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Original Research

Linking hearing impairment, employment and education

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ABSTRACT

Objective: To analyse the impact that hearing impairment and other relevant variables have on the education and employment situation of those affected by it in the Principality of Asturias, Spain.

Methods: To achieve this objective, two discrete choice models (probit) are presented. The first one associates, among other variables, hearing impairment with the individual's employment status and in the second model, an ordered multinomial probit model is used to analyse, among other variables, how the impairment affects the individual's level of studies.

Results: Although the levels of statistical significance are low, the model's estimates appear to indicate that hearing impairment in Spain increases the probability of being unemployed by 18.4% ($P = 0.09$). Additionally, the people suffering from such a disability are, compared with the rest of the population, 10.2% ($P = 0.05$) more likely to have only completed elementary studies without pursuing any further education.

Conclusions: If an individual is able to reach a level of secondary or higher education thus enabling a future incorporation to the work place, a benefit is obviously generated for both the individual as well as society (which has additionally incurred an investment in human capital). In this regard, encouraging the education of hearing-impaired students would profit both the individual (who receives an early integration as a child), which may contribute positively to family and social factors, as well as society who have incurred the investment. Therefore, our result could indicate that programmes created to support individuals with this type of disability represent an increase of welfare both individually and socially.

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Introduction

The 2010 Millennium Development Goals (MDGs) report¹ is the first to mention disabilities, noting the limited opportunities facing children with disabilities, and the link between

disability and marginalization in education. The Ministerial Declaration of July 2010 recognizes disability as a cross-cutting issue essential for the attainment of the MDGs, emphasizing the need to ensure that people with disabilities are not subject to multiple or aggravated forms of discrimination.

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In Spain, according to the data published by the 2014 report of the National Institute of Statistics (INE),² the number of people with hearing impairment (HI) was over a million and, of these, over one hundred thousand had profound deafness. Of the million afflicted, more than 90% communicate verbally and only between 6% and 8% of them do so using sign language. Within the European framework and in countries with similar levels of education and health care, figures are similar.³ Said report also highlights the importance of education as a variable for inclusion in social and working environments (evidenced by employment and activity rates which both rise with an increase in the education level). Worthy of note is the fact that people with HI are more active employment wise and present an activity rate that doubles that of people with cognitive disabilities, the latter appearing as the most inactive group (57.4% vs 27.1%).^{4,5}

The weight attributable to technical and/or personal assistance for breaking down the barriers that HI people came up against has been backed up by the related literature. The latter shows that technical, management and educational support of HI people (cochlear implants; mainstream placements; sign language; and bilingual education) provide improvements in terms of societal integration and personal well-being, as well as promoting equal opportunities for people with disabilities.⁶

For example, in the most severe cases, cochlear implants can derive into benefits for the patient, increasing both their quality of life as well as social inclusion.^{7–12} Additionally, it reduces the costs of special education since people in this situation require more resources and time to complete education.^{13–15}

As regards education, several articles have emphasized the former's importance in improving the social integration of hearing-impaired people.^{16–18} In this sense, there have been several relevant improvements in the educational support for HI children. However, results indicate that even after decades of social reform and technical advances, children with hearing impairment still lag behind their hearing peers.¹⁹ This underlies the need for different types of support for children suffering from the disadvantages of hearing loss.

Moreover, people with auditory disabilities usually occupy positions requiring lower qualifications which offer less opportunity for promotion.¹⁸ In this sense, several authors have analysed the relationship between suffering from hearing impairment and the level of education attained, acquired skills, labour force status, early retirement or disability pension among an array of other individual and social factors.^{13,17,18,20–23}

In this article, we analyse whether the probability of attaining a higher or lower level of education or the probability of being or not unemployed can be explained by the fact that an individual suffers or not from a hearing impairment. To the best of our knowledge, there is no research that has examined these issues for the Spanish case. Therefore this study can provide more information both in terms of educational level or employment status on one of the major existing and indeed future, public health concerns—it is estimated that hearing difficulties will constitute the ninth leading burden of disease worldwide in the year 2030.²¹ Our results conclude that being HI might imply a greater probability of not achieving higher educational levels than the very elementary ones.

Furthermore it could also increase the probability of being unemployed. For the foregoing reasons, improving and providing incentives for the education of students with HI would lead towards benefits at all levels: individual (achieving a better integration of the child), family, job and social, generating a net investment in their human capital.

Methods

In order to achieve the objective already mentioned, we present several probit models:^{24,25} a model that estimates the probability that individuals find themselves unemployed or not and a model that estimates the probability that an individual reaches a certain educational level. Models 1 and 2 have been estimated using the econometric package STATA IC version 12, with a significance level of 0.05.

Model specification

Model 1: Hearing impairment and unemployment

The first model we present links an individual's HI with their employment status and other individual and social characteristics. It is a discrete choice model with a fictitious dependent variable that takes value 1 if the individual is unemployed and 0 in the case that they are employed.

Model 2: Hearing impairment and education level

In this case we analyse how an individual's personal and health-related characteristics affect their educational level. To develop this analysis we use an ordered multiple-choice probit model. The dependent variable will present three possible values: 1 for low educational levels (in cases where the individual is illiterate or has not finished elementary education); 2 for middle educational levels (when the individual has finished compulsory schooling but has not attained higher degrees); and 3 for higher educational levels (when they have attained a university degree: Bachelors, Masters or PhD.)

Variables of the study

To reach the objectives proposed by the study, this article makes use of the data from the 2002 Health Survey for the Principality of Asturias (ESA)²⁶ promoted by the Ministry of Health of the Principality. This survey features the answers from a pool of 2031 individuals over the age of 15 years, residents of Asturias in the year 2002 (the latest year available). Furthermore, we will explain the variables used in each model:

Model 1: Variables

The dependent variable in model 1 measures the employment situation of the individual, assigning the value 1 when they are unemployed and 0 when they are employed. We have also included the following independent variables that try to capture the most relevant characteristics of the individual: gender, studies, whether they have limitations to do certain activities (in the case of this study, limitations to their personal mobility); if the interviewed person lives with someone requiring assistance and if the individual has any kind of HI or not. With respect to the introduction of health as an

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