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Disability type–specific mortality patterns and life expectancy among disabled people in South Korea using 10-year combined data between 2008 and 2017

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ABSTRACT

People with disabilities have a higher mortality risk than non-disabled people. However, mortality patterns and life expectancy according to disability types are under-researched. This study investigated the sociodemographic characteristics and compared mortality and life expectancy among people with disabilities according to disability type in Korea using 10-year combined data between 2008 and 2017. The National Health Information Database from the National Health Insurance Service covering the total Korean population between 2008 and 2017 was obtained. This study described the age and income distributions of people with disabilities and calculated the mortality rate, proportional mortality ratio, and life expectancy according to disability type. Most disability subgroups had higher average ages than were found for non-disabled people. The proportion of the bottom 20% household income group was also higher in all types of disabilities than in non-disabled people. The crude mortality rate, age-standardized mortality rate, and life expectancy were all worse in people with all types of disabilities than in their non-disabled counterparts, but variations according to disability type were found. The composition of causes of death also varied across disability types. Although all types of disabilities were associated with higher mortality rates and lower life expectancy, the sociodemographic characteristics and mortality and life expectancy patterns differed across types of disability. People with disabilities experienced various health-related problems and financial burdens. Public assistance needs to be strengthened to guarantee adequate income and health care services for people with disabilities, considering their sociodemographic characteristics and mortality patterns.

1. Introduction

People with disabilities are known to have a higher risk of mortality than non-disabled people (Bahk et al., 2019a; Majer et al., 2011; Park et al., 2017; Plana-Ripoll et al., 2019; Warren and Knight, 1982). Although a previous study reported a decrease in the life expectancy gap between non-disabled and disabled men and women in South Korea (hereafter, Korea), the magnitude of the difference was still very high, at 16.4 years in 2017 (Bahk et al., 2019a).

Disabled people are not a homogeneous group of people, but encompass a wide variety of disability types, because various health conditions over the life course may lead to disability (Becker, 2006; Casasnovas and Nicodemo, 2016; Jamoom et al., 2008). Health disadvantages among disabled people compared with non-disabled people have been reported (Bahk et al., 2019a; Dammeyer and Chapman, 2018; Glover et al., 2017; Jung et al., 2020; Park et al., 2017). However, sociodemographic characteristics and mortality and life expectancy patterns by disability types have been substantially under-researched. In addition, information on the causes of death for each type of disability is sparse. Identifying subgroup-specific patterns in demography and mortality (including causes of death) may help us to better understand disabled people as a population comprising heterogeneous groups of people with various disabilities and to look for potential ways of intervention.

Abbreviations: NHID, National Health Information Database; NHIS, National Health Insurance Service; PMR, Proportional mortality ratio.

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Using total Korean population data, this study aimed to describe the sociodemographic characteristics of the disabled population in a subgroup-specific manner and to compare mortality and life expectancy according to disability type in Korea using 10-year combined data between 2008 and 2017.

2. Materials and methods

2.1. Data and study population

This descriptive epidemiological study used multi-year cross-sectional data covering the whole Korean population. We used pooled data from 10 cross-sectional years of the National Health Information Database (NHID), which is provided by the National Health Insurance Service (NHIS) in Korea, for the years between 2008 and 2017. The NHID data cover all Korean nationals living in Korea (Seong et al., 2017). The reliability and representativeness of the NHID have been verified in prior studies (Bahk et al., 2017; Kim et al., 2020). The annual numbers of population and deaths during the study period according to sex, age, income quintile, and disability type were obtained from the NHID. The income quintiles for each year were calculated for the total study population using the equivalized household income considering the number of family members. These income quintiles determined from the total Korean population were applied to all groups of disabled and non-disabled people in this study. Data on causes of death were obtained by linking the NHID to mortality registration data from Statistics Korea. One-year mortality was calculated for each annual sample of the study population. A total of 502,938,403 records (25,660,309 from people with disabilities and 477,278,094 from people without disabilities) and 2,628,599 deaths (660,299 with disabilities and 1,968,300 without disabilities) for the study period of 2008–2017 were analyzed. Therefore, the mortality rates reported in this study were 10-year aggregated estimates of annual mortality rates.

People with disabilities in this study were defined as those who were officially registered with the Korean government as having a disability based on the Act On Welfare Of Persons With Disabilities (Kim, 2019; Kim et al., 2014). The Act defines a person with a disability as "a person whose daily life or social activity is substantially hampered by physical or mental disability over a long period of time" and classifies disabilities into 15 types: physical disabilities, brain lesion disorders, visual impairment, hearing impairment, language disabilities, intellectual disabilities, autistic disorder, mental disabilities, renal impairment, cardiac impairment, respiratory impairment, hepatic impairment, facial disfigurement, intestinal or urinary fistula, and epilepsy disorder.

2.2. Statistical analysis

Considering the small numbers of population and deaths for some disability types (e.g., people with facial disfigurement, epilepsy disorder, or hepatic impairment), 10-year data were combined to calculate the mortality rate, proportional mortality ratio (PMR), and life expectancy. The non-disabled population was used as the standard population to calculate the age-standardized mortality rates. The PMR was calculated to compare the proportional mortality between disabled and non-disabled populations. Abridged life tables were constructed using 5-year probabilities of death separately for each disability type. Standard life table procedures were used to calculate the life expectancy (Preston et al., 2000), and the Kannisto-Thatcher method was employed to expand the open-ended age interval of 85+ to estimate the probability of dying for each of the 5-year age groups of 85–89, 90–94, …, 120–124, and 125+ (Thatcher et al., 1998). We used these approaches to calculate life expectancy in prior studies (Bahk et al., 2019a; Bahk et al., 2019b; Khang and Bahk, 2019; Khang et al., 2019). Causes of death were coded according to the International Classification of Diseases 10th Revision (ICD-10) and categorized into 15 broad and 60 detailed causes. The sex-specific analyses for the age-standardized mortality rates and life expectancy are presented in Supplementary Tables 1 and 2. However, the sex-specific analyses for PMR are not presented due to the small number of deaths for each cause of death among some disability types.

2.3. Ethical consideration

This study was approved and reviewed by the National Health Insurance Service of Korea (No. NHIS-2022-1-148) and the Seoul National University Hospital Institutional Review Board (IRB No. E-2002-016-1098). The requirement for informed consent was exempted by the board because aggregate data without any personal information were used.

3. Results

Table 1 showed disability type–specific numbers of disabled population. In total, disabilities were present in 5.1% (N = 25,660,309) of the 10-year combined total Korean population (N = 502,938,403). People with physical disabilities accounted for 52.7% of the total disabled population, followed by people with hearing impairment (10.4%), brain lesion disorders (10.0%) and visual impairment (9.9%). People with facial disfigurement (N = 27,755), epilepsy disorder (N = 89,364), hepatic impairment (N = 98,792), cardiac impairment (N = 115,796), respiratory impairment (N = 148,671), intestinal or urinary fistula (N = 158,626), autistic disorder (N = 163,605), and language disabilities (N = 189,503) each accounted for less than 0.05% of the total Korean population, and less than 1% of the total disabled population.

Table 1 presents differences in the age distribution according to disability type. Compared with people without disabilities (mean age = 38.2 years old), people with disabilities were generally older (mean age = 58.0 years old) and had a higher proportion of people over the age of 35, except for people with intellectual disabilities and autistic disorder. The mean ages of people with intestinal or urinary fistula (66.8 years old), hearing impairment (66.5 years old), respiratory impairment (64.8 years old), brain lesion disorders (62.1 years old), and visual impairment (60.0 years old) were 60 years old or over. Individuals aged 0–14 accounted for more than half of people with autistic disorder (mean age = 15.3 years old).

As also shown in Table 1, lower income levels were found among disabled people. Among non-disabled people, 18.9% were in the lowest income quintile, whereas this proportion among disabled people was 34.2%. In all types of disabilities, the lowest quintile of income was the largest group among all five income quintiles. Of particular note, more than 60% of people with intellectual disabilities (61.6%), mental disabilities (75.9%), and epilepsy disorder (60.8%) were in the lowest 20% of income.

Table 2 presents the disability type–specific numbers of deaths, crude mortality rate, and age-standardized mortality rate. Of a total of 2,628,599 deaths for the 10 years between 2008 and 2017, 25.1% (N = 660,299) occurred in disabled people, a 5-fold greater proportion compared with the proportion of disabled population (5.1%) among the total population. Very high crude mortality rates, exceeding 6,000 per 100,000, were found among individuals with respiratory impairment, hepatic impairment, intestinal or urinary fistula, renal impairment, and brain lesion disorders. In terms of age-standardized mortality rates, disabled people had a 2.7 times (1103.3 per 100,000 divided by 412.4 per 100,000) higher mortality risk than non-disabled people. At least a 2-fold higher probability of mortality was found for each disability type. People with respiratory impairment, hepatic impairment, and intestinal or urinary fistula had a 10-fold higher age-standardized mortality rate than non-disabled people (Table 2).

Table 3 presents the PMRs of the disabled population based on the proportional mortality of the non-disabled population. In general, deaths due to congenital malformations showed an elevated proportional mortality among people with disabilities compared to the non-disabled population, although the absolute proportion was relatively

Table 1
Numbers of population, proportion (%) of men, mean age, and age and income group distributions according to disability type from the 10-year combined data between 2008 and 2017.

Disability type	Number of population	% of men	Age		Age group distribution (%)				Income group distribution (%)					
			Mean	SD	0–14 years	15–34 years	35–64 years	65 + years	Q1 (lowest)	Q2	Q3	Q4	Q5 (highest)	NA
Total population	502,938,403	50.0	39.2	20.8	15.5	28.0	44.9	11.6	19.6	19.7	19.6	19.6	19.6	1.8
Non-disabled	477,278,094	49.6	38.2	20.4	16.2	29.1	44.6	10.1	18.9	19.8	19.8	19.8	20.0	1.8
Disabled population	25,660,309	58.5	58.0	17.7	2.4	8.7	50.5	38.4	34.2	17.6	17.3	16.2	13.4	1.3
Physical disabilities	13,524,838	58.5	59.6	14.8	0.4	5.8	55.8	38.0	29.9	18.7	18.6	17.3	14.2	1.4
Brain lesion disorders	2,570,962	57.2	62.1	18.6	4.6	4.7	38.3	52.4	33.1	16.7	17.4	17.0	14.2	1.6
Visual impairment	2,552,256	59.9	60.0	16.6	1.0	7.8	49.0	42.2	31.0	19.3	18.5	16.7	13.3	1.3
Hearing impairment	2,656,176	54.9	66.5	17.1	1.5	4.5	33.2	60.8	27.5	19.3	19.2	18.0	14.6	1.4
Language disabilities	189,503	72.1	50.6	21.5	11.1	11.6	48.5	28.8	37.7	18.6	17.1	14.4	10.9	1.3
Intellectual disabilities	1,805,109	60.4	34.0	16.9	14.4	41.2	40.5	3.9	61.1	12.4	9.9	8.5	7.4	0.6
Autistic disorder	163,605	84.5	15.3	7.5	55.6	43.0	1.3	0.1	26.9	16.0	15.9	18.4	21.4	1.4
Mental disabilities	880,157	52.2	49.4	11.6	0.2	10.7	80.5	8.6	75.9	6.9	6.3	5.9	4.7	0.4
Renal impairment	678,699	57.3	57.5	13.9	0.3	5.9	63.6	30.2	36.4	15.6	16.1	16.1	14.7	1.2
Cardiac impairment	115,796	61.9	59.2	19.0	5.3	7.3	41.4	46.1	31.1	16.9	17.6	17.6	15.4	1.4
Respiratory impairment	148,671	76.4	64.8	11.8	0.4	1.5	45.1	53.1	35.6	17.1	17.7	16.1	12.2	1.3
Hepatic impairment	98,792	73.6	54.1	13.0	3.3	3.4	79.2	14.0	27.0	16.1	16.9	17.7	20.6	1.6
Facial disfigurement	27,755	58.4	48.9	15.9	2.7	17.8	64.3	15.2	37.4	18.8	17.2	14.5	10.6	1.5
Intestinal or urinary fistula	158,626	58.6	66.8	13.0	0.5	1.9	37.5	60.1	24.7	18.6	19.0	19.3	16.8	1.6
Epilepsy disorder	89,364	55.6	46.0	13.3	1.9	18.9	73.0	6.3	60.8	13.0	11.2	8.5	5.8	0.7

NA: not available, SD: standard deviation.

small (see Supplementary Table 3 for specific figures of proportional mortality). Of particular note, the PMRs for congenital malformations were very high among those with intellectual disabilities (PMR = 26.82), autistic disorder (PMR = 41.17), and cardiac impairment (PMR = 45.39). In the case of physical disability, visual impairment, and hearing impairment, the distribution of causes of death was relatively similar to that of non-disabled people. For some disability types, the main causes of death were associated with the characteristics of the disability itself. For example, people with cardiac impairment showed a large proportion of death due to cardiovascular diseases (PMR = 2.79), and people with renal impairment showed a large proportion of death due to urinary diseases (PMR = 26.02). Meanwhile, the proportion of deaths due to external causes was higher (exceeding 20%) among people with autistic disorder (40.23%, PMR = 3.18), mental disabilities (24.31%, PMR = 1.92), and epilepsy disorder (22.64%, PMR = 1.79) than among people with other types of disabilities and non-disabled people (see both Table 3 and Supplementary Table 3).

Fig. 1 presents life expectancies and 95% confidence intervals for the period of 2008–2017 according to disability type. The life expectancy gap between the disabled and non-disabled population was 17.6 years. The life expectancy of people with respiratory impairment was the shortest (19.0 years), and the life expectancy gap was 63.8 years. Among disabled people, people with hearing impairment (77.6 years) and facial disfigurement (76.4 years) showed relatively long life expectancies compared to those with other types of disabilities, and the life expectancy gaps were 5.2 and 6.4 years, respectively.

4. Discussion

This study analyzed sociodemographic characteristics, mortality, and life expectancy according to disability type. Existing studies have revealed that people with disabilities have disadvantages in terms of health and mortality through a comparison of people with disabilities versus people without disabilities (Bahk et al., 2019a; Jung et al., 2020; Ko et al., 2011; Park et al., 2017). However, this study made a novel contribution by presenting mortality disadvantages among various subgroups of disabled individuals using national data covering the total population in a country.

According to this study, people with any disabilities accounted for about 5% of the total population but accounted for a quarter of the total deaths. The people with disabilities analyzed in this study were limited to government-registered persons only; thus, the data do not cover all disabled people in the community. If all persons with disabilities in the community were considered or registered, the proportion of deaths from people with disabilities would well exceed a quarter of total deaths. These findings indicate that a large proportion of deaths at the national level could be attributable to deaths among people with disabilities. According to the National Survey on Persons with Disabilities in 2017, 97.3% of persons with legally defined disabilities were officially registered (Korea Institute for Health and Social Affairs, 2017). Additionally, according to the Korea National Health and Nutrition Examination Survey in 2020, 6% of the population aged 19 years and older currently have health problems or restrictions in daily life and social activities due to physical or mental disabilities (Korea Centers for Disease Control and Prevention, 2022). Considering the population under the age of 19, the prevalence of disability would be even greater than 6%. Based on this, it is assumed that the persons with disabilities included in this study covered about 80%–85% of the total population with disabilities, including minor restrictions, in Korea.

In this study, people with disability generally had higher average ages than people without disabilities, while persons with intellectual disabilities and autistic disorder showed lower average ages than the population average. The mean age gap between disabled (58.0 years) and non-disabled (38.2 years) individuals was 20 years, indicating that disabilities generally reflect conditions closely associated with population aging. In Korea, the proportion of people aged 65 and over in 2021 is 16.6%, but is expected to double (34.4%) in 2040 (Korea, 2021). The speed of aging in Korea is known to be very rapid, and is the fastest

Table 2
Number of deaths, crude mortality rate, and age-standardized mortality rate according to disability type from the 10-year combined data between 2008 and 2017.

Disability type	Number of deaths	Crude mortality rate (per 100,000)	Age-standardized mortality rate (per 100,000)
Total population	2,628,599	522.6	470.4 (469.9–471.0)
Non-disabled	1,968,300	412.4	412.4 (411.8 – 413.0)
Disabled population	660,299	2,573.2	1,103.3 (1,098.2–1,108.3)
Physical disabilities	240,492	1,778.2	890.3 (872.0 – 908.7)
Brain lesion disorders	162,739	6,329.9	2,560.8 (2,533.6 – 2,587.9)
Visual impairment	58,158	2,278.7	811.9 (795.3 – 828.6)
Hearing impairment	81,600	3,072.1	593.3 (582.5 – 604.0)
Language disabilities	5,790	3,055.4	1,541.3 (1,493.6 – 1,589.1)
Intellectual disabilities	14,085	780.3	1,289.1 (1,261.4 – 1,316.9)
Autistic disorder	175	107.0	1,378.3 (826.3 – 1,930.3)
Mental disabilities	13,145	1,493.5	1,399.9 (1,314.7 – 1,485.2)
Renal impairment	44,536	6,562.0	3,286.9 (3,119.2 – 3,454.5)
Cardiac impairment	5,911	5,104.7	2,966.6 (2,822.9 – 3,110.4)
Respiratory impairment	14,310	9,625.3	5,897.1 (5,454.2 – 6,339.9)
Hepatic impairment	7,156	7,243.5	5,484.3 (5,213.7 – 5,754.9)
Facial disfigurement	258	929.6	726.6 (629.1 – 824.1)
Intestinal or urinary fistula	10,748	6,775.7	4,726.9 (4,475.6 – 4,978.1)
Epilepsy disorder	1,196	1,338.3	1,427.5 (1,304.7 – 1,550.4)

among OECD countries (Lee, 2019). These facts suggest that demographic, socioeconomic, and health issues derived from disabilities will likely be of essential importance in Korea in the near future as Korea ages rapidly.

This study revealed poor economic conditions among people with disabilities. The share of the lowest income bracket was relatively high in people with most types of disabilities. More than 60% of people with intellectual disabilities, mental disabilities, and epilepsy disorder were placed in the bottom 20% of income. Both causation (low income determines poor health) and selection (poor health determines poor economic status) mechanisms might have produced the close relationship between low income and disability (Macintyre, 1997). Low income may impact both the occurrence of disabilities (e.g., manual workers with low income might be prone to occupational injuries, leading to physical disabilities) and the progression of disabilities. The financial burden might be a significant factor contributing to the health status and unmet needs for medical services among people with disabilities. For example, elderly people with both severe disabilities and low income reportedly reduced their medical use (Jeon et al., 2017). Meanwhile, people with disabilities need additional economic costs of living to maintain a similar level of well-being as people with no disabilities (Mitra et al., 2017). For people with additional medical problems other than disabilities, extra health care costs could be disproportionately burdensome for low-income groups, potentially obstructing access to health care. In addition, disability leads to exclusion from the labor market, which can result in poverty. Public assistance such as disability benefits need to be strengthened in order to maintain quality of life through a guarantee of adequate income.

All types of disabilities were associated with higher mortality rates and lower life expectancy, but there were variations. The age-standardized mortality rate differed by sex, with higher estimates among men than women for all disabilities except for intestinal or urinary fistula (Supplementary Table 1). The distribution of causes of death differed according to the type of disability. In most subgroups, death due to the disability itself accounted for a high proportion (see Supplementary Table 4). For example, cerebrovascular accidents (I60-I69) accounted for 34.4% of deaths in people with brain lesion disorders, and chronic renal failure (N18) caused 35.65% of deaths in people with renal impairment. Chronic lower respiratory disease (J40-J47) accounted for 43.82% of deaths in people with respiratory impairment. Among people with hepatic impairment, liver cancer (C22), alcoholic liver disease (K70), and liver cirrhosis (K74) caused 41.96%, 21.29%, and 12.88% of deaths, respectively. Rectal cancer (C19-C21), urinary bladder cancer (C67), and colorectal cancer (C18) accounted for 36.32%, 11.21%, and 10.63% of deaths among people with intestinal or urinary fistula, respectively.

A prior Korean study showed that people with disabilities reported higher rates of suicidal ideation and poor quality of life than those without disabilities (Ko et al., 2011). Our study indicated that higher proportions of suicide deaths than in the non-disabled population were observed in people with mental disabilities, epilepsy disorder, and facial disfigurement (see Supplementary Table 4). We found that people with any type of mental health problem (intellectual disabilities, autistic disorder, and mental disabilities) presented higher rates of mortality due to external causes. For example, people with autistic disorder showed a higher proportion of accidents and homicide, and the proportion of suicide was high among people with mental disabilities. In a Danish cohort study, people with mental disorders showed premature mortality attributable to external causes including suicide, homicide, and accidents (Plana-Ripoll et al., 2019). People with disabilities had poorer networks and social support than people without disabilities (Mithen et al., 2015).

In this study, people with physical disabilities, brain lesion disorders, visual impairment, hearing impairment, intellectual disabilities, mental disabilities, renal impairment, and cardiac impairment showed relatively higher proportions of death due to diabetes. Diabetes is a medically manageable disease; however, people with disabilities were more likely to have lower medication adherence than non-disabled people for various reasons such as impaired mobility or communication problems, which depend on the disability type (Park et al., 2008). In addition, previous studies showed that people with disabilities were more likely to have unhealthy behaviors such as physical inactivity and risky drinking, and chronic conditions such as obesity, osteoporosis, hypertension, diabetes mellitus, and dyslipidemia than those without disabilities (Fox et al., 2014; Jung et al., 2020; Ko et al., 2011; Son et al., 2020). People with disabilities also showed higher cardiovascular disease incidence and mortality rates than those without disabilities (Son et al., 2020). Lower cancer screening rates were observed among people with disabilities (Merten et al., 2015; Shin et al., 2020). Discrimination against disabled persons in the process of health care utilization might hinder people from seeking appropriate health care services (Moscoso-Porras and Alvarado, 2018). Health care services and health care support including preventive measures should be developed for people with disabilities. Moreover, health promotion services addressing common issues such as smoking, alcohol consumption, obesity, and physical activity should also be considered for people with disabilities. The provision of these services needs to be provided without discrimination, financial burden, and physical barriers to access (Moscoso-Porras and Alvarado, 2018; Scheer et al., 2003).

To the best of our knowledge, this study is the first to present the distributions of age, income, and causes of death by disability type for the entire national registered disabled population in Korea. However, this study has some limitations. First, this study did not consider the severity of disabilities, comorbidities, or multimorbidity. Therefore, it should be kept in mind that the mortality rate may differ according to the severity of each type of disability and underlying health conditions.

Table 3
Proportional mortality ratios for 15 broad causes of death by disability type during 2008–2017 (based on the proportional mortality of the non-disabled population).

Causes of death (ICD-10 code)	Disability type																
	Non-disabled	Disabled population	Physical disabilities	Brain lesion disorders	Visual impairment	Hearing impairment	Language disabilities	Intellectual disabilities	Autistic disorder	Mental disabilities	Renal impairment	Cardiac impairment	Respiratory impairment	Hepatic impairment	Facial disfigurement	Intestinal or urinary fistula	Epilepsy disorder
Infectious diseases (A00-B99)	1.00	1.13	1.19	0.88	1.05	1.15	0.66	1.64	0.91	1.60	0.69	0.64	3.23	3.99	0.92	0.41	1.04
Cancers (C00-C97)	1.00	0.70	0.83	0.41	0.79	0.80	1.59	0.48	0.17	0.45	0.32	0.41	0.51	1.52	1.51	2.55	0.60
Endocrine diseases (E00-E89)	1.00	1.91	1.56	1.66	2.65	1.17	0.69	1.31	0.82	1.23	6.86	1.67	0.22	0.27	0.66	0.40	0.67
Mental and nervous diseases (F00-G99)	1.00	1.41	1.32	2.25	1.06	1.25	1.04	2.70	3.17	1.86	0.09	0.26	0.16	0.06	0.41	0.23	4.34
Cardiovascular diseases (I00-I99)	1.00	1.31	1.09	2.16	1.09	1.14	0.98	0.94	0.51	0.78	0.83	2.79	0.33	0.10	0.53	0.27	0.64
Respiratory diseases (J00-J99)	1.00	1.21	1.16	0.99	1.21	1.57	0.73	1.30	0.69	1.23	0.26	0.64	7.09	0.07	0.42	0.37	0.65
Digestive diseases (*K*00-K95)	1.00	0.96	1.15	0.56	0.90	0.81	0.52	1.41	0.93	1.62	0.71	0.57	0.32	8.24	0.63	0.42	0.92
Musculoskeletal diseases (M00-M99)	1.00	1.25	2.08	0.52	1.05	1.02	0.53	0.81	0.00	0.90	0.93	0.69	1.07	0.33	2.60	0.45	0.99
Urinary diseases (N00-N99)	1.00	3.23	1.71	1.43	2.31	1.50	0.77	1.46	2.90	1.28	26.02	1.78	0.35	0.32	2.24	0.94	0.73
Conditions during pregnancy, childbirth and the puerperium (O00-O99)	1.00	0.12	0.10	0.17	0.00	0.05	0.00	0.28	0.00	0.90	0.00	1.33	0.00	0.00	0.00	0.00	0.00
Perinatal conditions (P00-P96)	1.00	0.21	0.04	0.73	0.00	0.06	0.00	0.33	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00
Congenital malformation (Q00-Q99)	1.00	2.56	1.07	2.39	0.60	0.62	1.99	26.82	41.17	1.87	4.59	45.39	1.91	3.42	16.66	0.54	4.82
External causes (V00-Y99)	1.00	0.62	0.78	0.39	0.64	0.63	0.50	1.13	3.18	1.92	0.27	0.29	0.23	0.17	1.17	0.24	1.79
Ill-defined causes (R00-R99)	1.00	0.74	0.84	0.59	0.97	1.11	0.58	0.77	0.68	0.83	0.10	0.40	0.31	0.08	0.84	0.31	0.78
Residual	1.00	1.06	1.18	1.02	1.35	1.08	0.65	1.67	0.65	0.97	0.54	0.70	0.31	0.08	1.32	0.61	1.72

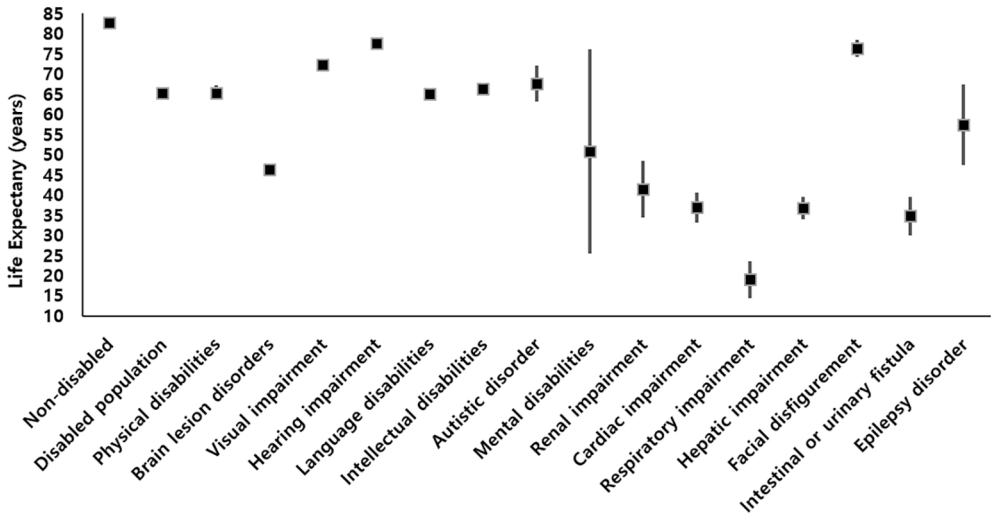

Fig. 1. Life expectancy and 95% confidence intervals according to disability type during 2008–2017 in Korea.

It should be noted, however, that a prior paper presented life expectancies according to disability grades (reflecting the severity of disability in Korea) and indicated a strong association between the severity indicator (grade) and life expectancy among the disabled population in Korea (Bahk et al., 2019a). Second, we did not take the onset and duration of disability into account. Mortality might differ depending on whether a disability is congenital or acquired. Third, the number of people with disabilities in this study would be smaller than the actual number in the community. Some people with disabilities may not have been registered because of barriers to the administrative registration process that requires additional procedures. It is also assumed that those who have recently acquired a disability would not have been included. Further research is needed to analyze mortality patterns considering the time of acquiring a disability and the disability period to provide more comprehensive information on the health matrix of people with disabilities in Korea. Moreover, future research conducted in diverse cultures and health systems would help to provide further information on the health of people with disabilities.

5. Conclusions

People with disabilities are exposed to various health-related problems and financial burdens. Policy-makers and health professionals who want to understand and improve the health of people with disabilities need to consider the sociodemographic characteristics of people with disabilities and their mortality patterns and appropriately provide adequate interventions without barriers to access.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2022.101958.

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