ABSTRACT

BACKGROUND

To assess the prevalence of visual impairment and visual care practices and its association with socioeconomic conditions in the infant population in Catalonia.

METHODS

The Catalan Institute of Statistics provided a random sample of 0 to 14-year-old non-institutionalized children whose parents were interviewed in a continuous health survey from 2011 to 2015 in Catalonia. A multistage stratified and random sampling procedure considering age, sex, county and town was followed.

All results have been weighted according to the sample design and are presented as the proportion of the condition with its 95% confidence limits. Chi square tests were performed to evaluate the association between categorical variables. To study the association of visual care with independent variables a multiple logistic regression model was used.

RESULTS

In 0 to 14-year-old children, a 12.9% (95% CI:11.8-13.9) prevalence of correctable visual impairment was observed. The prevalence of non-correctable visual impairment was 0.9% (95% CI:0.6-1.2). Non-correctable visual impairment was more prevalent in families with lower education levels, manual professions or unemployed.

13,5% (95% CI:12.3-14.6) of children without visual impairment visited a visual care professional in the last 12 months while this proportion was 67,4% (95% CI: 63.3-71.5) among those with correctable visual impairment. When parents have a university degree or non-manual professions a higher level of visual care was observed. In children with correctable visual impairment visual reviews were more frequent when parents are employed in a non-manual profession.

CONCLUSIONS

For the first time, indicators related to visual impairment in children in Catalonia have been recorded. There is an association between lower socioeconomic status and having non-correctable visual impairment and conversely having correctable visual impairment was significantly associated with employed parents.

More visual care is associated with higher socioeconomic status.

INTRODUCTION

It has been shown in many countries that the educational level and social class can be decisive factors affecting health. Thus, people with low incomes and with low education level declare that they have poor health and suffer more diseases(Black, 1982; Borrell *et al.*, 2011; Font-Ribera *et al.*, 1997; Whitehead, 1992). In the field of vision, studies have found a significant relationship between low social class and visual impairment or blindness(Mactaggart *et al.*, 2017; Perruccio *et al.*, 2010; Tielsch *et al.*, 1991; Yan et al., 2019).

Health surveys provide indispensable population information for health planning and evaluation(Mompart-Penina *et al.*, 2011). Many countries regularly apply health surveys to collect socioeconomic and health data, as clinical studies in the population have a high cost in time and money.

It has been shown that results of official health surveys in adults have a good sensitivity and specificity when questions about vision are held(Djafari *et al.*, 2003; Hiller & Krueger, 1983). Analyzing the health surveys of countries around us, it must be noticed that very few are dedicated to children and only a very little part of them have some questions referred to visual health("Encuesta Nacional de Salud-2017"; "Enquête sur la santé et la protection sociale (ESPS)"; "NHIS-National Health Interview Survey-2017").

There is a relationship between visual dysfunction in children and learning problems(Dusek *et al.*, 2010; Thurston, 2014) that could affect their future development. Visually impaired students are more likely to abandon their studies(Jackson, 2015).

Catalonia is a Mediterranean region, at the northeast of Spain, with of 7.5 million inhabitants. The Catalan Health Survey (CHS)(Generalitat de Catalunya, 2016) is an official survey with a specific questionnaire for children aged 0-14 including five questions related to vision. The analysis of these vision questions and their association with socioeconomic data allows an unprecedented study among Catalan children. It could possibly be the same to other similar societies around, where little literature is being found linking children's vision with socioeconomic conditions.

The objective of this paper is to estimate both types of visual impairment, correctable and non-correctable, and visual care in Catalan child population, related to socioeconomic variables such as parental level of education, parental employment and social class.

METHODS

The CHS(Generalitat de Catalunya, 2016), is an official health statistics survey carried out by the Health Department and the Institute of Statistics of the Catalan Government through pollsters trained for asking questions and for defining concepts. Since 2006, CHS has included a specific questionnaire for children aged 0-14 and from 2010 it is carried out as a continuous survey with an uninterrupted collection of data closing every semester.

The respondents are selected by the Catalan Population Register of the Catalan Institute of Statistics (IdesCat) excluding people living in collective establishments. Polyethapic stratified sampling is performed, representative by age group, sex and County (Mompart-Penina *et al*., 2011).

Participants. The size of the sample studied was 3836 children aged 0-14, corresponding to the data between 2011 and 2015 (waves 2 to 11) of the CHS children.

Data collection. Household interview survey. Information was provided by parents or tutor of the selected children.

Socioeconomic variables. Three range ages have been selected: 0-4, 5-9, and 10-14. Socioeconomic variables have been categorized as follows: the variable “parental highest level of education” has been structured based on the highest level of studies reached (university, high or primary school). The parents’ employment situation has been grouped as employee (work or on sick leave) and unemployed. Social class, has been categorized into six groups (Domingo-Salvany, 2000), I to III defined as non manual, and IVa, IVb, and V defined as manual (Table 1).

Visual variables. The variable "Correctable visual impairment" was defined from the question "Does your child have a visual impairment, or has the doctor said they do?" and the question "Does the child wear

glasses or contact lenses? ". As such, this variable includes subjects that declare a visual impairment and/or the use of correction.

From the question "Does your child have any serious limitations in sight, making it impossible for he/she to watch television at two meters, even with glasses or contact lenses, or does he/she suffer blindness in one or both eyes?" the "Non-correctable visual impairment" category was defined.

Information regarding the appointments to an optometrist and/or ophthalmologist during the 12 months prior to the interview was used to create the variable "Visits to eye care professionals", and the analysis was carried out distinguishing two groups: children with already detected correctable visual impairment and children without any previously known visual problem.

Analysis. Weighting according to the sample design of this survey has been used. The analysis has been stratified by sex and the prevalence of each variable is shown as a proportion with its confidence interval at 95%, taking into account socioeconomic status (CHS Catalunya, 2016). The confidence interval has been calculated using the number of responded questionnaires. The association among categorical variables was studied with unweighted chi-square test at 95% confidence level. To assess the association of visual care with independent variables, a multiple logistic regression model was fitted and the raw and adjusted odds ratio calculated.

RESULTS

Table 2 presents the distribution of the sample according to the main variables analyzed. 3836 children aged 0 to 14 have been studied, 1973 boys and 1863 girls. The distribution by age group provides three groups of similar size. The results about the level of education and employment situation show only father values since there were not statistical differences with mother values. The most prevalent parental highest level of education was high school, with a percentage of 62.8%. 59.4% of families belong to the

three social classes of craftsman professions (IVa, IVb, V) and 80.0% of parents were employees at the time of the survey.

For most children (86.2%) there was not any kind of visual impairment. There were 529 individuals (13.8%, 95% CI: 12.7-14.9) declaring some visual impairment: 35 individuals (0.9%, 95% CI: 0.6-1.2) reported non-correctable visual impairment corresponding to severe visual impairment, including blindness and 494 children (12.9%, 95% CI: 11.8-13.9) reported a correctable visual impairment.

The frequency of a correctable visual impairment was significantly greater among girls (χ^2=13.6, p=0.0005) and as the age increases (χ^2=389.7, p=0.000) (Figure 1). There was no statistically significant association between the socioeconomic variables studied and the presence of correctable visual impairment except for employment situation. A higher proportion of children with employed parents reported correctable visual impairment (χ^2 =4.4, p=0.036). Non-correctable visual impairment was more frequent when parents achieved a primary level of education (1.4%, 95% CI: 0.4-2.4), were unemployed (1.6%, 95% CI: 0.5-2.7) or belong to manual social classes (1.1%, 95% CI: 0.7-1.5). However, the differences were not statistically significant. (Table 3)

Visits to visual care professionals (ophthalmologist and/or optometrist) were less frequent in children who do not declare visual impairment (13.5%, 95% CI: 12.3-14.6) than in children who declare correctable visual impairment (67.4%, 95% CI: 63.3-71.5, χ^2=768.4, p=0.000). The age group 0-4 without visual impairment was the one with the lowest proportion of visits. In the group without visual impairment, visits to visual care professionals were more frequent in parents with higher education (χ^2=22.2, p=0.0005), employed (χ^2=6.18, p= 0.013) or non-manual social class (χ^2=33.2, p=0.000). Among people with correctable visual impairment, visits were more frequent when parents were employed (χ^2=6.71, p= 0.010) or non-manual social class (χ^2=9.33, p=0.002). (Table 4). In the multiple logistic regression model, no interaction was found between independent variables. The association of visual care visits with correctable visual impairment showed an OR:14.47 (95%CI: 11.60-18.04) and with social class OR:1.82

(95%CI: 1.52-2.18). The unadjusted OR were 13.26 (95%CI:10.71-16.40) and 1.49 (95%CI:1.27-1.75), respectively.

DISCUSSION

Although the correctable visual impairment is more frequent in adults than in children, our study showed that 13.8% of parents or tutors declare the presence of visual impairment that, in most children, was a correctable visual impairment. Similar burden for visual impairment due to refractive error results have been presented in United Kingdom, Sweden, USA (Mathers *et al.*, 2010; Thurston, 2014; Villarreal *et al.*, 2000; Vitale *et al.*, 2006). The distribution of correctable visual impairment showed a higher prevalence in older groups and among girls. This was an expected result since many studies corroborate myopia increase with age among school children(Czepita *et al.*, 2007a; Junghans & Crewther, 2003; O'Donoghue *et al.*, 2010; Harrington et al., 2019) and is higher among girls(Czepita *et al.*, 2007b; Krause *et al.*, 1982; Rodríguez-Ábrego & Sotelo-Dueñas, 2009). Unlike our findings, studies have also shown a higher prevalence of correctable visual impairment in children in economically disadvantaged groups (Ethan & Basch, 2008; Leone *et al.*, 2014; Schneider *et al.*, 2010; Williams *et al.*, 2008). Our results show no significant association between socioeconomic level and correctable visual impairment, except in employment situation. This unexpected result can probably be explained by the fact that employed families visit more frequently visual care professionals and that could provide more correctable visual impairment diagnosis.

The non-correctable visual impairment corresponds to ocular or neurological disorders, that is, an incapacitating injury that greatly reduces the visual acuity or visual field of the patient. At CHS it is identified by the question "Does your child have any serious limitations in sight, making it impossible for he/she to watch television at two meters, even with glasses or contact lenses, or does he/she suffer blindness in one or both eyes?". This condition was presented in 0.9% of children studied without age or sex defined pattern, but with a prevalence 2.5 times greater among the most disadvantaged social classes.

There was an association between disability/blindness and socioeconomic status, with higher prevalence when parents have achieved only primary education, were unemployed or belong to disadvantaged social classes. However, in our study, the findings were not statistically significant. These results were similar to those published in other studies carried out in children(Gilbert *et al.*, 1999). This relationship has also been found in adults with lower incomes, poor academic performance or poorer countries(Dandona & Dandona, 2001; Perruccio *et al.*, 2010; Rius *et al.*, 2014). Therefore, the links between non-correctable visual impairment with socioeconomic factors were similar in children and adults(Guisasola *et al.*, 2011; Guisasola *et al.*, 2014, Guisasola *et al.*, 2013; Rius *et al.*, 2014).

According the results of (Varadaraj et al., 2019) in 18 and older population, our results showed that children with correctable visual impairment visit more frequently a visual care professional than those without correctable visual impairment.

Several studies(Dunlop *et al.*, 2000; Navarro-Rubio *et al.*, 1995) have found that visual care in children has an association with socioeconomic status. According to different publications(Prus, 2007) people with higher education are more receptive to health education messages and have a better understanding about the health promotion. Some studies have shown that children whose parents have a higher education level are more likely to have the required glasses(Murthy *et al.*, 2002). In Catalonia, as in many other high-income countries, the optical correction is not covered by the public health service and, therefore, the family has to assume the cost. A family with low socioeconomic status might have difficulties covering the cost of optical compensation of their children. So, the impact of the correctable visual impairment limitations can be maintained over the time with its negative influence over their academic performance and future career(Thurston, 2014). The low socioeconomic status of parents is a barrier to visual care in children and actions are needed to raise the community awareness about the importance of periodic visual checkups for children and their coverage through public services. In our

study, the variable strongest associated to the frequency of visual care visits was correctable visual impairment and a much lower association with social class was also detected.

The strengths of this study were the representativeness of the data used, the age range examined and the fact of being the first study to analyse the association between visual impairment and visual care with socioeconomic status in Catalan children. Thus, we have been able, to obtain data on the distribution of visual impairment and visual care in Catalan children and analyze the association with socioeconomic factors (parental level of education, employment status and social class)

The limitations of the study were that information about vision was provided by parents or tutors and we didn't have data from clinical examinations. In addition, the survey did not allow us to know if the child's optical prescription was correct or must be updated.

In the case of non-correctable visual impairment, the question did not allow us to distinguish between blindness and severe visual limitation. We should, therefore, consider the possibility of improving CHS children's vision questions.

Finally, we conclude that correctable visual impairment was not associated with social class, but visual care was associated with correctable visual impairment and with social class.

KEY MESSAGES

- In our sample, correctable visual impairment was not related to low socioeconomic status.
- Non-correctable visual impairment appears with a higher, but not significant, proportion in disadvantaged families.
- Child vision care was significantly associated with correctable visual impairment and the family's socioeconomic status.

REFERENCES

Black D. (1982). *Inequalities in health. The Black report*. (P. Townsend & N. Davidson, Eds.). London: Penguin Books.

Borrell, C., Palència, L., & Rodríguez-Sanz, M. et al. (2011). Evolución de las desigualdades sociales en salud en Cataluña. *Medicina Clínica*, *137*, 60–65. https://doi.org/10.1016/S0025-7753(11)70031-8

Czepita, D., Mojsa, A., & Ustianowska, M. et al. (2007). Prevalence of refractive errors in schoolchildren ranging from 6 to 18 years of age. *Annales Academiae Medicae Stetinensis*, *53*(1), 53–56.

Czepita, D., Mojsa, A., Ustianowska, M. et al, & Czepita D, Mojsa A, Ustianowska M, et al. (2007). Role of gender in the occurrence of refractive errors. *Ann Acad Med Stetin*, *53*(2), 5–7. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18557370

Dandona, R., & Dandona, L. (2001). Socioeconomic status and blindness. *The British Journal of Ophthalmology*, *85*(12), 1484–1488. https://doi.org/10.1136/bjo.85.12.1484

Djafari, F., Gresset, J. A., & Boisjoly, H. M. et al. (2003). Estimation of the misclassification rate of self-reported visual disability. *Canadian Journal of Public Health*, *94*(5), 367–371.

Domingo-Salvany, A. et al. (2000). Una propuesta de medida de la clase social. *Atención Primaria*, *25*(5), 350–363. https://doi.org/10.1016/S0212-6567(00)78518-0

Dunlop, S., Coyte, P. C., & Mcisaac, W. (2000). Socio-economic status and the utilisation of physicians' services: results from the Canadian National Population Health Survey. *Social Science & Medecine*, *51*, 123–133.

Dusek, W., Pierscionek, B. K., & McClelland, J. F. (2010). A survey of visual function in an Austrian population of school-age children with reading and writing difficulties. *BMC Ophthalmology*, *10*(16). https://doi.org/10.1186/1471-2415-10-16

Enquête sur la santé et la protection sociale (ESPS). (n.d.). Retrieved July 25, 2018, from http://www.irdes.fr/recherche/enquetes/esps-enquete-sur-la-sante-et-la-protection-sociale/questionnaires/2012/moins-de-15-ans.pdf

Esca Catalunya. (2016). Document tècnic de l'Enquesta de salut de Catalunya. *Generalitat de Catalunya*. https://salutweb.gencat.cat/web/.content/_departament/estadistiques-sanitaries/enquestes/Enquesta-de-salut-de-Catalunya/documents-tecnics/document_tecnic_esca_2011_2016.pdf

Ethan, D., & Basch, C. E. (2008). Promoting healthy vision in students: Progress and challenges in policy, programs, and research. *Journal of School Health*, *78*(8), 411–416. https://doi.org/10.1111/j.1746-1561.2008.00323.x

Font-Ribera, L., García-Continente, X., & Davó-Blanes, M. C. et al. (2014). El estudio de las desigualdades sociales en la salud infantil y adolescente en España. *Gaceta Sanitaria*, *28*(4), 316–325. https://doi.org/10.1016/j.gaceta.2013.12.009

Generalitat de Catalunya. (2016). Enquesta de salut de Catalunya 1r semestre de 2016 Qüestionari de menors. *ESCA*, *12*, 1–25.

Gilbert CE, Anderton L, Dandona L, F. A. (1999). Prevalence of visual impairment in children: a review of available data. *Ophthalmic Epidemiol.*, *6*(1), 73–82.

Guisasola, L., Tresserras-Gaju, R., & García-Subirats, I. et al. (2011). Prevalencia y carga de defectos visuales en Catalunya. *Medicina Clinica*, *137*(Supl 2), 22–26.

Guisasola, L., Tresserras, R., & Rius, A. et al. (2014). Visual Correction and Occupational Social Class. *Optometry and Vision Science*, *91*(4), 464–471.

Guisasola, L., Tresserras, R., & Rius, A. et al. (2013). Problemas de visión causantes y no causantes de impedimento visual en una población laboral de Cataluña. *Arch Prev Riesgos Labor*, *16*(2), 71–76.

Harrington, S. C., Stack, J., Saunders, K., & O'Dwyer, V. (2019). Refractive error and visual impairment in Ireland schoolchildren. *British Journal of Ophthalmology*, *103*(8), 1112–1118. https://doi.org/10.1136/bjophthalmol-2018-312573

Hiller, R., & Krueger, D. E. (1983). Validity of a survey question as a measure of visual acuity impairment. *American Journal of Public Health*, *73*(1), 93–96. https://doi.org/10.2105/AJPH.73.1.93

Jackson, M. I. (2015). Poor Child Health, Family Capital and Cumulative Inequality in Child Health and Academic Achievement. *Journal of Health and Social Behavior*, *56*(2), 262–280. https://doi.org/10.1177/0022146515581857

Junghans, B. M., & Crewther, S. G. (2003). Prevalence of myopia among primary school children in eastern Sydney. *Clinical and Experimental Optometry*, *86*(5), 339–345. https://doi.org/10.1111/j.1444-0938.2003.tb03130.x

Krause, U., Krause, K., & Rantakallio, P. (1982). Sex differences in refraction errors up to the age of 15. *Acta Ophthalmologica*, *60*(6), 917–926.

Leone, J. F., Mitchell, P., & Kifley, A. et al. (2014). Normative visual acuity in infants and preschool-aged children in Sydney. *Acta Ophthalmologica*, *92*(7), e521–e529. https://doi.org/10.1111/aos.12366

Mactaggart, I., Polack, S., Murthy, G., & Kuper, H. (2017). A population-based survey of visual impairment and its correlates in Mahabubnagar district, Telangana State, India. *Ophthalmic Epidemiology*, *25*(3), 1–8. https://doi.org/10.1080/09286586.2017.1418386

Marmot M, Ryff CD, Bumpass LL, et al. (1997). Social inequalities in health: next questions and converging evidence. *Soc Sci Med*, *44*(6), 901–910.

Mathers, M., Keyes, M., & Wright, M. (2010). A review of the evidence on the effectiveness of children's vision screening. *Child: Care, Health and Development*, *36*(6), 756–780. https://doi.org/10.1111/j.1365-2214.2010.01109.x

Ministerio de Sanidad. (2017). Encuesta Nacional de Salud-2017-menores. Retrieved May 4, 2019, from https://www.mscbs.gob.es/estadEstudios/estadisticas/encuestaNacional/encuesta2017.htm

Mompart-Penina, A., Medina-Bustos, A., & Guillén-Estany, M. et al. (2011). Características metodológicas de la Encuesta de Salud de Catalunya 2006. *Medicina Clinica (Barcelona)*, *137*(Supl 2), 3–8. https://doi.org/10.1157/13076401

Murthy, G. V. S., Gupta, S. K., & Ellwein, L. B. et al. (2002). Refractive error in children in an urban population in New Delhi. *Investigative Ophthalmology & Visual Science*, *43*(3), 623–631.

Navarro-Rubio, M. D., Jovell, A. J., & Schor, E. L. (1995). Socioeconomic status and preventive health-care use by children in Spain. *Am J Prev Med*, *11*(4), 256–262.

NHIS-National Health Interview Survey-2017. (n.d.). Retrieved July 25, 2018, from https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm

O'Donoghue, L., McClelland, J. F., & Logan, N. S. et al. (2010). Refractive error and visual impairment in school children in Northern Ireland. *The British Journal of Ophthalmology*, *94*(9), 1155–1159. https://doi.org/10.1136/bjo.2009.176040

Perruccio, A. V, Badley, E. M., & Trope, G. E. (2010). A Canadian population-based study of vision problems: assessing the significance of socioeconomic status. *Canadian Journal of Ophthalmology. Journal Canadien d'ophtalmologie*, *45*(5), 477–483. https://doi.org/10.3129/i10-061

Prus, S. G. (2007). Age, SES, and health: A population level analysis of health inequalities over the lifecourse. *Sociology of Health and Illness*, *29*(2), 275–296. https://doi.org/10.1111/j.1467-9566.2007.00547.x

Rius, A, Artazcoz, L., & Guisasola, L. et al. (2014). Visual impairment and blindness in spanish adults: geographic inequalities are not explained by age or education. *Ophthalmology*, *121*(1), 408–416.

Rius, Anna, Guisasola, L., & Sabidó, M. et al. (2014). Prevalence of visual impairment in El Salvador: inequalities in educational level and occupational status. *Revista Panamericana de Salud Publica = Pan American Journal of Public Health*, *36*(5), 290–299.

Rodríguez-Ábrego, G., & Sotelo-Dueñas, H. M. (2009). Prevalencia de miopía en escolares de una zona suburbana. *Rev Med Inst Mex Seguro Soc*, *47*(1), 39–44.

Schneider, J., Leeder, S. R., & Gopinath, B. et al. (2010). Frequency, Course, and Impact of Correctable Visual Impairment (Uncorrected Refractive Error). *Survey of Ophthalmology*, *55*, 539–560. https://doi.org/10.1016/j.survophthal.2010.02.004

Thurston, A. (2014). The potential impact of undiagnosed vision impairment on reading development in the early years of school. *International Journal of Disability, Development and Education*, *61*(2), 152–164. https://doi.org/10.1080/1034912X.2014.905060

Tielsch, J. M., Sommer, A., & Katz, J. et al. (1991). Socioeconomic Status and Visual Impairment Among Urban Americans. *Archives of Ophthalmology*, *109*(5), 637–641. https://doi.org/10.1001/archopht.1991.01080050051027

Varadaraj, V., Frick, K.D., Saaddine, J.D., et al. (2019). Trends in Eye Care Use and Eyeglasses Affordability: The US National Health Interview Survey, 2008-2016. *JAMA Ophthalmol .*, *137*(4), 391–398.

Villarreal, M. G., Ohlsson, J., & Abrahamsson, M. et al. (2000). Myopisation: the refractive tendency in teenagers. Prevalence of myopia among young teenagers in Sweden. *Acta Ophthalmologica Scandinavica*, *78*(2), 177–181. https://doi.org/10.1034/j.1600-0420.2000.078002177.x

Vitale, S., Cotch, M., & Sperduto, R. (2006). Prevalence of visual impairment in the United States. *JAMA*, *295*(18), 2158–2163. https://doi.org/10.1001/jama.295.18.2158

Whitehead, M. (1992). The concepts and principles of equity and health. *International Journal of Health Services : Planning, Administration, Evaluation*, *22*(3), 429–445. https://doi.org/10.1093/heapro/6.3.217

Williams, C., Northstone, K., & Howard, M. et al. (2008). Prevalence and risk factors for common vision problems in children: data from the ALSPAC study. *The British Journal of Ophthalmology*, *92*(7), 959–964. https://doi.org/10.1136/bjo.2007.134700

Yan, X., Chen, L., & Yan, H. (2019). Socio-economic status, visual impairment and the mediating role of lifestyles in developed rural areas of China. *PLoS ONE*, *14*(4), 1–18. https://doi.org/10.1371/journal.pone.0215329

Table 1.-. Social class groups

Social class	Definition	Social class groups
I	Executives of public companies with more than 10 employees; professions associated with the second and third cycle of the university	Non manual social classes
II	Managers of firms with fewer than 10 employees; professionals with a college degree; technicians, artists, and athletes	
III	Administrative employees and professionals involved in support of administrative and financial management; personal service and security workers; self-employed; supervisors of manual workers	
IV a	Skilled manual workers	Manual social classes
IV b	Semiskilled manual workers	
V	Unskilled	

Table 2. Description of the sample. Source: Catalan Health Survey (2011-2015).

CHARACTERISTIC	GROUP	n (%)
AGE (years)	0-4	1 275 (33.2)
	5-9	1 356 (35.4)
	10-14	1 205 (31.4)
SEX	Boys	1 973 (51.4)
	Girls	1 863 (48.6)
FATHER'S LEVEL OF EDUCATION	University	818 (21.3)
	High School	2 410 (62.8)
	Primary School	498 (13.0)
	Missing	110 (2.9)
FATHER'S EMPLOYMENT SITUATION	Employee	3 067 (80.0)
	Unemployed	506 (13.2)
	Missing	263 (6.9)
SOCIAL CLASS	I	394 (10.3)
	II	452 (11.8)
	III	635 (16.6)
	Non-manual (I, II, III)	1 481 (38.6)
	Iva	623 (16.2)
	IVb	1 337 (34.6)
	V	319 (8.3)
	Manual (IVa, IVb, V)	2 279 (59.4)
	Missing	75 (2.0)

There were no statistical differences among mother and father data.

Table 3. Distribution of visual impairment by sex, age and socioeconomic variables. Source: Catalan Health Survey (2011-2015)

		NO VISUAL IMPAIRMENT			CORRECTABLE VISUAL IMPAIRMENT			NON-CORRECTABLE VISUAL IMPAIRMENT
	GROUP	**ALL CHILDREN % (95% CI)**	**BOYS % (95% CI)**	**GIRLS % (95% CI)**	**ALL CHILDREN % (95% CI)**	**BOYS % (95% CI)**	**GIRLS % (95% CI)**	**ALL CHILDREN % (95% CI)**
	TOTAL	86.2 (85.1-87.3)	88.2 (86.8-89.6)	84.1 (82.5-85.8)	12.9 (11.8-13.9)	10.9 (9.6-12.3)	14.9 (13.3-16.5)	0,9 (0.6-1.2)
AGE years)	0-4	98.4 (97.7-99.1)	98.0 (97.0-99.1)	98.7 (97.8-99.6)	1.0 (0.5-1.6)	1.1 (0.3-1.9)	1.0 (0.2-1.7)	0.6 (0.2-1.1)
	5-9	88.2 (86.5-89.9)	89.7 (87.4-91.9)	86.6 (84.0-89.2)	11.3 (9.6-13.0)	9.6 (7.4-11.8)	13.1 (10.5-15.6)	0.5 (0.1-0.9)
	10-14	71.1 (68.6-73.7)	76.1 (72.8-79.5)	65.8 (62.0-69.7)	27.2 (24.7-29.7)	22.9 (19.6-26.2)	31.8 (28.0-35.6)	1.7 (0.9-2.4)
FATHER'S LEVEL OF EDUCATION	University	88.5 (86.3-90.7)	90.4 (87.5-93.2)	86.5 (83.1-89.9)	10.5 (8.4-12.6)	9.2 (6.4-11.9)	12.0 (8.8-15.2)	1.0 (0.3-1.7)
	High School	85.6 (84.2-87.0)	87.7 (85.9-89.5)	83.3 (81.2-85.4)	13.6 (12.2-15.0)	11.6 (9.8-13.4)	15.8 (13.7-17.8)	0.8 (0.5-1.2)
	Primary School	86.1 (83.1-89.2)	87.4 (83.3-91.4)	84.8 (80.2-89.4)	12.4 (9.6-15.3)	11.1 (7.3-14.9)	13.9 (9.5-18.3)	1.4 (0.4-2.4)
	Missing	92	44	48	18	5	13	0
FATHER'S EMPLOYMENT SITUATION	Employee	86.1 (84.9-87.3)	88.3 (86.7-89.9)	83.7 (81.9-85.6)	13.1 (11.9-14.3)	11.0 (9.5-12.6)	15.3 (13.5-17.7)	0.8 (0.5-1.1)
	Unemployed	88.7 (86.0-91.5)	87.9 (83.9-91.8)	89.7 (85.8-93.5)	9.7 (7.1-12.3)	10.2 (6.6-13.9)	9.1 (5.5-12.7)	1.6 (0.5-2.7)
	Missing	218	115	103	43	15	28	2
SOCIAL CLASS	Non-manual (I, II, III)	87.8 (86.1-89.4)	89.3 (87.1-91.5)	86.2 (83.7-88.7)	11.5 (9.9-13.2)	10.1 (7.9-12.2)	13.1 (10.6-15.6)	0.7 (0.3-1.1)
	Manual (IVa, IVb, V)	85.3 (83.8-86.7)	87.5 (85.6-89.3)	82.8 (80.6-85.0)	13.6 (12.2-15.1)	11.5 (9.7-13.3)	15.9 (13.7-18.1)	1.1 (0.7-1.5)
	Missing	64	33	31	12	4	8	0

There were no statistical differences among mother and father data

Table 4.- Distribution of visits to visual care professionals by sex, age and socioeconomic variables. Source: Catalan Health Survey (2011-2015)

		NO VISUAL IMPAIRMENT			CORRECTABLE VISUAL IMPAIRMENT		
	GROUP	**ALL CHILDREN % (95% CI)**	**BOYS % (95% CI)**	**GIRLS % (95% CI)**	**ALL CHILDREN % (95% CI)**	**BOYS % (95% CI)**	**GIRLS % (95% CI)**
	TOTAL	13.5 (12.3-14.6)	12.6 (11.1-14.2)	14.4 (12.6-16.1)	67.4 (63.3-71.5)	66.7 (60.4-73.0)	68.0 (62.5-73.5)
AGE years)	0-4	6.2 (4.9-7.6)	6.5 (4.6-8.4)	6.1 (4.2-7.9)	61.5 (35.1-88.0)	57.1 (20.5-93.8)	66.7 (28.9-100)
	5-9	18.5 (16.3-20.7)	16.8 (13.9-19.7)	20.1 (16.9-23.4)	79.7 (73.4-86.1)	74.6 (64.2-85.0)	83.7 (75.9-91.5)
	10-14	17.0 (14.5-19.6)	15.5 (12.2-18.7)	19.0 (15.0-22.9)	61.9 (56.6-67.1)	63.4 (55.5-71.3)	60.8 (53.7-67.8)
FATHER'S LEVEL OF EDUCATION	University	18.7(15.8-21.5)	17.4 (13.7-21.2)	20.0 (15.7-24.3)	76.7 (67.8-85.7)	82.1 (70.0-94.1)	72.3 (59.6-85.1)
	High School	12.1 (10.7-13.5)	11.3 (9.5-13.2)	13.0 (10.9-15.1)	66.5 (61.4-71.6)	64.3 (56.5-72.2)	68.1 (61.4-74.8)
	Primary School	11.0 (8.0-13.9)	10.5 (6.5-14.5)	11.4 (7.0-15.8)	61.3 (49.2-73.4)	58.6 (40.7-76.5)	63.6 (47.2-80.0)
	Missing	13	6	7	11	3	8
FATHER'S EMPLOYMENT SITUATION	Employee	14.4 (13.3-15.7)	13.7 (11.9-15.5)	15.2 (13.2-17.1)	69.4 (64.9-73.9)	70.1 (63.3-76.9)	68.9 (62.8-74.9)
	Unemployed	10.0 (7.2-12.8)	9.1 (5.4-12.7)	11.1 (6.9-15.2)	51.0 (37.0-65.0)	44.4 (25.7-63.2)	59.1 (38.5-79.6)
	Missing	20	8	12	29	10	19
SOCIAL CLASS	Non-manual (I, II, II)	17.8 (15.7-19.8)	16.6 (13.8-19.4)	19.0 (16.0-22.1)	76.6 (70.3-83.0)	78.9 (69.8-88.1)	74.7 (66.0-83.5)
	Manual (IVa, IVb, V)	10.7 (9.3-12.1)	10.1 (8.2-11.9)	11.4 (9.4-13.5)	63.0 (57.7-68.4)	60.3 (52.1-68.5)	65.1 (58.1-72.2)
	Missing	6	4	2	6	2	4

There were no statistical differences among mother and father data