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Research Paper

Impact of disability status on suicide risks in South Korea: Analysis of National Health Insurance cohort data from 2003 to 2013

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Abstract

Background: The elevated risk of suicide in people with disability has been suggested in the previous studies; however, the majority of study results have been limited to specific disability types, and there is a lack of research comparing the risk of suicide in people with disability in general.

Objectives: To examine the hazard ratio of suicide according to the presence and the types of disability and identify patterns in the results.

Methods: In this study, we used National Health Insurance Service-National Sample Cohort data on 990,598 people, and performed analysis on the cause of death from 2003 through 2013. A Cox proportional hazard model was used to estimate the hazard ratio of suicide associated with disability and its types.

Results: The hazard ratio of suicide among people with disability was 1.9-folds higher compared to people without disability. The risk of suicide among different disability types was higher in mental disorder, renal failure, brain injury and physical disability. The hazard ratio of suicide in people with disability was not varied by income. The time to death by suicide for people with disability from the onset of their disability was 39.8 months on average.

Conclusions: Our findings suggest that when the government plans suicide prevention policies, early and additional interventions specific to people with disability are needed. Disability due to mental disorder, renal failure should be given priority.

Keywords: Suicide; Suicide risk; Disability types; People with disability

The World Health Organization reports that approximately 800,000 people worldwide die by suicide annually, which confirms that suicide is a serious problem.[1] The rate of death by suicide in Korea is very high, at 28.5 per 100,000 persons in 2013, which is approximately 2.4-folds higher than the Organization for Economic Co-operation and Development (OECD) average (12.1 per 100,000 persons), and Korea has been ranked first regarding its suicide rate by the OECD among all the countries in the recent 10 years.[2] Additionally, according to a report by Statistics Korea, suicide was ranked fourth as a cause of total deaths in the country in 2014, and it was ranked first among people in their 20s and 30s, and second among people in their 40s and 50s.[3] Consequently, social interest in suicide has increased, and much research has been conducted in Korea, with 851 studies on suicide published between 1966 and 2014.[4] However, despite the increased social interest, few studies have been conducted on suicide among disabled people. For example, the disabled account for approximately 5% of the total population in Korea[5] but basic research has rarely been conducted on whether the suicide rate is higher in people with disability compared to people without disability, and which specific features of disability are associated with a higher risk of suicide.

Research on the risk of suicide among people with disability has centered around mental disorder. In Saha

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et al.'s study (2007), the risk of suicide was 12-folds higher for people with schizophrenia than for people without disability,[6] and according to Shaddock's study (2003), the risk of suicide was 3−12-folds higher for people with mental illness than for people without disability.[7] Regarding other disabilities, Shooshtary et al (2007) suggested an association between physical disability and the suicide attempt,[8] and Kaplan et al (2008) suggested an association between physical disability and suicide death.[9] Also, an association has been reported between suicide and disability due to kidney failure and brain injury.[10,11] However, previous researches are lacking on the overall suicide risk for people with disability, and the risk of suicide for different disability types has not been compared. Additionally, no data show the actual suicide risk for different disability types, considering the individual's sex, age, income and geographic region due to the limitation of information or the difficulty of investigation.

Methods

Ethics statement

The study was reviewed by the Seoul National Hospital Institutional Review Board (IRB No: 11627-2016-001), and it did not undergo the patients' approval process because it used publicly available secondary data and an experiment with human subjects was not conducted. All data were coded to protect each individual's identity.

Data

We used the National Health Insurance Service-National Sample Cohort data provided by the National Health Insurance Service, which was built on the basis of the National Health Insurance claims data. The health care system of Korea consists of national health insurance and medical aid that cover almost all of Korean. As of June 2015, the total number of registrants was approximately 51,878,000.[12] The National Health Insurance Service-National Sample Cohort data were sampled from the 2002 database of qualified people for national health insurance and medical aid using a proportional allocation with stratified sampling method on the strata of sex, age, the income level. And the dataset was consisted of demographic information (sex, age, region, etc.) and the type of registrant, income level quantile, disability type, date of registration for disability, cause of death, and date of death. Age was classified by pre-adolescent (0−9), adolescent (10−19), 20s, 30s, 40s, 50s, 60s, 70s, and 80 years old and older. And region was classified by administrative districts. Districts of South Korea are divided into 7 Metropolitan cities and 9 provinces. Thus, we classified the geographical location as ''Metropolitan city'' and ''Province.'' Those included in the data were maintained in the database through 2013, thus making this dataset the cohort data. We used the data established from Jan. 2003 to Dec. 2013, and analyzed 990,598 people of 1,025,340, after excluding the records of those registered as disabled before 2003, and records of those with missing data.

Classification of disability

In Korea, disability is largely categorized into 15 types according to the disability level criteria set by the Ministry of Health and Welfare, and diagnosis by a specialist physician is required for disability classification. For a person to register as disabled, they must submit documents, including appraised results for disability and the diagnosis, to a local National Pension Service office, and go through the validation process. The 15 disability types are as follows: physical disability (PD), disability due to brain injury, vision disability (VD), hearing disability (HD), speech and language disability, intellectual disability (ID), disability due to mental disorder, disability due to autism spectrum disorder, disability due to renal failure, disability due to heart problems, disability due to respiratory problems, disability due to liver disease, disability due to facial disfigurement, disability due to excretory problems, and epilepsy disability. In this study, the top seven disability types in terms of prevalence were analyzed, and they are as follows: (1) PD, which includes disability due to amputation, joint problems, mobility disorder, deformity, and so forth; (2) disability due to brain injury, which includes complex disabilities resulting from injury to the central nervous system; (3) VD, which includes disability due to vision loss and a vision field deficit; (4) HD, which includes disability due to hearing loss and equilibrium dysfunction; (5) ID, including cases with an IQ of 70 or lower; (6) disability due to mental disorder, including schizophrenia, schizoaffective disorder, bipolar affective disorder, and recurrent depression; and, (7) disorder due to renal failure, including dialysis and kidney transplant. Other disability types not analyzed in this study were as follows: speech and language disability, disability due to autism spectrum disorder, disability due to heart problems, disability due to respiratory problems, disability due to liver disease, disability due to facial disfigurement, disability due to excretory problems, and disability due to epilepsy.

Income measurement

We utilized the income level quantiles used in the assessment of health insurance premiums as a proxy indicator of the estimated income level. The method used for estimating the income level has been widely utilized in previous studies.[13,14] In Korea, the criteria for determining health insurance premiums are different for people registering through an employee health insurance and self-employed health insurance, and there are medical aid beneficiaries who do not pay the premiums. The premiums are calculated based on the monthly wage for people