

Radosław Antczak

Institute of Statistics and Demography, SGH Warsaw School of Economics
rantcza@sgh.waw.pl
ORCID: 0000-0002-4797-0907

Izabela Grabowska

Institute of Statistics and Demography, SGH Warsaw School of Economics
igrabow@sgh.waw.pl
ORCID: 0000-0003-1144-294X

Jan Zwierzchowski

Institute of Statistics and Demography, SGH Warsaw School of Economics
jzwier@sgh.waw.pl
ORCID: 0000-0003-3355-1290

Tomasz Panek

Institute of Statistics and Demography, SGH Warsaw School of Economics
tompa10@interia.pl
ORCID: 0000-0002-1034-7222

We are more alike than you think. Age distribution of the quality of life among persons with and without disabilities

Abstract

Purpose

In this article we apply the age perspective to assess the quality of life (QoL) of persons with disabilities. Using a single measurement tool, we compare age profiles in the quality of life of persons with disabilities to the population without disabilities. By doing so, we examine whether

the general patterns (such as U-shaped profile) are observed also among the population with disabilities, hence assessing how heterogenous this group is.

Methods

We have constructed a multidimensional measurement model identifying overall and nine dimensions of the quality of life using structural equation modelling. The model conceptually is based on the Eurostat guidelines. All analyses are based on EU-SILC survey data, carried out in Poland in 2015.

Results

The quality of life for both groups has an inverse, right-skewed U-shape. The maximum value is achieved for the age group of 30–34 and after this threshold a constant decline is observed. The QoL scores for the population with disabilities are obviously significantly lower. Additionally, they are more heterogenous, and with greater variation between men and women. In a majority of the domains we also observe lower scores for persons with disabilities. However, people with disabilities are similarly diversified by age as persons without disabilities.

Conclusion

Our study suggests that people with disabilities are similarly diversified by age as persons without disabilities. Therefore, disability means something different for younger and older persons and this difference is reflected in their quality of life. It means that public policy for persons with disabilities should also be diversified, avoiding 'one-for-all' policy.

Keywords: quality of life, persons with disabilities, age, survey data

Introduction

Nowadays, many social and economic phenomena are seen through the prism of age. Analysis of age effects is not only present in scientific discourse, but also social policy is developed and operationalised in many countries through the lenses of age. Moreover, age is often an eligibility criterion to many social policy measures and entitlements. Different age groups have their own characteristics and own needs – many policymakers try to address the differences in the socio-economic situation of different age groups. Even if we take a holistic view at life course with overlapping periods of education and work, still demand for social services follows the age profile. Moreover, age profiles also vary by gender (Mortimer & Shanahan, 2003).

If we add to the age perspective the dimension of disability, the analysis becomes more complex. For the population with disabilities the demand for social and medical services changes with age in connection with the particular life stage, as well as with limitations connected with disabilities, which can also change due to age. The interactions between the life course perspective and the limitation connected with disabilities create the real demand for social policy tools ensuring basic rights and

proper functioning. With age the share of persons with disabilities grows, no matter if we refer to medical impairments or daily life functioning.

The third concept we use in this paper is the multidimensional quality of life (QoL), embracing different life domains, subjective and objective measures, the individual situation, and the external environment (such as access to medical and social services). Our assumption is to assess multidimensional quality of life from the point of view of both age and disability. Therefore, to measure multidimensional quality of life, we apply the guidelines of the European Statistical System (Eurostat, 2016).

Combining these three concepts, the purpose of this study is to investigate differences in QoL by age between the population with and without disabilities. First, we establish the overall QoL variable, as well as domain QoL variables, then we construct the age profile for all these variables separately for the population with and without disabilities. The third step is to test the differences between persons with and without disabilities in QoL variables by age. The analysis is done for Poland, using data from the EU-SILC Survey (The European Union Statistics on Income and Living Conditions) carried out in 2015.

The main contribution of the paper is twofold. The first one is of methodological character – we have developed a tool used to measure both the overall multidimensional QoL and the QoL in each life domain. The tool, based on capabilities approach (Sen, 1985, 1992), can be successfully used to measure QoL for the population with and without disabilities. The second one is the comparison of age profiles of the QoL (overall and in particular life domains) for the population with and without disabilities using the same measurement tool. This approach enables comparisons between the analysed populations.

This paper is organised as follows. The first part presents a literature review on measuring quality of life in the case of persons with and without disabilities, as well as on the relationship between age and quality of life. The second part identifies the relevant knowledge gaps and formulates research questions. The third part provides information on the model aimed at measuring quality of life. In the fourth part we present the findings. The last part contains discussion of the obtained results in view of the literature and their potential implications for social policy.

Literature review

The literature review consists of two parts. In the first one, we present a brief overview of the quality of life concepts, while the second underlines the relationship between quality of life and age. In both parts the disability dimension was also included.

Quality of life concepts

Considerations on human life are rooted in the ancient philosophy. Based on these foundations, two main constructs are used in the analysis of quality of life and well-being: hedonic well-being, eudaimonia, and life satisfaction. The first one underlines the importance of emotions, affect, and subjectivity, the second one points to self-development and self-realisation, and life satisfaction refers to cognitive aspects (Sirgy, 2012).

Although the term is commonly used, there is no single, universally accepted definition of quality of life. The World Health Organization's definition focuses on individuals' perceptions of their position in life and the correspondence with their expectations. Other definitions include satisfaction with needs, objective, and subjective evaluations of different dimensions of life, agency and meaning of life. It is gaining importance in the area of healthcare and, as such, it is identified as an outcome of the efficacy of the treatment (Ferrans, 2005). Hence, the concept is multifaceted, multidimensional, and ambiguous, and requires a clear definition before beginning the research.

For the purpose of this article we follow the individual-referenced definition of QoL outlined by Schalock, Keith, Verdugo, and Gomez (2010), in which they underline that QoL is a multidimensional phenomenon composed of core domains influenced by personal characteristics and environmental factors. The authors claim that core domains are the same for all people, although they may vary individually in relative value and importance. Alongside various definitions, there are also different measurement tools for this phenomenon (Cummins, 2005; Felce, 1997; Renwick et al, 1996; WHO, 1997).

To conceptualise precisely this general definition outlined above, we apply the capability approach, formulated by Sen (1985, 1992) for measurement of individual well-being. The capability approach can serve as a valuable tool to assess the quality of life as it addresses the issue of inequality and acknowledges human agency (Gilroy, 2007). Sen's (1985) formulation attempted to operationalise this measurement based on the capabilities and functioning. The starting point was the vector of goods (resources) in the possession of the unit, enabling them to function (Basu & Lopez-Calva, 2010). An individual can use the properties of owned goods to achieve certain functioning. In general, the bigger the set of available resources, the greater freedom enjoyed by individuals. Sen advocated measuring latent capabilities, which reflect the scope of freedom, rather than observed functioning for the purpose of assessing quality of life. Using the capabilities approach it is possible to measure levels of unobservable potential quality of life, which correspond to capabilities, rather than

being focused solely on observable indicators. Following Sen, we propose assessing individuals' levels of QoL by estimating values corresponding to their capabilities rather than functioning.

There are different approaches not only to the definition the QoL, but also to the measurement of this phenomenon. On the general level, we can distinguish two approaches to the measurement of quality of life, alongside the concepts described above. The first one is connected with measuring QoL for the total population or its particular sub-groups (present mostly in sociological, economic, and demographic research). The second one is dedicated strictly to populations with particular afflictions, which are usually connected with some kind of disability or disabilities (present mostly in medical and socio-medical research).

There are several examples of the first approach, i.e. developing the quality of life model for the total population or broad group. Such models are usually of multidimensional nature, e.g. Kelley-Gillespie developed an integrated conceptual model of Quality of Life for older adults, including 6 domains: 1) social well-being, 2) physical well-being, 3) psychological well-being, 4) cognitive well-being, 5) spiritual well-being, and 6) environmental well-being (Kelley-Gillespie, 2009). Yet, the most complex and precise concept of measurement is provided by the final report of the Sponsorship Group *Measuring Progress, Well-being and Sustainable Development* and the Task Force on multidimensional measurement of quality of life, accepted by the European Statistical System Committee (Eurostat, 2011). This proposal is an extension of the QoL measurement concept of Berger-Schmitt and Noll (2000), operationalised within the framework of the European System of Social Indicators, which refers to recommendations *Report on Measurement of Economic Performance and Social Progress* (Stiglitz, Sen, & Fitoussi, 2009). In those reports the multidimensional character of QoL was underlined, as well as the necessity to combine both subjective and objective measures. Moreover, it was clearly stated that QoL should be assessed both at individual and community levels. The Task Force on multidimensional measurement of quality of life in its final report identified 9 dimensions to be measured within the framework of the European Statistical System (Eurostat, 2016), i.e. material living conditions, productive or main activity, health, education, leisure and social interactions, economic and physical safety, governance and basic rights, natural and living environment, and overall experience of life. Each dimension comprises a set of indicators of subjective and objective character. The system of indicators enables analysis of different life aspects within each dimension and their time changes, as well as relative assessment of QoL of individuals or households. However, it does not provide an explicitly formulated guide to operationalise the measurement nor a synthetic measure of QoL.

When it comes to the second approach, the concept of quality of life also provides a useful conceptual and measurement framework to assess individual outcomes for persons with disabilities, guaranteed under the UNCRPD (Karr, 2011). Originally, clinical outcome measures were aimed at physical symptoms or mortality (Jespersen et al., 2018, Speight et al., 2009). Nowadays, it is widely recognised that quality of life is a goal of all healthcare interventions (Laranjeira, 2008). Moreover, within disability research, it has been suggested that quality of life should be considered as the key outcomes (Colver, 2009, Dijkers, 2010). One of the reasons for the growing interest in quality of life research of persons with disabilities is that for this group the need to improve their QoL is as an important target to be achieved as reaching full medical targets (understood as a state of full good health), which is usually not possible (Kłak, et al. 2012). In this approach, quality of life is also considered as a multidimensional construct, which includes physical, mental, and social dimensions (WHO, 1997). In the Polish literature (e.g. Wróblewska & Wróblewski, 2007) we can find adaptations to the Polish context of the general questionnaires used to measure the health-related quality of life (HRQoL), as proposed by the WHO (1997). QoL is studied for particular groups of persons with disabilities, distinguished by the type of disability or impairment.

The influence of a particular type of disability or affliction on the life quality was accentuated and measured in different domains, both using subjective and objective measures (i.e. Hornslien, Sandset, Bath, Wyller, & Berge, 2013; Taft, Magnusson, Ekstedt, & Malmgren, 2014). A significant literature on measurement tools of QoL for persons with a particular type of disability or impairment can be found in Polish research, especially in terms of subjective measures and questionnaires to measure subjective aspects of the QoL (i.e. Bak et al., 2013; Bąk-Drabik & Ziora, 2010; Chrobak, 2009; Cieślik & Podbielska 2015; Gnacińska-Szymańska et al., 2012; Jankowska-Polańska & Polański 2014; Kłak et al., 2012; Socha et al., 2011; Turska & Skowron 2009; Wielgosz et al., 2015). Moreover, in the Polish literature (e.g. Wróblewska & Wróblewski, 2007) we can find adaptations to the Polish context of the general questionnaires used to measure the health-related quality of life (HRQoL), as proposed by the WHO (1997).

These two approaches (general quality of life and QoL developed for persons with limitations) share important similarities: QoL should be composed of the same factors and relationships for all people, is experienced when a person's needs are met and when the individual has the opportunity to pursue life enrichment in major life activity settings, is comprised of both subjective and objective components, and is a multidimensional construct, influenced by individual and environmental factors (Karr, 2011; Verdugo et al., 2010). However, in the case of overall quality of life, developed for the total population, the scope of dimensions which were considered

was broader, whereas in the case of measuring QoL for persons with disability, the starting point is functioning connected with multiple, various limitations. In this article we decided to operationalise the first approach – we constructed a measure for the whole population and then we applied it for the population with disabilities. This approach is of the macrolevel character and has a bigger potential to create public policy guidelines towards the disabled population.

Quality of life and age

The age profiles of life quality depend on the method of measurement. Analysis by age is usually studied with regard to subjective aspects of quality of life – namely life satisfaction, happiness or well-being. The relationship is studied both on cross-sectional as well as panel data. Although panel data for analysing changes in quality of life by age are most desired, in many countries, Poland included, are not available in a longer perspective or very fragmented.

Much research deals with subjective measures of QoL and their distribution by age. The results are quite blurred. Commonly, it is believed that life satisfaction of persons over 50 years old deteriorates with age due to health problems, but scientific literature does not provide too much empirical evidence.

Recent studies show that the distribution of life satisfaction by age takes the U-shape, with the minimum at the 40–50 years age group (Blanchflower & Oswald, 2004, 2008; Böhnke & Kohler, 2010; Clark, 2007; Clark & Oswald, 2006; Gerdtham & Johannesson, 2001; Helliwell, 2003). Even controlling for cohort effects (Clark, 2007) or unobserved heterogeneity (Clark & Oswald, 2006) the U-shaped pattern still holds. However, there is no consensus in the literature about that – so far psychological literature has shown no relationship between age and life satisfaction (Cantril, 1965; Frijters & Beaton, 2012; Palmore & Luikart, 1972). For example, for Australia recent analyses have revealed even a negative (but weak) relationship between age and life satisfaction (Dear et al., 2002).

Stone et al. (2010) also noticed the U-shaped pattern of global well-being and hedonic well-being (positive affect) of Americans with an inflection point at the age of 54. They also examined patterns of well-being (both global and hedonic) for men and women and concluded that the age profiles are essentially identical, albeit with some gender differences in level. Moreover, Blanchflower and Oswald (2004) tested the age patterns of life satisfaction by gender. In the United States, without controlling for cohort effects, males reach their minimum life satisfaction at 35.7 years of age, but with the control for cohort effects, this minimum moved forward to 52.9. Women reached a minimum at 38.6, even when cohort effects are accounted

for. In Europe, well-being reached a minimum at 44.5 without cohort effects and at 46.5 with cohort effects.

A broader approach to measuring age patterns of life satisfaction can be found in studies conducted by McAdams et al. (2012), who analysed eight individual domains of life satisfaction: health, income, housing, partnership, job, social life, amount of leisure time, and use of leisure time. Age trajectories varied significantly across these domains, but in general, satisfaction with social life, housing, amount of leisure time and use of leisure time showed a U-shape pattern with age. When aggregating all eight domains, the U-shaped pattern held for the overall life satisfaction.

There is also, although very limited, evidence on an inverted U-shape pattern of life satisfaction by age (Easterlin, 2006; Easterlin & Sawangfa, 2007). In these studies, the authors used the life domains approach – they analysed such variables as happiness, financial satisfaction, job satisfaction, family satisfaction and health satisfaction, taken from the United States General Social Surveys (1973–1994). They found out that the level of happiness is the highest at mid-life, but not by a great deal. It rises from 18 to 51 years of age and declines thereafter (controlling for the birth cohort, gender, race, and education).

A linear relationship (upward or downward) between reported well-being and age has been observed by Deaton (2008), who – using the World Gallup Poll data – found out that the relationship between age and life satisfaction varies across countries, and in all of them the value of life satisfaction is the lowest for older age groups. Similar results were reached by Carmel (2001, 2011) for Israel.

An additional challenge with assessing the relationship between age and QoL is model specification. Van Landeghem (2012) concluded that when controlling for cohort effects with fixed-effects estimation, the U-shape disappeared and the curves of life satisfaction sloped upward with age. Similar results were reached by other researchers (Frijters & Beatton, 2012; Gwozdz & Sousa-Poza, 2010; Kassenboehmer & Haisken-DeNew, 2012).

Summing up, the studies on the relationship on life satisfaction, well-being or happiness and age provide unambiguous results. It was confirmed by López Ulloa et al. (2013), who analysed the relationship between age and life satisfaction by a literature review, but no conclusive finding was made. Their recommendation was to analyse satisfaction with various aspects of life.

Recently Eurofound published a report on relationships between age and quality of life (Eurofound, 2019) by its dimensions,¹ which can shed some light on this issue. The authors take a more multidimensional approach and they focus not only on life

¹ Based on the data from European Quality of Life Survey (EQLS).

satisfaction or well-being, but they define QoL through separate five dimensions: difficulty making ends meet, political participation in society, perceived social exclusion, mental well-being, life satisfaction. The results are quite diversified across dimensions and groups of countries. In terms of difficulty making ends meet, the authors showed it increased from young adulthood to mid-life, after then the financial tension started to decrease. In terms of perception of social exclusion, the curve is hump-shaped in all country clusters, with the exception of the Balkan countries. For the next dimension – political participation in the society – the profile of the curve is again hump-shaped, with a maximum for middle age groups in all the analysed European countries. As for life satisfaction, the curve was U-shaped in most analysed countries in 2011 (with a minimum at 45–54 years of age). In 2016 the life satisfaction significantly decreased for the age groups from 45–54 upwards in comparison to 2016 for Eastern European countries, whereas in some other European countries, the 2016 results point to life satisfaction decreasing with age.

In the analysis of QoL by age also the gender dimension is taken into account. In the literature we can find evidence that gender interacts with age in different ways, taking into account simultaneously income and cultural context (e.g. Mercier et al. 1998; Eckerman, 2014). The results of the interdependencies between age, gender and QoL depend on the particular measurement tool of the QoL used in particular studies. For example, as for subjective well-being, women in many countries consistently report higher levels, but this varies with age and across cultural contexts (Bălăţescu, 2014; Kaliterna & Burusic, 2014; Tiefenbach & Kohlbacher, 2014). There are studies for gender differences in QoL for particular age groups as well (Campos et al., 2014; Wróblewska & Wróblewski, 2007).

The age and gender effects of QoL are also present in the literature concerning populations with a particular impairment or disability (e.g. Geue, et al., 2014; Luna & MacMillan, 2015), but those studies refer more to medical effects. Another important dimension to examine quality of life by age is health. Bad health and disability negatively affect life satisfaction of older population. Health problems or disability has a stronger negative influence on life satisfaction for younger than for older persons (Angelini et al., 2012). Disability has a stronger impact on life satisfaction than personal characteristics, such as gender or marital status (Addabbo, 2016). When comparing subjective well-being of older couples with and without disabilities, in all well-being measures persons with disabilities report worse subjective well-being (Freedman et al., 2012). Several research studies also investigated the quality of life and well-being of persons with a specific disability of impairment, and not aiming at general population with disabilities (e.g. Geyh et al., 2007; La Grow et al., 2011; Simones & Santos, 2017).

Knowledge gap and research aim

In our research we use a multidimensional measurement model for individual QoL, based on the Eurostat guidelines (Eurostat, 2011, 2016), both for persons with and without disabilities. So far, this measurement concept has not been commonly used to measure quality of life for persons with disabilities. We realise that such a general tool, which can be applied to the whole population and its sub-groups can miss some specificity of QoL for persons with disabilities, however, the advantage of comparability between the populations with and without disabilities is crucial here. This approach implies using the same measurement tool for both populations: with and without disabilities.

The relationship between quality of life and age is not measured for the population with disabilities as a whole, usually the analysis recalls to subpopulation of persons with a particular type of affliction. Moreover, the age profiles for the entire population or its particular sub-groups are created for subjective measures of quality of life, such as life satisfaction, well-being or happiness. Little is known about age distribution of more multidimensional measures of QoL. In our study we investigate age profiles by gender with respect to multidimensional QoL measurement.

To conclude, the aim of this article is to identify and compare the age profiles of multidimensional quality of life – overall and in particular dimensions – for two types of population: with and without disabilities, and separately for men and women within each group.

Methods

We use data from the European Survey on Income and Living Conditions (EU-SILC), conducted in Poland in 2015. This survey was carried out under EU resolution on a sample representative for the Polish population aged 15 years and over. The total sample size for this year was 27,997, however, 2,698 persons did not answer the question on activities limitation, therefore, the final sample size used for analyses was 25,299 respondents. Persons with disabilities constitute 26.1% of the total sample. The main differences between two sub-samples are visible in their age structure, marital status, income, and education level. In the group of persons with disabilities, as compared to people without disabilities, there are higher shares of older cohorts (65 years and older), especially in the case of women – this group constitutes more than half of all the women with disabilities. In the group of persons without disabilities there are more single persons (especially among men) and among

those with disabilities – more widowed persons, mainly widowed women. The next difference is equivalised income, where quartiles were calculated based on the total sample. The shares of top income quartiles are much higher among the persons without disabilities. Finally, the population with disabilities had a much higher share of those with primary education (especially among women) and lower shares of persons with tertiary education. Additionally, much fewer persons with disabilities worked. The only characteristics where those two populations were similarly distributed is the place of living. The description of the sample, with the distinction for two sub-samples and gender, is presented in Table 1.

Table 1. Sample description

Characteristics	Persons							
	With disabilities				Without disabilities			
	women		men		women		men	
	n	%	n	%	n	%	n	%
Age								
up to 24 years	73	1.9	86	3.1	1191	11.9	1250	14.4
25–34	137	3.6	136	4.9	1570	15.7	1482	17.1
35–44	227	5.9	190	6.9	1866	18.7	1657	19.1
45–54	432	11.2	325	11.8	1705	17.1	1450	16.7
55–64	924	23.9	783	28.4	1974	19.7	1580	18.2
65–74	914	23.7	667	24.2	1110	11.1	895	10.3
75 years and over	1152	29.9	569	20.6	581	5.8	373	4.3
Size of place of living								
cities 500k and more	222	5.8	138	5.0	670	6.7	471	5.4
100k–499k	589	15.3	397	14.4	1441	14.4	1193	13.7
20k–99k	741	19.2	478	17.3	1860	18.6	1523	17.5
less than 20k	575	14.9	420	15.2	1387	13.9	1230	14.2
rural	1732	44.9	1323	48.0	4639	46.4	4270	49.2
Marital status								
single	325	8.4	392	14.2	2037	20.4	2550	29.4
married	1892	49.0	2038	73.9	6216	62.2	5631	64.8
divorced	236	6.1	121	4.4	553	5.5	280	3.2
widowed	1406	36.4	205	7.4	1191	11.9	226	2.6
Household size								
single hh	926	24.0	248	9.0	942	9.4	454	5.2
2 persons	1371	35.5	1213	44.0	2442	24.4	2095	24.1
3 persons	622	16.1	518	18.8	2152	21.5	2002	23.0
4 persons	435	11.3	375	13.6	2232	22.3	2093	24.1
5 and more persons	505	13.1	402	14.6	2229	22.3	2043	23.5

Characteristics	Persons							
	With disabilities				Without disabilities			
	women		men		women		men	
	n	%	n	%	n	%	n	%
Equivalent income quartiles								
bottom	1109	28.7	743	27.0	2415	24.2	2073	23.9
2nd	1120	29.0	772	28.0	2456	24.6	2002	23.0
3rd	954	24.7	724	26.3	2487	24.9	2131	24.5
top	676	17.5	517	18.8	2639	26.4	2481	28.6
Education level								
primary and below	1587	41.1	821	29.8	2049	20.5	1703	19.6
vocational	935	24.2	1168	42.4	2488	24.9	3418	39.3
secondary	933	24.2	512	18.6	2960	29.6	2006	23.1
tertiary	404	10.5	254	9.2	2500	25.0	1560	18.0
Employment status								
working	608	15.9	670	24.3	4965	49.7	5635	64.9
not working	3251	84.2	2086	75.7	5032	50.3	3052	35.1
Total	3859	100.0	2756	100.0	9997	100.0	8697	100.0

Source: own elaboration based on EU-SILC 2015 data.

In the next part we describe the QoL measurement model, and the process of creating age profiles.

QoL measurement model

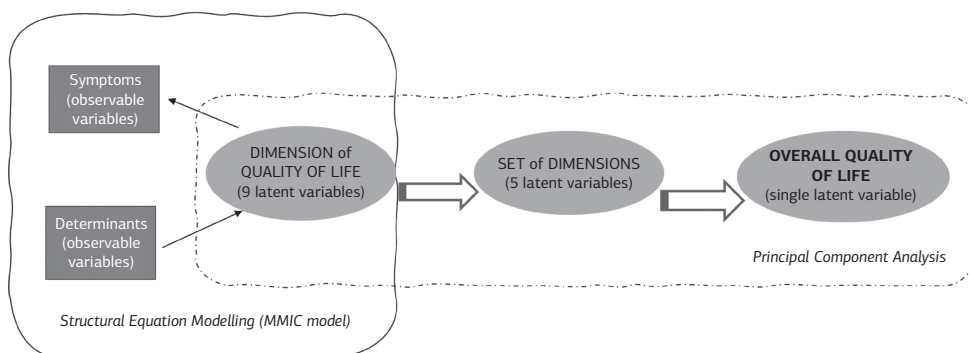
The identification for persons with disabilities was based on the commonly used measure of disability – activities of daily living limitation (ADL) (Wiener et al., 1990). This question has three categories: 1) strongly limited in daily activities, 2) limited, but not strongly, 3) not limited at all. All persons who were at least limited (1 and 2) in their activities are defined as those with disabilities.

We have chosen the model following the European Statistical System approach (Eurostat, 2011, 2016) due to its multidimensionality and possibility to operationalise. In its conceptual part, the model is based on the capability approach (Sen, 1985, 1992).

In the measurement of Quality of Life we applied the MIMIC model, in which capabilities are assigned to dimensions of quality of life, presented within the European Statistical System (Eurostat, 2011, 2016). The model includes 9 dimensions: material living conditions, productive or main activity, health, education, leisure and social interactions, economic and physical safety, governance and basic rights, natural and living environment, and overall experience of life. Each of the dimensions

is represented by a set of determinants (including individual characteristics of the respondents, such as gender, age, place of living or health status) and a set of symptoms which are directly an observable list of variables from EU-SILC questionnaires (see more details of the model in: Zwierzchowski & Panek, 2020). The analytical framework is presented in Figure 1 and the list of symptoms for each domain is included in Annex 1.

Figure 1. Analytical framework



Source: own elaboration.

The dimension QoL indicators were computed for each person, using estimated parameters in the proposed version of the MIMIC model. To estimate the overall life quality indicator for each person we used the formative approach (Diamantopoulos & Sigauw, 2006; Edwards & Bagozzi, 2007; Panek, 2016). In our study, the overall life quality is described as a latent variable influenced by dimension (group) quality of life indicators. The measurement model in this respect is based on the principal component method, which is often used for formative indicators (Maggino & Zumbo, 2012). In this method it is assumed that the overall quality of life indicator is a linear combination of dimension (group) life quality indicators and there is no measurement error (Panek, 2016). Both dimension and overall quality of life scores were calculated for the total sample (persons 18+).

In the next step, for the overall quality of life variable, as well as the variables responsible for quality of life in each of 9 dimensions, we created age profiles, i.e. mean standardised scores of quality of life for each 5-year old age group. These scores were calculated separately among the persons with and without disabilities. Such a procedure – calculating QoL scores in the first step for the total population, and then dividing the population into two sub-groups, allowed us to apply the same tool for persons with and without disabilities.

Results

Before analysing the age profiles, we assessed age as a determinant of quality of life (among the total population). Separate regressions for each dimension were carried out and as each dimension has a different distribution of QoL scores, it is not possible to directly compare the coefficient. Yet, we may say that age is a significant determinant of quality of life in each of the 9 dimensions and it is always significant on the p-level <0.00. Additionally, in 6 dimensions this influence is positive, meaning that the older the person is, the higher their quality of life is. In three dimensions, the direction is opposite – in health, governance and basic rights and overall experience of life – quality of life deteriorates as the person ages. These findings prove that age perspective is significant in determining quality of life.

Table 2. Age as a determinant of 9 quality of life dimensions using the linear regression method (total population 18+)

Dimension	Coefficient	Standard Error	P	Confidence Interval	
Material conditions	0.006	0.0012	0.000	0.004	0.008
Productivity	0.005	0.0002	0.000	0.005	0.006
Health	-0.031	0.0004	0.000	-0.032	-0.031
Education	0.010	0.0001	0.000	0.010	0.010
Leisure and social interactions	0.013	0.0009	0.000	0.012	0.014
Economic security and physical safety	0.004	0.0002	0.000	0.003	0.004
Governance and basic rights	-0.002	0.0003	0.000	-0.002	-0.001
Natural and living environment	0.0003	0.0001	0.000	0.0002	0.0004
Overall experience of life	-0.015	0.0009	0.000	-0.017	-0.013

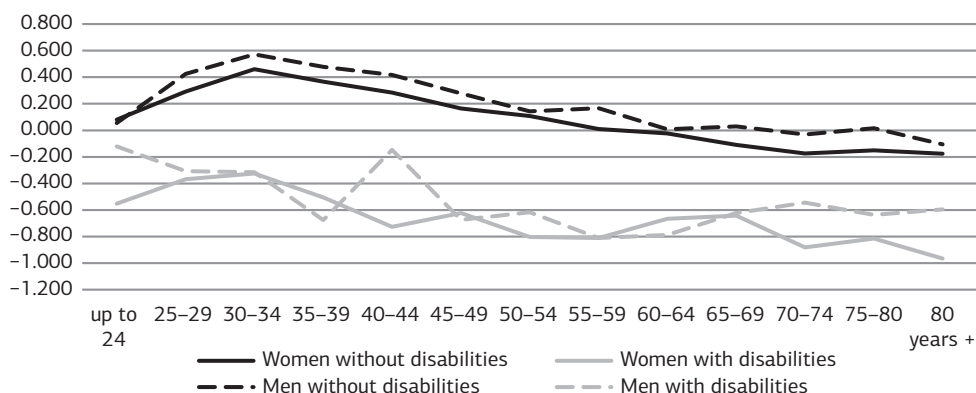
Source: own elaboration based on EU-SILC 2015 data.

After dividing the total population into two sub-groups – persons with and without disabilities – we start presenting the results from the age profiles of the overall quality of life (Figure 2). First, quite an obvious conclusion is that the overall quality of life for persons with disabilities (both for men and women) is lower than for persons without disabilities mainly as a result of limitations in different life domains caused by disability. The general shape of the curve for all four groups (women with disabilities, men with disabilities, women without disabilities, men without disabilities) is similar – their overall quality of life declines with age. For persons without disabilities, the shape is almost identical both for men and women – starting from a low value among the youngest age group, then growing quickly to achieve a peak at the age

of 30–34, after which the QoL score starts to decline. This decline is continuous, achieving the lowest value among the oldest old (who are people aged 80 years and over). Despite the same starting position, QoL is higher for men during the whole life, despite a decreasing difference between men and women in certain age groups (e.g. 50–54, 60–64).

In the case of persons with disabilities, the profile is not so pronounced and more diversified. There are also greater differences between both genders. Generally speaking, for women with disabilities the overall trend is negative, with a peak value for the age group of 30–34 and some rebounds at the age 45–49 and 60–64. For men with disabilities the profile is more diversified – there is a decrease observed until the age of 35, then until the age of 44 there is a significant recovery observed, after which again a decrease is recorded, with a slight increase after the age of 64 and stabilisation up to the last age group. The trend for men is visibly different than for women with disabilities and different than for men without disabilities.

Figure 2. Age profiles of the overall quality of life by gender and disability

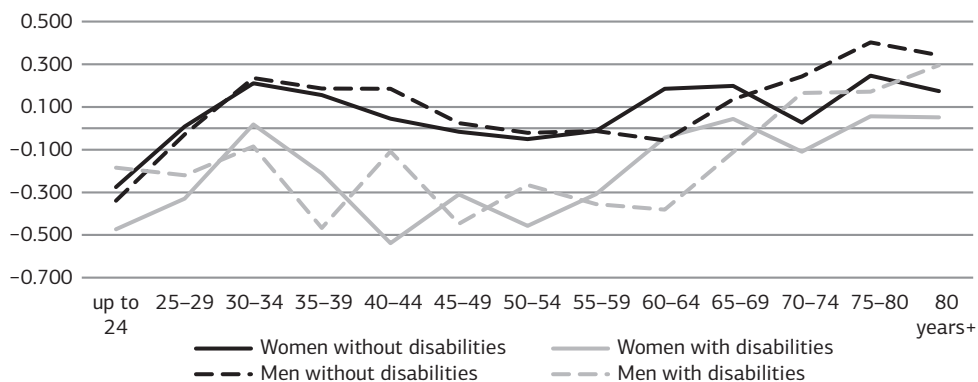


Source: own elaboration based on EU-SILC 2015 data.

In the analysis of the age profiles of the quality of life in the material conditions domain we can also notice that persons without disabilities enjoy higher QoL than persons with disabilities, for both genders, with a small exception among the youngest and the oldest groups. The biggest difference is observed from the age of 34 to 60, so for the age of the core labour market activity. Persons without disabilities have bigger opportunities to be active on the labour market and to improve their material conditions. Both for men and women we can observe an increase in QoL in this dimension until the age of 34. After that period, a downward trend is observed, stronger for persons with disabilities. A recovery is to be noticed after the age of 54 for

women (with and without disabilities), and after the age of 64 for men. Surprisingly, men with disabilities enjoy higher QoL than women without disabilities in the oldest age groups, which confirms strong gender disparities in material conditions, even offsetting the effect of disability. In all the groups, the highest scores are noted for the oldest persons.

Figure 3. Age profiles of the quality of life in the material conditions dimension by gender and disability



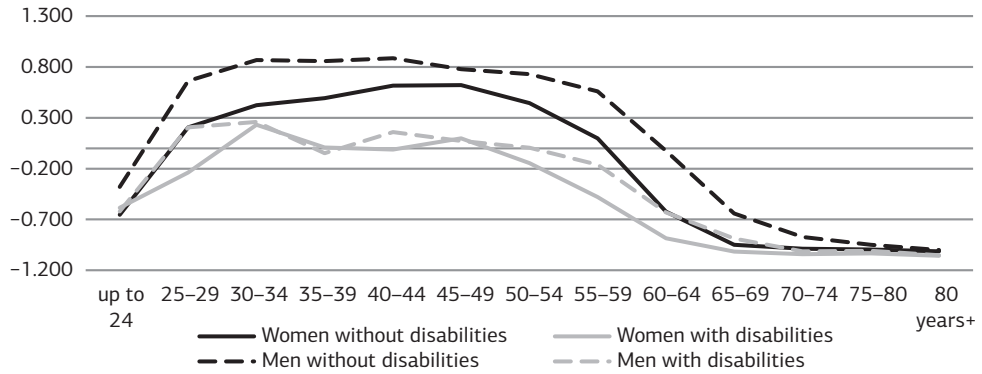
Source: own elaboration based on EU-SILC 2015 data.

The age profiles for the QoL in the productivity dimension follow a clear pattern both for persons with and without disabilities – an inverse U-shape pattern. The biggest difference between persons with and without disabilities can be observed for the age group of 34–59 for women and 25–59 for men. For women without disabilities the maximum value of QoL in the analysed dimension is observed for the age of 45–49, whereas for women with disabilities for the age of 30–34. The curve for men is flatter, both for persons with and without disabilities. For the oldest age groups (for women over 65 and for men over 74) the QoL in the productivity dimension is the same for persons with and without disabilities. The inverse U-shape pattern of the curve for both populations with and without disabilities (for both genders) results mainly from their labour market activity, which obviously is lower for the population with disabilities. For persons with disabilities at the age of 30–49 the QoL in the productivity domain gender differences are not pronounced in comparison to the population without disabilities.

For the QoL in the health dimension there is a strong downward trend recorded for persons with and without disabilities and both for men and women. Moreover, the difference between persons with and without disabilities is quite stable across

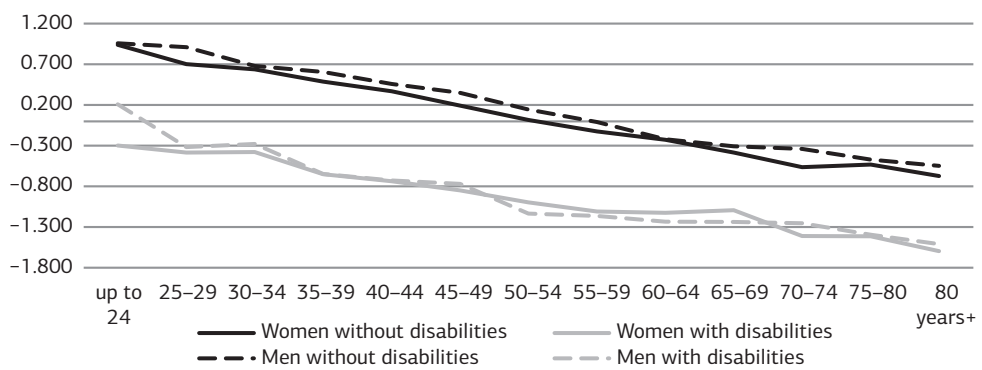
age. It is also one of the dimensions where the differences between men and women are very low. Hence, disability or a lack of disability has no effect on the pace of diminishing health as a person ages.

Figure 4. Age profiles of the quality of life in the dimension of productivity by gender and disability



Source: own elaboration based on EU-SILC 2015 data.

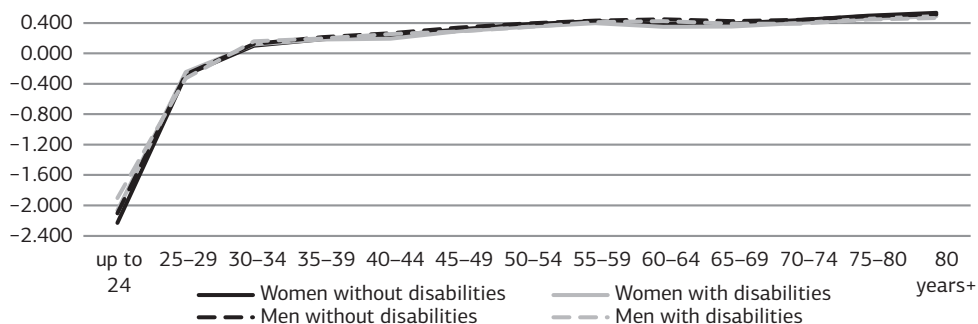
Figure 5. Age profiles of the quality of life in the health dimension by gender and disability



Source: own elaboration based on EU-SILC 2015 data.

As the education dimension is mainly based on the education level, and its maximum level is usually achieved in the beginning or mid 20s, the curve for the education domain of the QoL sharply increases up to the age of 30, and then it stabilises or grows slightly. The age profiles in this domain follow the same pattern for persons with and without disabilities, and for men and women. We also do not observe differences between these four groups.

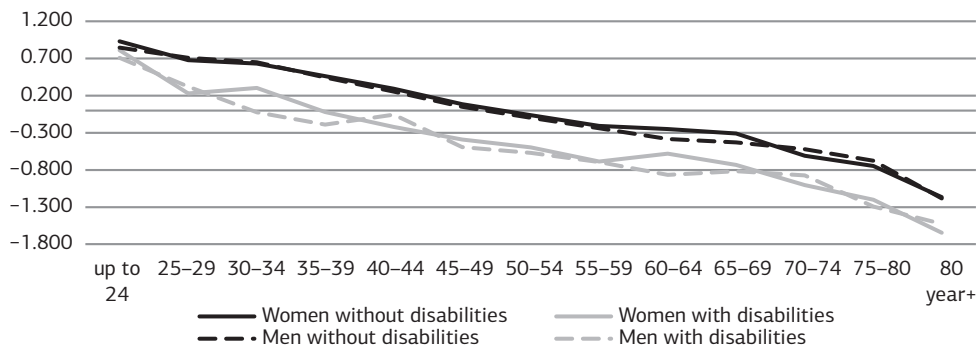
Figure 6. Age profiles of the quality of life in the education dimension by gender and disability



Source: own elaboration based on EU-SILC 2015 data.

The age profile of the QoL in the leisure dimension follows a downward trend for persons with and without disabilities and for men and women. Persons without disabilities enjoy higher QoL in this dimension for both genders (although the difference among the youngest age group is the lowest). The lines for men and women without disabilities are very much alike, but in the case of persons with disabilities some differences are observed, with higher QoL for women in the 30–34 and 60–64 age groups.

Figure 7. Age profiles of the quality of life in the leisure and social interactions dimension by gender and disability

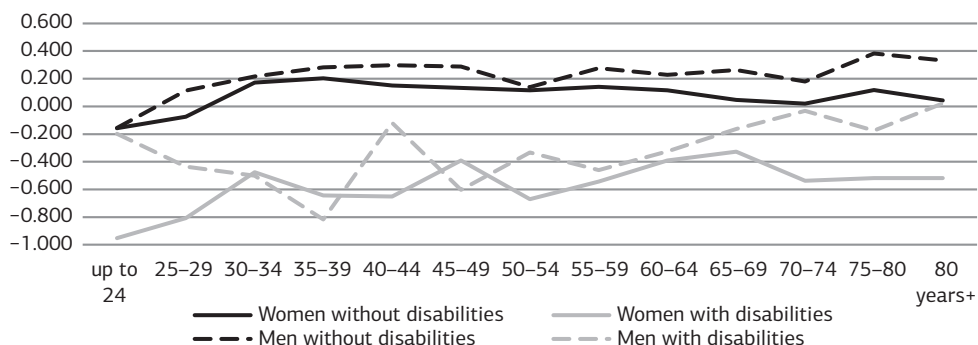


Source: own elaboration based on EU-SILC 2015 data.

The age profiles of the QoL in the security and safety dimension are generally flat for persons without disabilities. The QoL for persons without disabilities grows up to the age of 34, followed by almost a straight line until the last age group. For persons with disabilities there are some local maximums and minimums observed (especially for men), with a longer period of a constant increase for the age of 50–69

for women and 55–74 for men. Interestingly, older men in both populations enjoy higher QoL than older women (around the age of 60, 65), whereas in the younger age groups this difference is much smaller (with the exception of the youngest and middle-aged men with disabilities). Similarly to other domains, persons with disabilities enjoy lower QoL in this dimension than persons without disabilities, yet at older ages this gap narrows.

Figure 8. Age profiles of the quality of life in the security and safety dimension by gender and disability

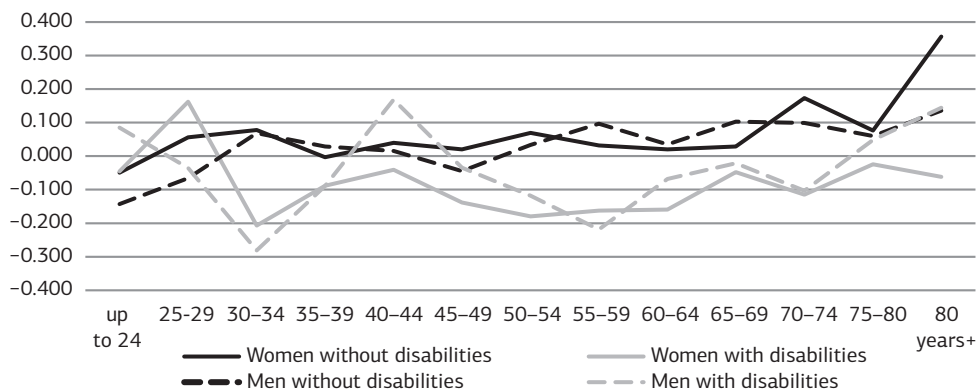


Source: own elaboration based on EU-SILC 2015 data.

The age profile for basic rights is not strongly diversified for persons without disabilities for almost all the age groups. Only for the oldest group of women without disabilities (over 75 years old) and the youngest men without disabilities (up to 34 years old) a significant increase is observed. For persons with disabilities the profile is much more diversified, especially for men. On the contrary to other domains, in the youngest age groups (men up to 24 years old, women up to 29 years old) persons with disabilities, both men and women, have higher QoL than persons without disabilities. Moreover, for men the same situation can be observed for the age group of 40–44.

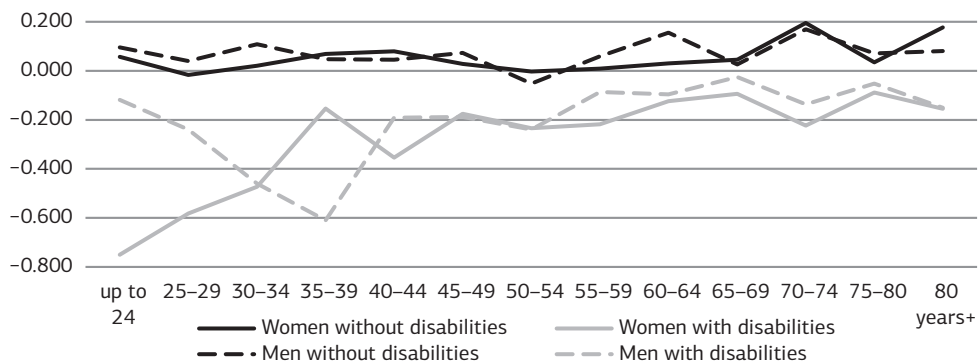
The age profile of the QoL in the environmental dimension is quite stable for persons without disabilities, with some local peaks and slides after the age of 69 for women and 49 for men. Those fluctuations were marginal, though. For persons with disabilities, the age profile in QoL in this domain is much more diversified. For women with disabilities there is a very strong increase recorded up to age of 39, after that age the QoL fluctuates on a small scale. For men with disabilities age profiles are different – until the age of 39 there is a strong decrease observed, and after that we observe an increase again and finally a stagnation (or a little increase) up to the oldest old age group. Generally speaking, the gender gap in this domain is rather low, both among the population with and without disabilities.

Figure 9. Age profiles of the quality of life in the basic rights dimension by gender and disability



Source: own elaboration based on EU-SILC 2015 data.

Figure 10. Age profiles of the quality of life in the environment dimension by gender and disability

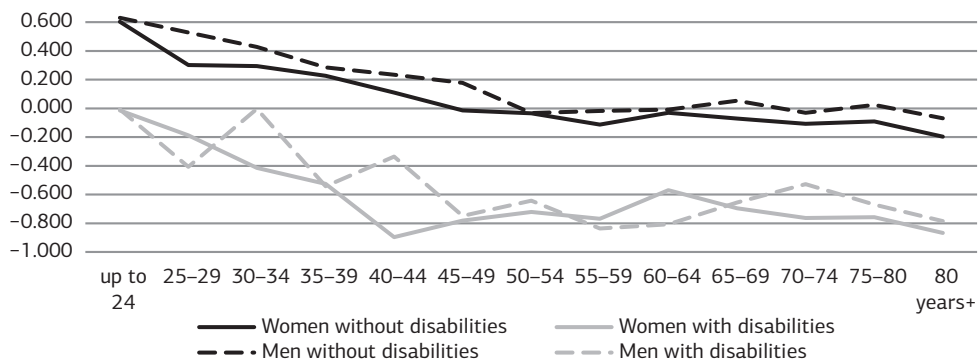


Source: own elaboration based on EU-SILC 2015 data.

The age profiles of the overall life experience, which is mainly related to life satisfaction and other subjective well-being indices, generally show a downward trend for persons with and without disabilities for both genders. For persons without disabilities the downward trend is more pronounced, whereas for persons with disabilities the profile is more diversified. For women with disabilities for the age group of 44–64 there is an increase observed, preceded and followed by periods of a decrease. For men with disabilities, the QoL in that domain fluctuates, showing a general downward trend with and an exception of the age group of 60–74, where

a steady increase is observed. Further research is needed to explain the fluctuation of the QoL curve in that domain for persons with disabilities.

Figure 11. Age profiles of the quality of life in the overall life experience by gender and disability



Source: own elaboration based on EU-SILC 2015 data.

Conclusion

In this study we have assessed the multidimensional quality of life of persons with disabilities across age and compared it to the quality of life of persons without disabilities. We developed a statistical model to construct domains and overall quality of life. Then, we compared standardised scores of the QoL for the two populations in 5-year age groups, for men and women separately. The important feature of the proposed QoL measurement model is its multidimensional character. The model is also universal, thus enables comparisons between populations with and without disabilities.

In general, Quality of Life for both groups has an inverse, right-skewed U-shape. The maximum value is achieved for the age group of 30–34 and after this threshold a constant decline is observed. This pattern is clearly visible for the population without disabilities, with almost an identical shape for men and women, although higher scores for men are maintained for the whole life.

The QoL scores for the population with disabilities are obviously significantly lower. They are more heterogenous across the age, and with greater variation between men and women. Women achieve the maximum for the age of 30–34, followed by a constant decrease up to the last age groups. For men with disabilities, the maximum is achieved for the age of 40–44, after which we observe a decrease and then a slight

increase after 64, followed by a stagnation. It means that disability has a various and complex influence on quality of life; moreover, it can differently affect men and women. An important hint in searching for the explanation to the shape of the overall QoL curve can be the fact that disability can happen at any point of lifetime. Many persons became persons with disabilities at older age due to limitations connected with biological ageing. Thus, their present QoL can be influenced by life experience without disabilities (Leveille et al., 2000). Additional explanation might be given by analysing the specific domains of quality of life.

In a majority of the domains, as expected, we observe lower scores for persons with disabilities. In the case of material conditions, the trends across the age suggest more similar trends for gender than the disability status: men – with and without disabilities – have similar patterns, likewise women. Even for the older age groups (after 69) men with disabilities have higher QoL than women without disabilities. Material conditions at older age are often a result of the their previous labour market activity. At older age (mainly post-working age) disability is often caused by biological ageing, hence, for many persons with disabilities at older age, their material situation results from their working age activity at the labour market, when they functioned without disabilities. That explains the convergence of the QoL curve in this domain between the population with and without disabilities. In the case of the age profile for persons without disabilities the results are also confirmed by the research done by Eurofound (2019) for Central and Eastern European countries – the shape of the age profile follows the same pattern for similar life domains.

In the productivity area, there are similar patterns for persons with and without disabilities. The gender differences are much smaller among the population with disabilities. Especially for the age groups of 30–49, the QoL in the productivity domain differences between men and women are smaller in comparison to the population without disabilities, which means that at that age, limitations connected with disabilities offset disparities connected with socio-economic gender roles (Neubert, 2019; Beigi & Cheng, 2010).

In the health domain, the patterns for both populations are almost identical, and the differences between genders are fractional. Almost identical patterns for both populations are also visible in the case of the education domain. Moreover, in this domain, the scores for both populations are on the same level. In the leisure domain, we again observe a similar (decreasing) trend among all four groups (men and women, with and without disabilities), although people with disabilities are more diversified. Higher QoL of persons without disabilities in this domain is probably the result of better access to social and cultural services. This diversity between persons with and without disabilities is especially visible in the domain of security and safety, where the

scores are generally stable across the age, with various slight differences between age groups. For persons without disabilities, the increase for the age of 50–69 for women and 55–74 for men can be associated with bigger availability of social security benefits. In the basic rights domain, the scores are also quite stable from young to old age, and similar for both populations. The similar result is to be observed for the Eurofound study (2019) for the political participation domain, which is the closest to the basic rights domain in our study.

The environment is the next domain where the scores for the population without disabilities are quite stable with age and similar for men and women, whereas among persons with disabilities, the scores fluctuate to a great extent and work differently for both genders: for women we observe an increase up to 40 years of age, followed by a stagnation, and for men we note a decline up to age 39, and then a sharp increase and then a very slight increase up to old age. Finally, in the overall experience domain, QoL scores decrease with age for both populations and the differences between men and women are very small. In our research the age profile in this domain follows a general downward trend for all the analysed populations, whereas in the case of the Eurofound research (2019) in the life satisfaction domain the curve was more U-Shaped for Central and Eastern European countries. However, it should be noted that in the case of our research the overall experience domain consists of more indicators than just life satisfaction.

Taking into account overall and domain-specific Quality of Life, the most important conclusion from our study suggests that people with disabilities are similarly diversified by age as persons without disabilities. Disability, therefore, means something different for younger and older persons and this difference is reflected in their quality of life. For example, the decline in general health as people age among those with disabilities has a similar pace as among persons without disabilities. Obviously, the starting point and the level is significantly lower for persons with disabilities, but the declining trend is similar in both populations. It means that public policy for persons with disabilities should also be diversified. There are different health policies for the middle-aged and different ones for older people within general populations, so it should also be undertaken for populations with disabilities.

Another important conclusion underlines greater differences between men and women among the population with disabilities. In a majority of the domains, not only differences are greater, but also the trend might be different. It points to a need for another diversification of policies towards persons with disabilities as they affect differently men and women. Moreover, gender stereotypes based on the general population might not be true for persons with disabilities. An especially important aspect is the interaction between gender (and gender roles), disability, and

age – disability can influence gender roles in different ways at different life stages. When considering a proper support system for persons with disabilities, also support in fulfilling gender and family roles should be provided. For balanced QoL the support system should embrace social, medical, educational, etc. services provided in local communities, which address a broad range of needs, also embracing fulfilling family and gender roles.

Overall, this study encourages greater diversification in creating public policy for persons with disabilities and to abandon ‘one-size-fits-all’ policy. This group undergoes similar transformations as the general population (declining quality of life with age), yet might be more heterogenous (greater differences between men and women), which should be studied further and reflected in policy making. This implies more flexibility and the need to establish individual support plans for persons with disabilities, embracing different support tools and services.

The paper gives the first insight into age effects in particular life domains by gender for populations with and without disabilities. However, it does not provide explanations to the particular shape of the age profiles of QoL by gender and disability. A further step should be to model the influence of the interactions of gender and age in QoL for populations with and without disabilities.

The paper embraces the analysis done for Poland. Cross-national comparisons of QoL of the age profile by gender and disability are the next direction of future research, using the same data source – the EU-SILC database. This will shed some light on differences in age profiles, taking into account various cultural and institutional settings.

Declarations

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Not applicable

Conflicts of interest/Competing interests

The authors declare no conflict of interest

Availability of data and material

Data available upon receiving a consent from the data supplier (Eurostat)

Code availability

Analysis carried out using the SPSS, STATA software

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Annex 1.

List of variables used as symptoms for each quality of life domain

Domains	Indicators
1. Material conditions	1.1. Median disposable equivalised income 1.2. At-risk-of poverty rate 1.3. At-risk-of poverty rate anchored at a fixed moment in time 1.4. Satisfaction with the financial situation 1.5. Severe material deprivation rate 1.6. (In)ability to make ends meet 1.7. Structural problems of the dwelling 1.8. Space of dwelling overcrowding/under-occupation
2. Productivity or other main activity (Productivity)	2.1. Employment rate 2.2. Unemployment rate 2.3. Long-term unemployment rate 2.4. People leaving in households with very low work intensity 2.5. Underemployed part-time workers 2.6. Low-wage earners 2.7. Long working hours (more than 48 at week) 2.8. Job satisfaction
3. Health	3.1. Self-perceived health 3.2. Unmet needs for medical care
4. Education	4.1. Educational attainment 4.2. Early leavers from education and training

Domains	Indicators
5. Leisure and social interactions (Leisure-Social-Interactions)	5.1. Non-participation in culture or sport activities 5. 2. Satisfaction with time use 5. 3. Financial obstacles to leisure participation 5.4. Frequency of getting together with friends 5.5. Satisfaction with personal relationships 5.6. Participation in voluntary activities 5.7. Help from others (having someone to rely on in case of need) 5.8 Having someone to discuss personal matters with 5.9 Trust in others
6. Economic security and physical safety (Security-Safety)	6.1. Population unable to face unexpected financial expenses 6.2. Population in arrears 6.3. Percentage of persons employed in previous year transitioning to unemployment this year 6.4. Perception of crime, violence, and vandalism in the living area 6.5. Safety feeling (population feeling safe when walking alone in their area after dark)
7. Governance and basic rights (Basic-Rights)	7.1. Trust in the police, the legal system and political system 7.2. Active citizenship
8. Natural and living environment (Environment)	8.1. Perception of pollution, grime and other environmental problems 8.2. Noise from neighbours or from the street 8.3. Satisfaction with recreational and green areas 8.4. Satisfaction with living environment
9. Overall experience of life (Experience-Life)	9.1. Overall life satisfaction 9.2. Negative affects (being very nervous, feeling down in the dumps, feeling downhearted or depressed) 9.3. Positive affects (being happy) 9.4. Assessing whether life is worthwhile