

DISABILITY-ADJUSTED LIFE YEARS LOST DUE TO MIGRAINE: A NATIONWIDE BURDEN-OF-ILLNESS STUDY FROM THE SPANISH NATIONAL HEALTH SURVEY

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Background and objective

- Migraine is a chronic sometimes highly disabling neurological disease that manifests itself with recurrent episodes of headache [1]. The prevalence of migraine has been estimated between 10-16% (in Spain 12.6%), being higher in women than in men [2-4].
- Migraine symptoms exerts a great impact on the patient's daily functioning both in physical, emotional and social aspects, as well as with family, work and social relationships, impacting their health-related quality of life [5].
- Therefore, migraine has a strong impact at societal and sanitary level, representing the second leading cause of neurological disability in the world [6]. Globally, migraine was responsible for 46.6 million years lived with disability (ADL) in 2020 and is one of the leading causes of lost of disability-adjusted life years (DALYs) in the world [7,8].
- The objective of this study was to estimate the burden-of-illness (BOI) of migraine in Spain, and to characterize the excess burden in migraineurs compared with non-migraineurs.**

Methods

- A cross-sectional study was designed using existing disaggregated and anonymized data with national representativeness: The nationwide cross-sectional Spanish National Health Survey (SNHS)[9]. Abstracted data of migraineurs and non-migraineurs both gender, 15+ years old, were obtained by propensity score optimal matching [10].
- Migraineurs were identified in the database of SNHS when respondent answered consecutively yes first in the survey question asking the interviewee if they have had a migraine in the past 12 months and then if a physician has told he/she have a migraine.
- BOI was estimated as number of disability-adjusted life years (DALY) lost, after applying an annual discount rate of 3% over individual life-expectancy while participating in the survey. Relative percentage of life expectancy lost was also computed. Disutility values (1-utility value) were obtained from the Spanish version of EQ-5D-5L questionnaire completed by participant in the SNHS, and using Spanish tariffs [9].
- Since the standard age-weighted modulation factor is 0, and premature mortality is not associated with migraine, the following abbreviated formula was used for the calculation of DALYs: $DALYs = \sum Ni * Ti * t * D * d$, where Ni = population in each age group and gender; Ti = Incidence rate of the disease (in this study the absolute prevalence in the year of the survey has been used as an approximation to the frequency of the disease); t = mean duration of the disease at each age (in this study life expectancy in years in the year of the survey has been used for each age and gender); D = disutility coefficient; d = discount rate applied (3%).
- Data of persons 15+ years old were abstracted from the SNHS database; 1,435 migraineurs (76.2% women, 52.9 years) and 5,623 non-migraineurs (77.5% women, 53.1 years) obtained by propensity score optimal matching (Table 1).

Table 1. Demographics characteristics of sample by migraine status.

		Non-migraineurs (n=5,623)	Migraineurs (n=1,435)	p
Age (years)		53.1 (18.1)	52.9 (17.2)	0.680
Age group (years)				
	15-24	4.5%	4.6%	
	25-34	12.8%	11.3%	
	35-44	18.9%	19.4%	
	45-54	18.8%	19.7%	0.662
	55-64	15.5%	18.0%	
	65-74	13.9%	13.6%	
	75+ years	15.5%	13.4%	
Gender	Woman	77.5%	76.2%	0.297
Accident in prior 12 months	Yes	8.9%	9.8%	0.286
Civil status				
	Single	20.2%	21.0%	
	Married	55.5%	54.8%	
	Widower	18.1%	13.7%	0.031
	Separated	2.8%	3.2%	
	Divorced	3.8%	5.3%	
	Illiterate	1.8%	2.6%	
	Incomplete primary schooling	9.6%	13.0%	
	Primary schooling	19.3%	19.6%	
Education level	Secondary schooling	24.0%	23.4%	<0.001
	Bachelor	12.6%	11.1%	
	Labor trainee	6.5%	8.0%	
	High labor trainee	7.7%	7.0%	
	University	18.5%	15.3%	
	None	38.1%	41.6%	
Physical activity	Occasional	38.9%	41.6%	<0.001
	Several times per month	11.2%	9.6%	
	Several times per week	11.8%	7.2%	
	Daily or almost daily	16.9%	11.5%	
	5-6 days per week	1.6%	0.9%	
	3-4 days per week	3.6%	2.7%	
	1-2 days per week	15.1%	12.2%	
	2-3 days per week	10.8%	8.3%	<0.001
	Once a month	6.4%	6.7%	
	Less than once a month	10.9%	11.7%	
	None in last 12 months	15.1%	18.1%	
	Never	19.6%	27.6%	
Alcohol consumption (days/month)				
	Yes	24.3%	22.7%	0.225
Smoking (daily)				

- Excess burden expressed in DALYs in migraineurs related to non-migraineurs was estimated by means of a Univariate General Linear model with robust standard error calculation for differences when applicable and using covariates not included in the propensity score computation.
- Subgroups (by gender and age) and sensitivity analysis (modifying the precision of caliper in propensity score calculation, 1:1 matching and not using propensity score) were also carried out to control for possible uncertainty of base case analysis.

Conclusions

- In Spain, from a nationwide societal perspective, migraine was associated with a meaningful burden of illness in comparison to non-migraineurs.**
- It is expected that migraineurs lost a significant portion of their years of life-expectancy (close to 9%) due to disability, with more than 1/3 attributable to migraine.**
- Projecting these figures to the number of known prevalent migraineurs in Spain, migraine is responsible of an adjusted excess of 3.2 million DALYs lost; 2.2 million in women and 1.0 million in men.**

Results

- Migraineurs showed an adjusted mean (95% CI) DALY lost of 1.88 (1.78-1.98) years, which was in excess of 0.92 (0.79-1.06) years related to non-migraineurs; $p<0.001$ (Figure 1).
- In terms of percentage of life-expectancy lost, migraineurs lost 8.97% (8,31-9.64), which was an excess of 3.25% (2.45-4.06) related to non-migraineurs; $p<0.001$ (Figure 1).
- Subgroup analysis by gender and age strata confirmed the findings observed in the entire sample analyzed in the study: both men and woman with migraine showed significantly higher DALYs lost compared with persons without migraine in the Spanish population (Figures 2 and 4).
- Likewise, life-expectancy lost was significantly higher in migraineurs versus non-migraineurs regardless the age or gender (Figures 3 and 5).
- Sensitivity analysis showed case base analysis was robust with burden excess attributable to migraine of a similar magnitude in scenarios different than base case (Figure 6).
- Projection of these figures to the number of known prevalent migraineurs in Spain, migraine would be responsible of an adjusted excess of 3.2 million DALYs lost; 2.2 million in women and 1.0 million in men (Table 2).

Figure 1. Burden of illness excess attributable to migraine expressed as DALYs lost in years and in % of life-expectancy lost.

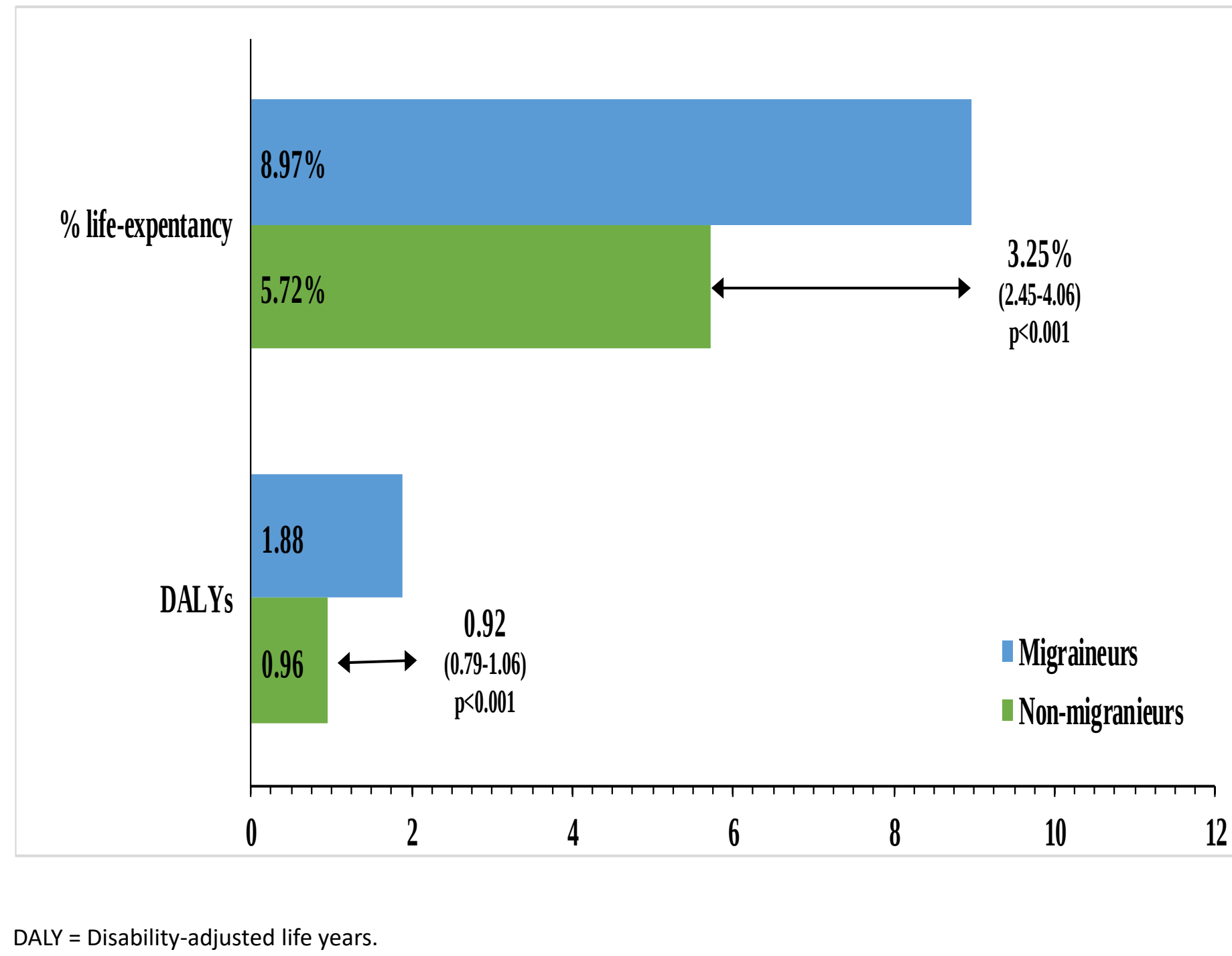


Figure 2. Burden of illness excess attributable to migraine expressed as DALYs lost in years by gender.

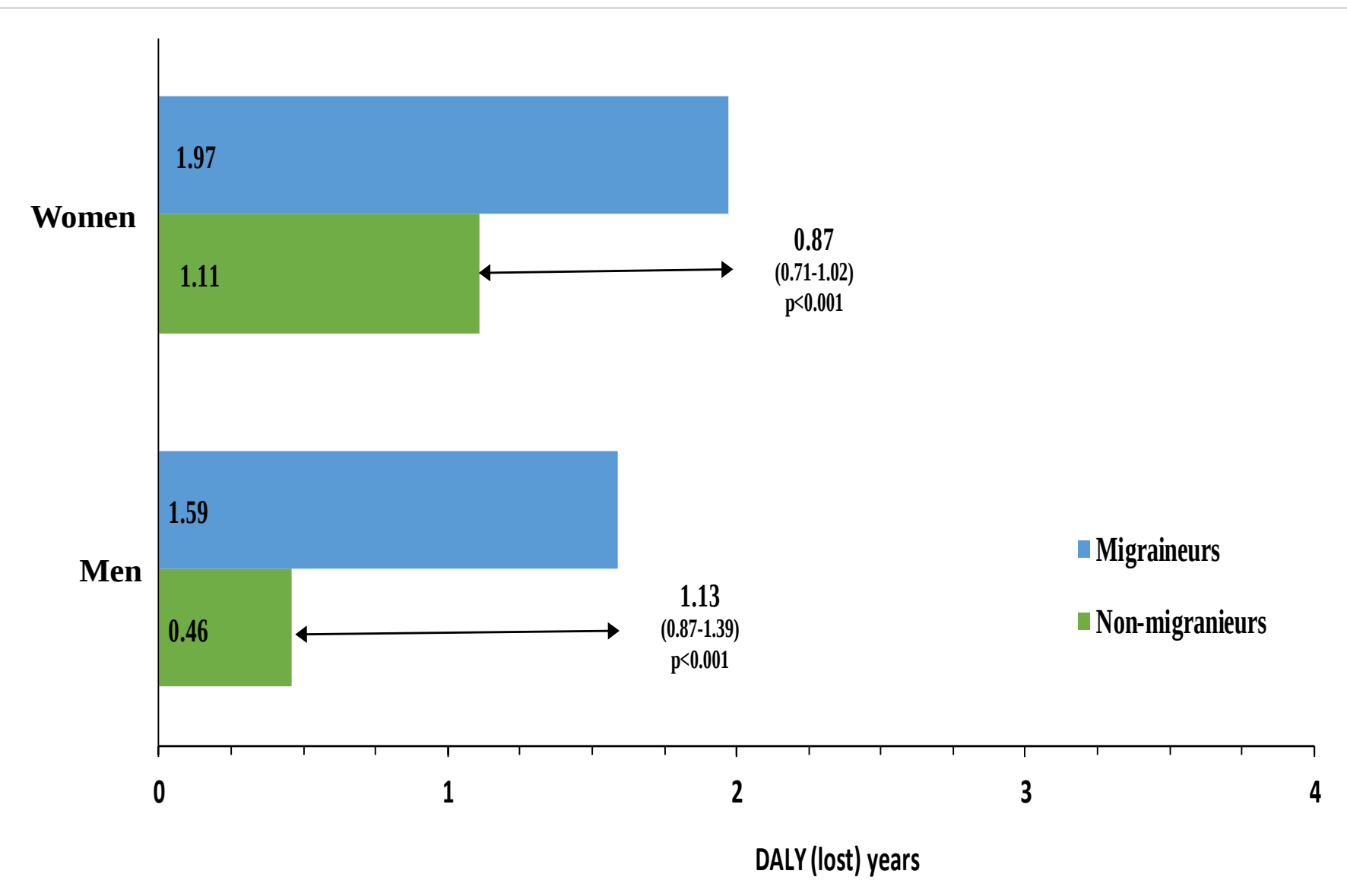
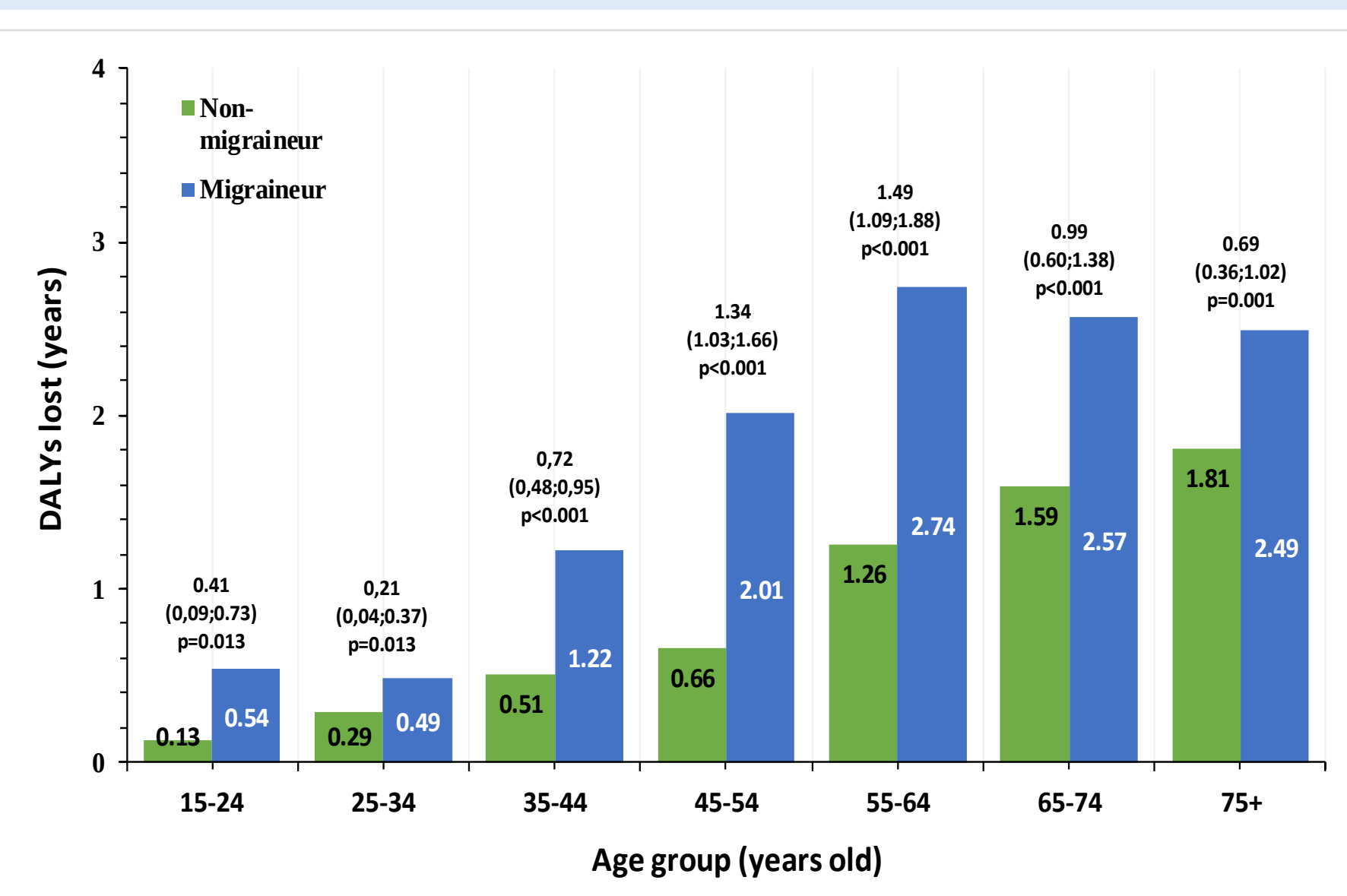


Figure 4. Burden of illness excess attributable to migraine expressed as DALYs lost in years by age strata.



Data are expressed as mean and mean excess burden with 95% confidence interval adjusted by propensity score and covariates.

Figure 3. Burden of illness excess attributable to migraine expressed in % of life-expectancy lost by gender.

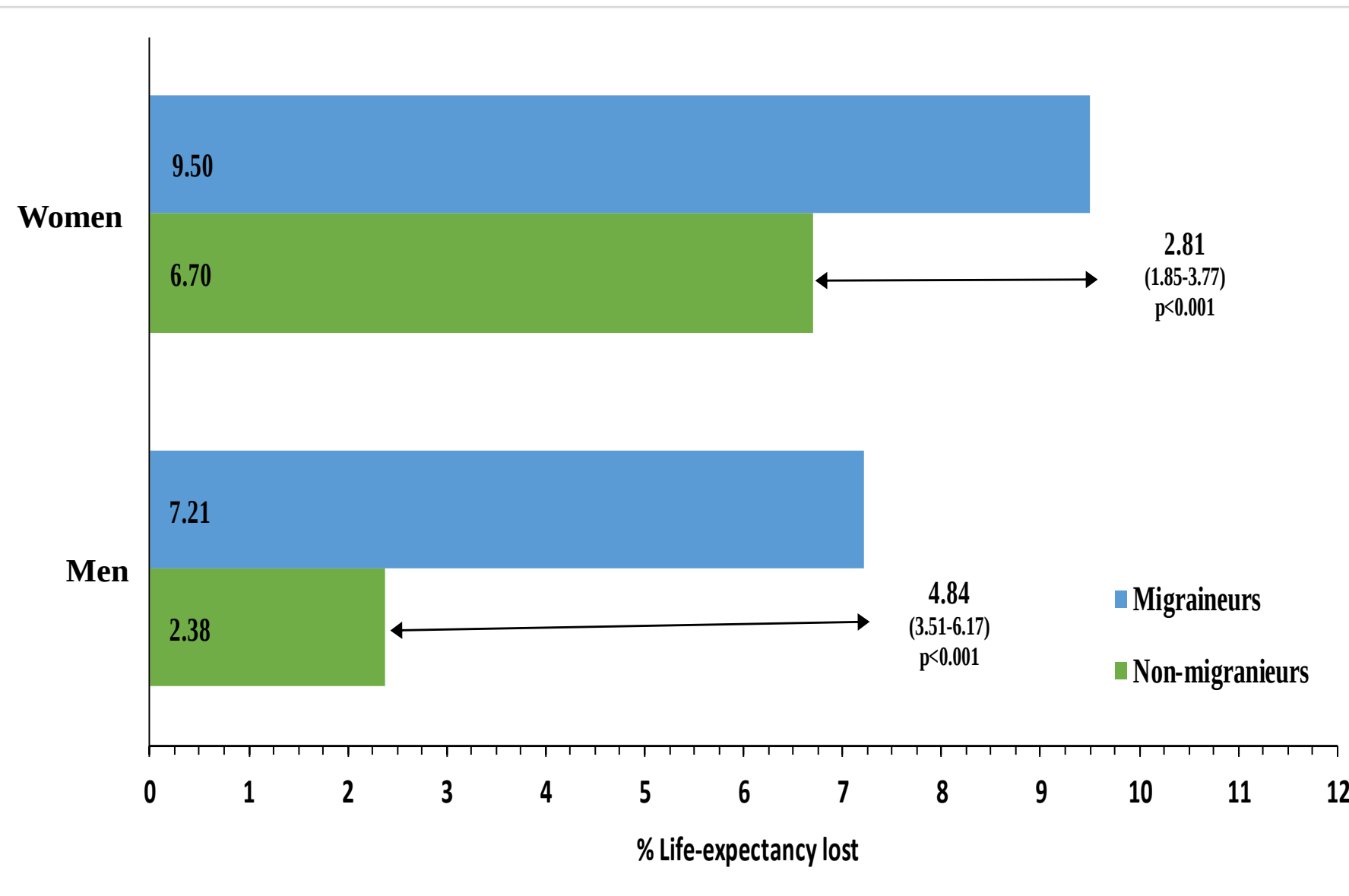


Figure 5. Burden of illness excess attributable to migraine expressed in % of life-expectancy lost by age strata.

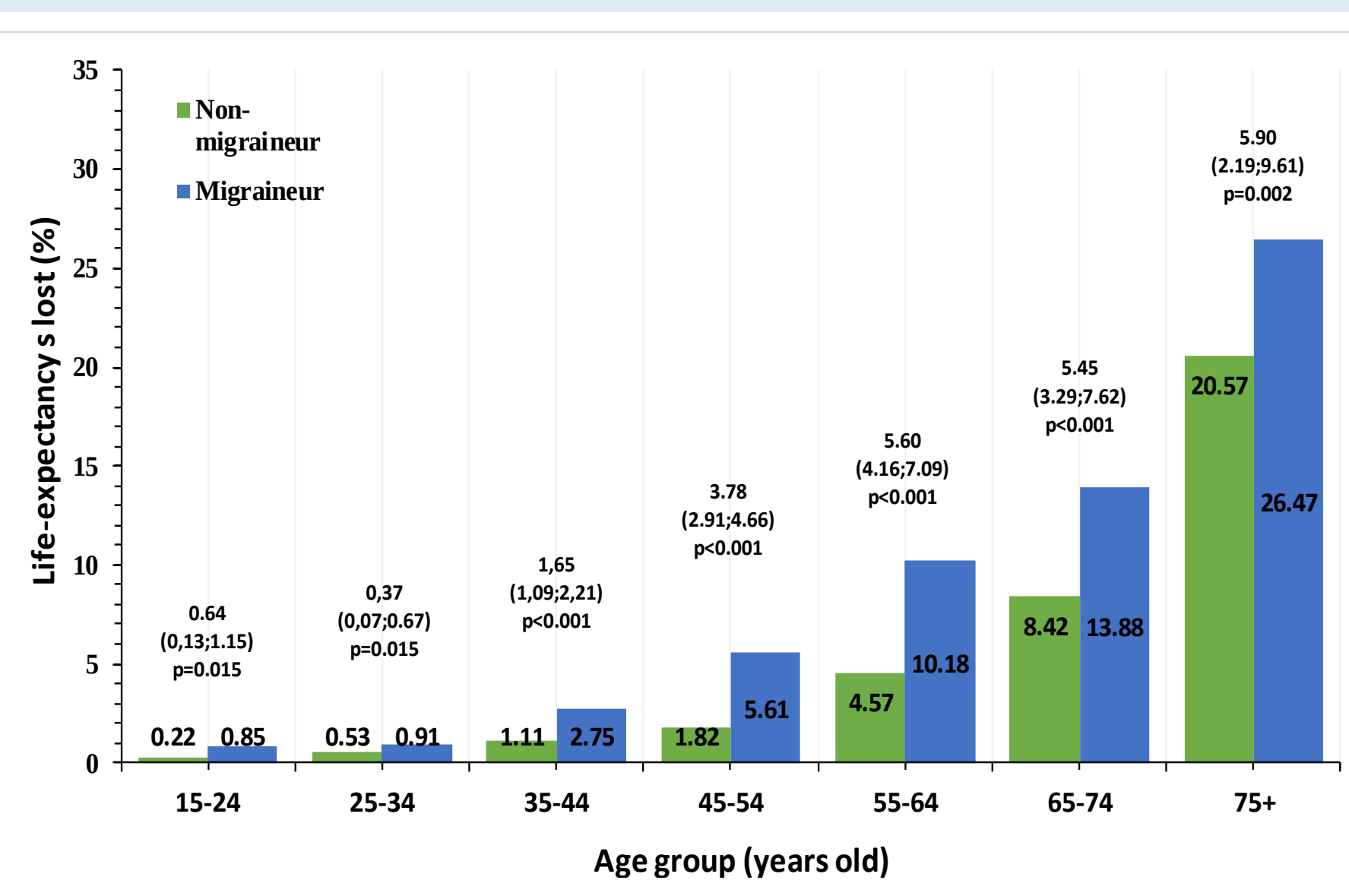
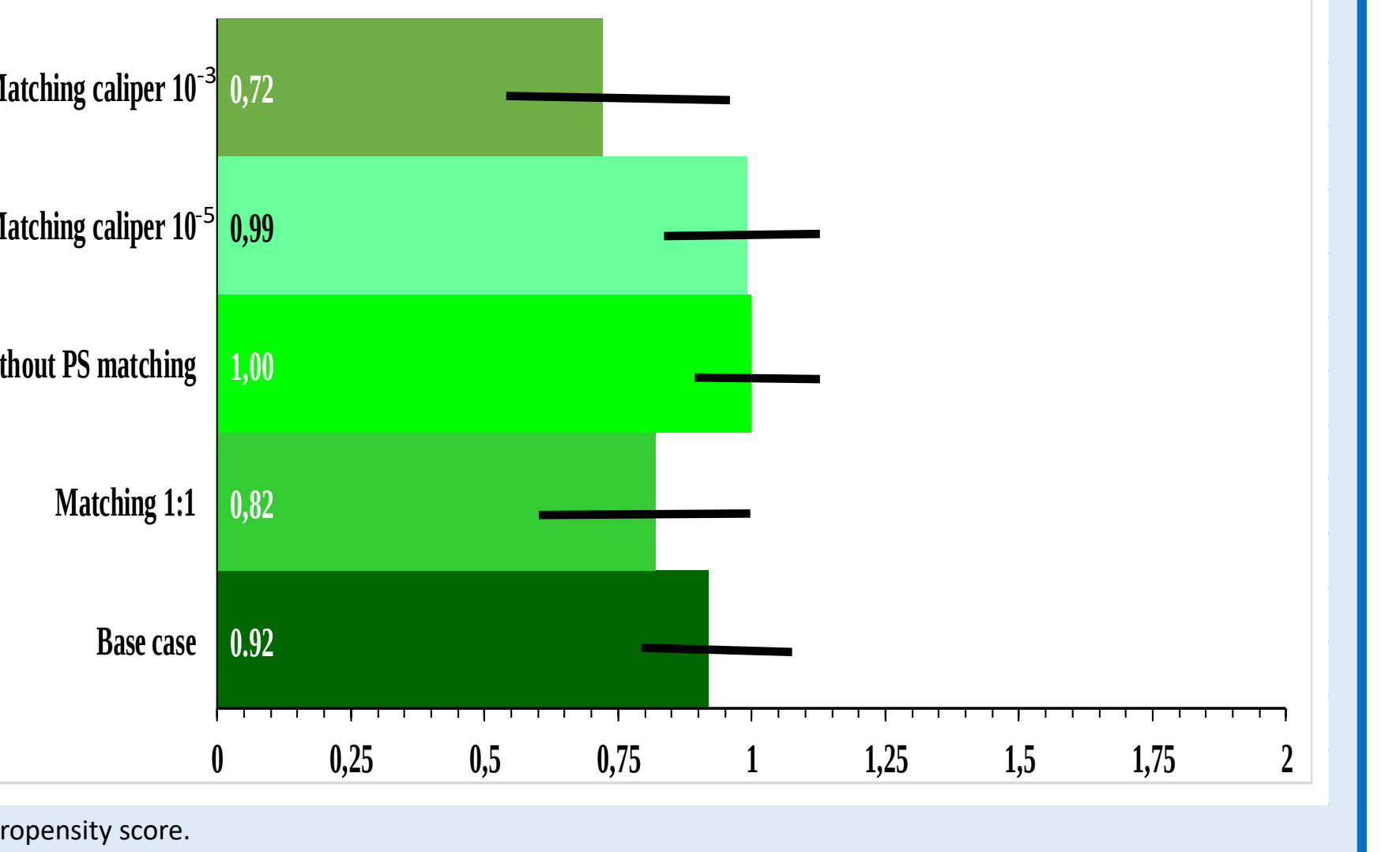


Figure 6. Sensitivity analysis: Burden-of-illness excess attributable to migraine expressed as DALYs lost in years according to different scenarios.



PS=Propensity score.

Table 2. Projection of burden-of-disease in adjusted DALYs lost to the Spanish known prevalent migraineurs in year 2020, total and by age and gender.

Age group (years)	Total	Women	Men
15 - 24	125,838	100,942	24,896
25 - 34	89,794	86,980	2,814
35 - 44	456,457	261,748	194,709
45 - 54	1,011,471	708,051	303,420
55 - 64	867,070	603,115	263,956
65 - 74	360,882	262,322	98,560
75 +	248,619	171,471	77,147
15 +	3,160,130	2,194,629	965,502

DALY = Disability-adjusted life years.

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