to show the current level of equipping apartments with the technical infrastructure devices. The questions referred to the presence of the following facilities and equipment in the dwelling:

o hot water,	o toilet on the staircase,
o only cold water,	o toilet in the apartment,
o central heating,	o national grid gas,
o tiled (coal) stove,	o bathroom.

Having a toilet on the staircase in Polish conditions means that the toilet is common for two or more apartments (shared) and is usually located in a common corridor.

The respondents could tick off more than one answer. The facilities and equipment in the apartment most often mentioned by the respondents were as follows: hot water (89%), toilet and bathroom in the apartment (75%), central heating (63%), national grid gas (56%). Less frequently, the respondents marked electric heating (18%), tiled stove (16%), toilet on the staircase (13%), only cold water (7%), bathroom without a toilet in the apartment (4%). Significantly more often, comparing the respondents from Jelenia Góra, the respondents from Wrocław had a toilet and a bathroom in the apartment ($p=0.002$), national grid gas (70%), electric heating ($p=0.012$). In turn, Jelenia Góra residents had a tiled stove ($p<0.001$), a toilet on the staircase ($p=0.001$) significantly more often (Table 3; Figs. 2 and 3).

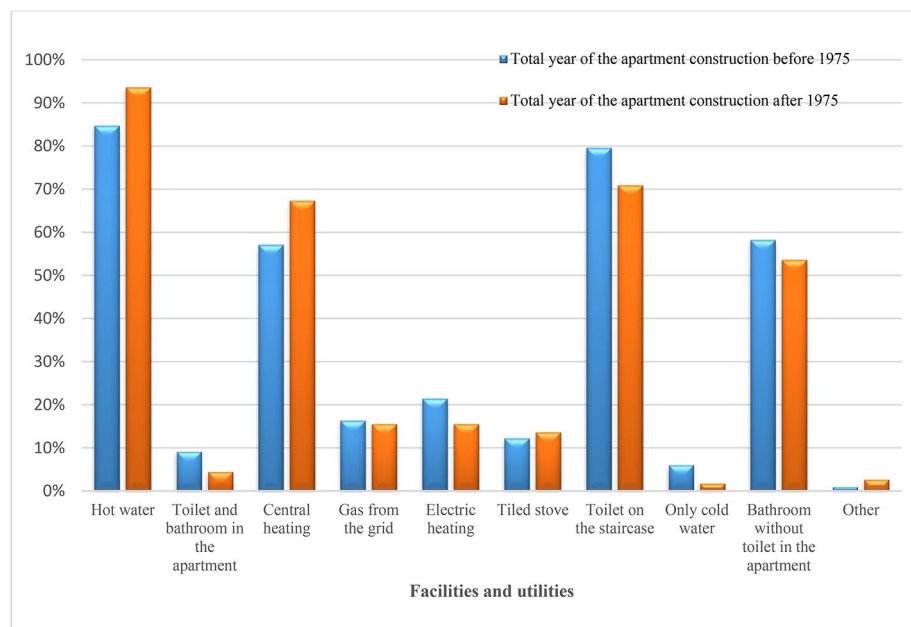
It was found that the availability of hot water was significantly higher in the buildings constructed after 1975 (94%) than in the buildings erected earlier (85%). The difference is statistically significant ($p=0.036$). No more statistically significant differences were found ($p\geq 0.05$).

When the answers provided by the respondents from Jelenia Góra only were analysed, it was found that a toilet and a bathroom in an apartment were significantly more common in the buildings constructed before 1975 (78%), less often in the buildings put up after 1975 (57%). The difference is statistically significant ($p=0.047$). A bathroom without a toilet in an apartment was marked only in the buildings built before 1975. In the case of the respondents from Wrocław, it was recorded that in the buildings constructed after 1975 hot

Table 3 Facilities and equipment in the respondents' present apartments in Wrocław and in Jelenia Góra (multiple answers possible)

Facilities and equipment in the apartment	Place of residence						<i>p</i>
	Total		Jelenia Góra		Wrocław		
	N	%	N	%	N	%	
Hot water	186	89.4%	84	90.3%	102	88.7%	0.704
Toilet and bathroom in the apartment	156	75.0%	60	64.5%	96	83.5%	0.002
Central heating	130	62.5%	57	61.3%	73	63.5%	0.746
Gas from the grid	116	55.8%	35	37.6%	81	70.4%	<0.001
Electric heating	38	18.3%	10	10.8%	28	24.3%	0.012
Tiled stove	33	15.9%	25	26.9%	8	7.0%	<0.001
Toilet on the staircase	27	13.0%	20	21.5%	7	6.1%	0.001
Only cold water	14	6.7%	5	5.4%	9	7.8%	0.483
Bathroom without toilet in the apartment	8	3.8%	2	2.2%	6	5.2%	0.253
Other	4	1.9%	1	1.1%	3	2.6%	0.423

N – number; *p* – significance level

**Fig. 2** Facilities and utilities in the present apartment, broken down by the year of the apartment construction – in total

water and central heating were present significantly more often. However, a tiled stove was reported only in the buildings built before 1975.

The conducted research also analysed whether the respondents had carried out renovations in their apartments in order to alleviate or eliminate mobility limitations. The research showed that 69% of all the respondents in Wrocław and Jelenia Góra performed such works. It was found that renovations were implemented significantly more often by the respondents



Fig. 3 Multi-family buildings: **A, B.** Tenement house (built before 1945), **C-D.** Multi-family building in the prefabricated large-panel technology (built around 1980), **E-F.** Contemporary construction (year of construction around 2010)

Table 4 Renovations performed to install the facilities eliminating architectural and technical barriers, broken down by place of residence

Description:			Place of residence	
			Jelenia Góra	Wrocław
Renovations performed to install the facilities eliminating architectural and technical barriers	Yes	Number	21	43
		share [in%]	22.6%	37.4%
	No	Number	72	72
		share [in%]	77.4%	62.6%
Chi - square test:			$\chi^2=5,30$; $p=0,021$	

Annotation. n – number; % – percentage; χ^2 – value of the chi-square test of independence; p – significance level

living in Wrocław (37%), and less often by the respondents from Jelenia Góra (23%). The difference is statistically significant (Table 4).

Based on the provided answers, it was found that an apartment was most often adapted to the respondent's needs through: adapting a bathroom and a toilet (25%), adjusting floor thresholds (21%), installing various handles and grippers (12%). Less frequently different texture or colour floors (8%), anti-skid floors (8%), widened door frames (6%), additional handrails along the walls (3%), ramps (3%), lifting equipment (2%), elevators (1%) were used. The residents of Wrocław significantly more often marked adapted bathrooms and

toilets, different texture or colour floors, lifts/elevators. In turn, the respondents from Jelenia Góra significantly more often used additional handrails along the walls (Fig. 4).

3.2 Actual number of people who need to eliminate barriers in their apartment

The majority of the respondents believed that living at home meant that they would experience certain limitations in terms of their physical mobility and day to day activities in their home (54% of the answers “definitely yes” and 39% of the answers “rather yes”).

The remaining respondents had an opposite opinion (2% of the answers “rather not”, 0.5% of the answers “definitely not”) or had no opinion regarding this issue (5%). The conducted statistical analysis did not show significant differences in the distribution of provided responses between the groups separated by place of residence ($p=0.524$).

Apart from the current state of adapting the apartment to the mobility needs of the people with mobility limitations, the demand for the elimination of architectural and technical barriers was also analysed. The respondents were most often of the opinion that adapted bathrooms or toilets should be available in the dwelling to facilitate mobility (52%). Less frequently they believed that the following facilities such be provided: anti-skid floors (33%), adapted floor thresholds (28%), various handles and grippers (21%), additional handrails along the walls (14%), widened door frames (12%). Few of the respondents expected such facilities as the lifts/elevators (7%), elevators (5%), different texture and colour floors (5%), ramps (4%) (Table 5).

The respondents over 65 years of age significantly more often than younger respondents expressed the need for such facilities in their apartment as additional handrails along the walls ($p=0.001$) and lifts/elevators ($p=0.033$). It was not found that the other facilities were significantly more often chosen by any of the age groups ($p\geq 0.05$) (Table 6).

This supports the general hypothesis that the need for mobility facilities in and out of the apartment increases with age. The respondents living on the ground floor or the first floor wished to have adapted bathrooms and toilets significantly more often than the respondents living on the upper floors ($p=0.026$). It was not found that the other facilities were significantly more often chosen by any of the groups separated according to the place of residence ($p\geq 0.05$).

Fig. 4 Facilities adapting the apartments resided by seniors to their mobility needs (multiple answers possible)

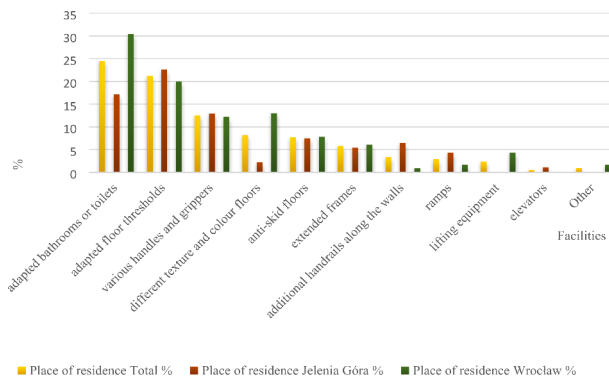


Table 5 Demand for the facilities adapted to the respondent's mobility needs – facilities required in an apartment to facilitate moving around (multiple answers possible)

The facilities adapted to the respondent's mobility needs	Place of residence						<i>p</i>
	Total		Jelenia Góra		Wrocław		
	N	%	N	%	N	%	
adapted bathrooms or toilets	109	52.4%	54	58.1%	55	47.8%	0.142
anti-skid floors	68	32.7%	27	29.0%	41	35.7%	0.312
adapted floor thresholds	58	27.9%	26	28.0%	32	27.8%	0.983
various handles and grippers	44	21.2%	17	18.3%	27	23.5%	0.361
additional handrails along the walls	28	13.5%	7	7.5%	21	18.3%	0.024
widened door frames	25	12.0%	14	15.1%	11	9.6%	0.226
lifts/elevators	15	7.2%	2	2.2%	13	11.3%	0.011
elevators	11	5.3%	2	2.2%	9	7.8%	0.069
different texture and colour floors	10	4.8%	1	1.1%	9	7.8%	0.024
ramps	8	3.8%	6	6.5%	2	1.7%	0.079
None of the above	40	19.2%	14	15.1%	26	22.6%	0.169
Other	1	0.5%	0	0.0%	1	0.9%	0.367

Annotation. *N* – number; % – percentage; *p* – significance level

Table 6 The distribution of responses regarding the demand for mobility facilities, broken down by the respondent's age. All respondents

The facilities adapted to the respondent's mobility needs	Age		<i>p</i>
	≤65	>65	
various handles and grippers	16.4%	26.8%	0.067
adapted bathrooms or toilets	56.4%	47.4%	0.199
anti-skid floors	30.9%	35.1%	0.527
additional handrails along the walls	6.4%	21.6%	0.001
adapted floor thresholds	30.0%	25.8%	0.499
ramps	2.7%	5.2%	0.366
widened door frames	14.5%	9.3%	0.246
elevators	5.5%	5.2%	0.924
different texture and colour floors	1.8%	7.2%	0.057
lifts/elevators	3.6%	11.3%	0.033
None of the above	20.0%	18.6%	0.793
Other	0.0%	1.0%	0.286

Annotation. % – percentage; *p* – significance level

3.3 Declared demand for amenities in the building and housing estate

In order to leave the apartment, the respondents most often needed such mobility facilities as: a bench in close proximity (51%), a lift (47%), various handles, grippers, handrails along the walls (35%), ramps or driveways (28%). They were less likely to need such facilities as pavements of different texture or colour (10%), extended door frames (9%), lifting equipment (4%).

The residents of Jelenia Góra significantly more often than the inhabitants of Wrocław expressed the need for benches in close proximity, ramps and driveways. On the other hand, the inhabitants of Wrocław significantly more frequently indicated the need for different

Table 7 Mobility facilities needed to leave the apartment (multiple answers possible)

Mobility facilities needed to leave the apartment:	Place of residence						<i>p</i>
	Total		Jelenia Góra		Wrocław		
	N	%	N	%	N	%	
bench in close proximity	107	51,4%	58	62,4%	49	42,6%	0,005
lift	98	47,1%	38	40,9%	60	52,2%	0,104
various handles, grippers, handrails along the walls	72	34,6%	30	32,3%	42	36,5%	0,520
ramps or driveways	58	27,9%	42	45,2%	16	13,9%	<0,001
pavements of different texture or colour	21	10,1%	4	4,3%	17	14,8%	0,013
widened door frames	19	9,1%	9	9,7%	10	8,7%	0,807
lifts/elevators	9	4,3%	0	0,0%	9	7,8%	0,006
None of the above	37	17,8%	11	11,8%	26	22,6%	0,043
Other	3	1,4%	1	1,1%	2	1,7%	0,690

Annotation. *N* – number; % – percentage; *p* – significance level

Table 8 The distribution of answers by age. All respondents

Mobility facilities needed to leave the apartment:	Age:		<i>p</i>
	≤65	>65	
bench in close proximity	30.0%	25.8%	0.499
lift	38.2%	56.7%	0.008
various handles, grippers, handrails along the walls	27.3%	43.3%	0.016
ramps or driveways	11.8%	6.2%	0.161
pavements of different texture or colour	51.8%	50.5%	0.852
widened door frames	8.2%	11.3%	0.443
lifts/elevators	0.0%	9.3%	0.001
None of the above	23.6%	11.3%	0.021
Other	1.8%	1.0%	0.636

Annotation. *N* – number; % – percentage; *p* – significance level

texture pavements and lifts/elevators. They also less often needed any mobility facilities necessary to leave their apartment (Table 7).

The respondents over 65 years of age significantly more often than younger participants of the survey required such facilities as: lift ($p=0.008$), various handles, grippers, handrails along the walls ($p=0.016$), lifts/elevators ($p=0.001$). Younger respondents significantly less often than the older ones required facilities necessary to leave the apartment ($p=0.021$) (Table 8).

An interesting element of the conducted survey are the answers provided to an open question: “Do you have any suggestions regarding the development of the city in relation to the needs of seniors and people with mobility impairments?”

The suggestions expressed by the respondents are as follows: more accessible lower-level pavements (4%), driveways to shops and offices (4%), even surface (3%), more benches (3%), more lifts (2%), more clubs for seniors (1%), more low-floor public transport vehicles (1%), more ramps for wheelchairs (1%), no stairs (0.5%), extended traffic light timing (0.5%), moving walkways (0.5%), handrails and ramps in municipal institutions (0.5%), more integration meetings for people with disabilities (0.5%), more toilets (0.5%).

3.4 Respondents' readiness to change their apartment

The further part of the study addressed the readiness to change the apartment into the one adapted to the mobility needs of the respondents. They were asked for their opinion regarding their propensity to change the apartment – at present or in the future (Table 9).

The respondents occupying the apartments built after 1990 were less likely to change their dwellings, but the standard of finishing the apartment was also higher than that of the apartments built in the period 1945–1990. It should be added that some of the respondents who owned the apartments rejected the possibility of changing their dwelling due to the form of ownership.

In the case of Jelenia Góra residents, the people living in the buildings constructed in the years 1945–1975 (50%) would be most often willing to change their apartment, while people living in the buildings erected in the years 1976–1990 (37%) would be less likely to do so, before 1945 (14%) and after 2000 (29%) respectively, people living in the buildings put up in 1991–2000 (8%) were least likely to do so. The difference is statistically significant ($p=0.001$). In the case of Wrocław residents, no statistically significant correlations were found between the willingness to change the apartment into a council flat adapted to the needs resulting from mobility limitations and the year of the building construction which the respondent currently occupies ($p=0.331$).

4 Discussion

The conducted research allowed answering the formulated research questions.

It was established that the standard of finishing and equipping the apartments in utilities frequently depends on the year of the building construction in which the apartment is located.

The current standard of equipment in the apartments occupied by the respondents shows that some of them are significantly underinvested. Not all the respondents have access to hot water in the apartment – as many as 11% declare no hot water. No central

Table 9 The respondents' readiness to change their apartment to a council flat adapted to their mobility needs, and the year of the building construction in which the apartment is located (all respondents)

Specification			Would the respondent be willing to change the apartment?		
			Yes	No	Maybe
Year of the building construction in which the apartment is located	Before 1945	Number	16	23	15
		% of the Year	29.6%	42.6%	27.8%
	1945–1975	Number	18	9	17
		% of the Year	40.9%	20.5%	38.6%
	1976–1990	Number	23	10	35
		% of the Year	33.8%	14.7%	51.5%
	1991–2000	Number	4	12	12
		% of the Year	14.3%	42.9%	42.9%
	After 2000	Number	3	8	3
		% of the Year	21.4%	57.1%	21.4%
Chi-square test of independence			$\chi^2=24.74$; $p=0.002$		

Annotation. % – percentage; χ^2 – value of the chi-square test of independence; p – significance level

heating, no toilet and bathrooms in the apartment are declared by 25% of the survey participants, moreover, some of the respondents' apartments are not connected to central heating – 36%. The research confirmed that the age of the building is important regarding the access to hot water ($p=0.036$) – the availability of hot water was significantly higher in the buildings constructed after 1975 (94%) than in the buildings erected earlier (85%).

Attention should be paid here to the extreme non-adjustment of apartments to modern standards of their equipment, including, in particular, a toilet on the staircase – as much as 13% of the respondents, or a bathroom without a toilet in the apartment – 4%. The reason for such situation may be the lack of funds for the renovation of buildings remaining in the municipality resources (they are usually low rent-regulated apartments), it may also result from structural obstacles of buildings or the lack of investment profitability along with a significant depreciation of the building.

Along with the deteriorating health of seniors, such a state of equipment in utilities is a huge problem in everyday existence. However, as shown by the research results published by Statistics Polans GUS (Statistics Poland, 2021), technical and sanitary conditions of dwellings occupied by seniors are still better in urban areas comparing to the rural ones, although the situation of older population living in rural areas is constantly improving.

Another question referred to the scale of demand for adapting apartments to the needs of the older adults and the people with disabilities. As presented above, as many as 52% of the respondents (109 people) indicated that in order to facilitate mobility, an apartment should have fitted bathrooms or toilets, slightly fewer marked facilities in the form of non-slip floors (33% – 66 people), and adapting floor thresholds (28% – 58 people). It can be concluded that the demand for renovations related to the adaptation of apartments is high, and adding the discussed facilities would significantly improve the daily functioning of elderly people. This is confirmed by the research carried out earlier in the Lower Silesia Voivodship by Kurtyka-Macak et al. (2019), based on which it was established that the number of people who need and do not have such facilities is significantly higher than those who need and have them. The number of respondents who had and needed a fitted bathroom amounted to 36.2% ($n=21$), whereas as many as 77.0% out of 214 people ($n=120$) did not have, but needed a fitted bathroom. The scale of the problem is significant and a systemic solution should be considered. In addition, the research conducted by GUS (2021) revealed that 2020 was yet another year which recorded a decrease in the percentage of seniors' households that were located in buildings with architectural barriers making access to them more difficult (from 31.4% noted in 2019 to 29.1%). In this respect urban inhabitants still experience a worse situation than the rural ones but in both cases an improvement comparing to the previous year was recorded.

Physical modifications to the original structure and design of dwellings, especially in relation to improving accessibility of its environment, have also been shown as the key elements in facilitating aging-in-place (Hwang, et al., 2011; Sixsmith & Sixsmith, 2008).

Apart from the problem of adjusting the apartment itself, the authors asked about adapting the immediate environment to the respondents' mobility needs. The question was formulated as an open-ended question (no suggested answer). It is surprising how many respondents indicated the need to adapt the pedestrian road for people with mobility prob-

lems. The respondents primarily asked for more accessible lowered level pavements, drive-ways to shops and offices, or smoothed pavement surfaces.

The authors of the research also asked a question: Is it possible to identify significant differences between the finishing standard and the demand for the elimination of architectural and technical barriers in the analysed cities, according to the opinion of the residents? It was found that the inhabitants of Jelenia Góra had a tiled stove and a toilet on the staircase significantly more often. The inhabitants of Wrocław significantly more frequently adapted bathrooms and toilets themselves as well as floors of various textures. On the other hand, the respondents from Jelenia Góra had additional handrails along the walls significantly more often. In turn, the demand in both cities for works facilitating independent mobility turned out to be enormous: as many as 52% of the respondents believe that in order to facilitate mobility, their apartment should be equipped with fitted bathrooms or toilets. As indicated earlier, the respondents living in Wrocław significantly more often than the residents of Jelenia Góra wished to have at their disposal such facilities as: additional handrails along the walls, lifting equipment and different texture and colour floors.

An important problem addressed in the research was related to the readiness for changing the apartment into a council flat (from the municipality housing resources) – adapted to the mobility needs of seniors. The following question was asked: Can the year of the building construction and the apartment standard have impact on the decision to change the dwelling?

When the total number of the respondents was analysed, it was found that the residents of buildings constructed in the years 1945–1975 (41%) and 1976–1990 (34%) were most likely to change their apartments. The least willing to move were those living in buildings erected in 1991–2000 (14%) and after 2000 (21%). The difference is statistically significant ($p=0.002$).

However, it is important to consider what is actually better for seniors. According to Wiles et al. (2011), older people want choices about where and how they age in place. The theory “Aging in place” was seen as an advantage in terms of a sense of attachment or connection and feelings of security and familiarity in relation to both homes and communities.

Should changing apartments into those adapted for people with mobility limitations be considered? The research into determining factors that favourably affect independent living of elderly people has been conducted not only in Europe, but also around the world (Szewrański, et al., 2018; Kazak, et al., 2017; van Hoof, et al., 2018). The standard and suitability of older people’s accommodation is vital to their quality of life and a key factor in their capacity to take care of themselves or to be cared for at home should they become dependent (Cullen, et al., 2007; Fox, et al., 2017).

In Poland, we have an example of a pilot apartment change program launched in Poznań (a city with a number of inhabitants comparable to that of Wrocław). The program is called: *Studio apartments for seniors* and focused on improving the housing conditions and the quality of living for seniors. The program also aims at adapting the apartment space to their needs, facilitate the implementation of programs addressed to elderly people, and counteract the social exclusion of seniors resulting from housing and social reasons (Regulation No. 368/2019/P of the President of the City of Poznań ..., 2019).

The elderly living in villages are in a worse situation in terms of fitting their dwellings with a bathroom, a flushed toilet and running hot water.

In 2019, 9 people aged 65 and older took advantage of the offer. The condition was to change the occupied council flat into a studio apartment or obtain the right to conclude a council flat lease agreement as part of the realization of the social list or housing list, or to obtain the right to conclude a council flat lease agreement based on an unrealized court ruling. Work on the program continued in the following years.

Currently, in Polish cities there is a possibility of exchanging a council flat as part of the application: renting the dwelling within the framework of a mutual exchange or ex officio exchange. However, this program is not financially supported by the city authorities in terms of adapting housing for the elderly. As it was mentioned in the introduction, in Poland, the State Fund for Rehabilitation of Disabled People (PFRON) (the Act of August 27, 1997 on vocational and social rehabilitation and employment of people with disabilities) is an institution that financially supports investments in the elimination of mobility barriers. Przybyła et al. wrote about the scale of assistance provided by this institution in 2020. PFRON (Art. 47) considers it appropriate to provide co-funding, as part of the elimination of architectural, urban and communication barriers, of the indicated investments in order to enable the participation of people with disabilities in social life. However, this applies to people with a disability certificate only, thus not to all seniors. In the indicated group of respondents, about 20% of them had such a certificate, hence the conclusion that other people in need have to adapt the apartment to their mobility needs at their own expense, usually with the help of their family.

5 Conclusion

The conducted research allowed answering the formulated problem questions. Based on the findings, the following conclusions were put forward:

1. It was established that the standard of finishing and equipping the apartments with utilities depends on the year of the building construction in which the apartment is located. Apartments age along with their users, and, at the same time, with people who require more than regular care and intimacy in dealing with their health problems.
2. The demand for adapting apartments to the needs of the elderly and the people with disabilities, which was established as a result of the research, indicates a significant problem resulting from the underinvested housing stock in Polish cities and the problem of moving around progressing along with the residents' age.
3. A greater tendency to change their place of residence into the one adapted to their mobility needs (free from architectural and technical barriers) was demonstrated by the residents of buildings constructed in the years 1945–1975 – as much as 41% and 1976–1990 (34%). Along with the deteriorating health condition, more facilities to move around are required as the residents age along with the building in which their apartment is located. This proves the lack of indispensable renovations in the buildings and the apartments. The system of co-funding renovations in the apartments resided by elderly people should be improved.
4. Contemporary housing construction is carried out taking into account the requirements of people with disabilities. In the past other housing standards applied, adapting which to the current level is costly and sometimes technically impossible to achieve. Seniors

are often doomed to live in a non-adapted apartment, without a lift, bathroom, hot water or central heating.

5. Local authorities should develop a renovation system for adapting apartments to the needs of people with reduced mobility and a system of changing apartments into the ones tailored to the needs of the elderly and people with mobility impairments.
6. Certainly, with the support of the city authorities and the state co-funding, the programs for people who have an apartment, but of a low standard and without the necessary facilities, can be created. The supervised system can additionally protect the elderly against possible fraud.
7. Further research of the authors' team addresses the influence of the form of housing ownership (council flat, cooperative apartment, condominium) on, e.g., the standard of utilities, adaptation to mobility needs and readiness to change an apartment into the one free from architectural and technical barriers.

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Declarations

Ethics approval and consent to participate Not applicable.

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