

The prevalence and characteristics of migraine among the Belgian working population

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Abstract

Introduction : Migraine is a very common disease. For the first time in Belgium, a study has been set up to assess some characteristics of the migraine problem like occurrence, frequency, duration, in a convenience sample of employees.

Methods and study population : A total of 1660 persons participated in the study. Employees completed a short international validated self-administered questionnaire (ID-Migraine Screener) in which migraine-related characteristics have been assessed.

Results and discussion : Lifetime prevalence of migraine in this study was 20.2% (95% CI : 18.3-22.2%), was significantly higher for women than for men and was the highest in the age group 35-44 years. On average 10.6 lost working days due to migraine were reported per absentee and per year, or per migraineur on average 2.3 days, and per employee 0.4 days. Migraine is estimated to account for about 1,154,336 lost working days each year in Flanders and Brussels. However underreporting of symptoms, attacks and sick leave days was estimated at about 50%, depending on the time frame. Sixty-nine percent of the migraine sufferers use medication regularly. Only minor differences have been detected in migraine prevalence according to the recorded occupational risks. Finally, the limitations of the study are discussed.

Key words : Migraine ; prevalence ; characteristics ; working population.

measuring instruments used and to sometimes unclear definitions of the period over which the prevalence was measured (lifetime, year, months).

It was estimated that 5.7 working days are lost per year per patient because of migraine (Bigal *et al.* 2004).

Migraine usually manifests itself in the form of headache, although other symptoms also must be present (Ashkenazi, Silberstein 2003). The severity and frequency of the attacks vary from person to person. At least 10% of migraine patients have weekly attacks. In 20% of the patients, one attack lasts 2 to 3 days. About 5% of the population suffers from migraine for at least 18 days/year and at least 1% one day/week (Goadsby *et al.* 2002).

A migraine attack has a major impact on the patient's personal, social and professional life. The World Health Organization classifies migraine as one of the 20 main causes of incapacity for work.

In recent years, increasing attention has been paid to the prevention and treatment of migraine (Dowson *et al.* 2003, Bigal *et al.* 2004). Because in Belgium no data were available regarding the impact of this health problem, it was decided to set up a study for better assessing the prevalence of migraine in the Flanders and Brussels regions, and of its characteristics such as the type of complaints, the use of medication and the economic impact in terms of lost working days.

Introduction

Migraine is a fairly common disease : 10% or more of the population is confronted with it, and it affects women more than men (Silberstein, Goadsby 2002, Dowson *et al.* 2003, Steiner 2004, Stovner *et al.* 2007). The annual prevalence of migraine in the general population varies from about 6% among men to 18% among women, with a peak in the 15-45 year age group. The lifetime prevalence of migraine varies between 8% and 13% among men and between 25% and 33% among women (Bigal *et al.* 2004). This large variation in prevalence rates is also due to the different

Methods and study population

MEASURING INSTRUMENT

A survey was conducted in which a number of characteristics of migraine were measured using the ID-Migraine screener, an international validated short questionnaire (Lipton *et al.* 2003) based on the diagnostic criteria of the International Headache Society (IHS) (International Classification of Headache Disorders 2004). Although this instrument was designed as a screening instrument to be used in general practice (Lipton *et al.* 2003), a precursor of it was also used in large population

based surveys (Lipton *et al.* 2001). The occurrence of three symptoms along with the occurrence of the headache was investigated: nausea, photophobia and being restricted in activities. The headache is considered to be migraine if at least two of the three symptoms occur regularly (at least 'less than half the time' or 'half the time or more'). Thus, migraine was defined applying the Lipton screening criteria (Lipton *et al.* 2003) on the data reported in the questionnaire. The yearly, quarterly and monthly prevalence was calculated. Characteristics of migraine were recorded as well: frequency, severity, duration, origin, use of medication (unspecified), therapeutic outcomes, and impact on work, leisure time and everyday household activities. Loss of productivity however, could not be measured.

The questionnaire also contained relevant demographic and work-related variables. The industrial sector (NACE-BEL (National Institute of Statistics 1993)) was recorded, as well as the working posture, and whether the employee was exposed to the following risks: solvents, noise, shift work, VDU work, mental stress and biological agents. The questionnaire was completed anonymously.

We looked at the correlation between these variables and individual characteristics such as age, gender and Body Mass Index (BMI), as well as occupational factors such as job category, occupational risk and industrial sector.

STUDY POPULATION AND POWER CALCULATIONS

If the annual prevalence of migraine is estimated to be 12% and the mean number of lost working days per migraine patient is 5.7 (Bigal *et al.* 2004), with a sample of 1600 employees the prevalence can be estimated with 95% confidence between 10.4 and 13.5%. Among these 1600 employees, 192 patients could be expected with a total of 1094 lost working days, with a mean number of working days lost being between 5.3 and 6.1 (95% CI).

A convenience sample of employees in Flanders and the Brussels-Capital Region was chosen to assess the extent of the migraine problem. Employees who consecutively showed up for the periodical medical examination at the offices of IDEWE, the External Service for Prevention and Protection at Work, were invited to participate in the study. It must be stressed that employees undergoing this medical examination are not allowed to be in a period of sick leave. Employees were informed about the aims of the study, the guarantee of anonymity, and were invited to fill in the questionnaire. In order to obtain a good regional distribution of the sample, the 1600 employees aimed at were recruited in the 8 regional divisions (about 200 employees per region).

Statistical processing of the data was carried out using SPSS 10 software (SPSS Base 10.0 1999). Descriptive statistics were computed and preva-

lence rates (P) were compared between the different groups by computing prevalence rate ratios (PR) and their 95% confidence intervals (95% CI) using the test-based method (Kleinbaum *et al.* 1982). Prevalence rate ratios were computed as the ratio between the values of the group with the highest prevalence and those of the group with the lowest prevalence.

DATA ANALYSIS

The technique for calculating the 95% CI could only be applied if there were more than 5 observations in each group. If this condition was not fulfilled, the significance of the prevalence difference was tested using Fisher's exact test. When cross-tabulating categorical data, chi-squared test or Fisher's exact test were used (Kirkwood 1988). Differences were considered statistically significant if the p-value was lower than 0.05. For variables which were not normally distributed, the differences between groups were tested by means of a Kruskal-Wallis test (Kirkwood 1988).

Results

A total of 1660 persons participated in the study. The mean age in the sample was 39 years (standard deviation (SD) = 11.02). The sample was composed of 52.4% men and 47.6% women. The mean BMI was 25.4 kg/m² (SD = 4.4). The distribution of age and other descriptive variables is shown in Table 1.

Of the 1660 participants, 50.7% (n = 842) suffered from headache now and then. The complaints reported by headache sufferers are shown in Table 2.

A total of 336 persons suffered from migraine as defined by the ID-migraine screener: the lifetime prevalence in our sample was thus 20.2% (95% CI: 18.3%-22.2%), 9.5% among men (95% CI: 7.5%-11.5%) and 32% among women (95% CI: 28.7%-35.3%) (Table 1). The mean age of migraine sufferers was 38.1 years (SD = 10.6) and the mean BMI was 25.1 kg/m² (SD = 4.4). Migraine prevalence rates reach a peak in the 35 to 44-year age group and then gradually diminish in subsequent age groups (Table 1). A significantly higher prevalence was found among women than among men. The prevalence of migraine was the highest in the BMI class lower than 20, but this was only the case among women when we stratified by gender. The prevalence among men was lowest in the BMI class lower than 20. However, these differences are not statistically significant. White collar workers suffered significantly more often from migraine than blue collar workers.

However, the significant differences between age groups and job category disappeared when we stratified by gender.

Table 1

Frequency distribution of demographic and other variables in the sample (n = 1660) and lifetime prevalence of migraine according to these variables

<i>Variable</i>	<i>Persons in the sample</i>	<i>% in the sample</i>	<i>Persons with migraine</i>	<i>Prevalence (%) of migraine</i>
<i>AGE</i>				
< 25 years	177	10.7	40	22.6
25 – 34 years	441	26.7	89	20.2
35 – 44 years	473	28.6	110	23.3
45 – 54 years	437	26.4	80	18.3
≥ 55 years	125	7.6	15	12.0
Total	1653	100.0	334	20.2 (*)
<i>GENDER</i>				
Female	775	47.6	248	32.0
Male	852	52.4	81	9.5
Total	1627	100.0	329	20.2 (*)
<i>BODY MASS INDEX (BMI)</i>				
< 20	113	7.0	32	28.3
≥ 20 and < 25	721	44.9	152	21.1
≥ 25 and < 30	559	34.8	106	18.9
≥ 30	212	13.2	41	19.3
Total	1605	100.0	331	20.6 (NS)
<i>JOB CATEGORY</i>				
Blue collar worker	869	53.8	156	18.0
White collar worker	747	46.2	172	23.0
Total	1616	100.0	328	20.2 (*)
<i>WORKING POSTURES</i>				
Standing	949	79.8	186	19.6
Mobile	823	76.8	164	19.9
Sitting	645	69.3	122	18.9
Other (a)	100	19.8	20	20.0 (NS)

(*) : The differences are statistically significant between the categories (chi-square test), $p < 0.05$.

(NS) : The differences are not statistically significant (chi-square test), $p > 0.05$.

(a) For 'Other' working postures, mainly a combination of 2 or 3 of the specified working postures (standing/mobile/sitting) was reported by the participants in the study. Due to multiple responses, the total is not displayed.

Table 2

Complaints reported by headache sufferers (n = 842)

<i>Complaint</i>	<i>Never</i>		<i>Rarely</i>		<i>< half of the time</i>		<i>≥ half of the time</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Nausea	321	38.4	272	32.5	132	15.8	112	13.4
Photophobia	151	18.1	261	31.3	178	21.3	245	29.3
Restricted activity	156	18.8	304	36.7	202	24.4	167	20.1

On average, migraine sufferers had 20.8 migraine attacks in the past year, in the last month 3.2 attacks, and in the last 3 months 7.2 attacks. These differences probably represent an underreporting in the number of attacks the further respondents go back in time (recall bias).

If we extrapolate the results for the past month (= 3.2 attacks) on an annual basis, this gives us 38.4 attacks, whereas only 20.8 attacks were reported. This is 54% of the extrapolated figure. A similar extrapolation based on the data for the last 3 months gives an estimated average of 28.8 attacks

per year. The reported number of attacks here is 72% of this extrapolated figure.

Of the 336 persons suffering from migraine, 278 reported how many times they had an attack in the last year. Of those, 66 (23.7%) reported two or more attacks per month. As for migraine attacks in the last month, 329 persons indicated the number of attacks. Of those, 228 (69.3%) reported two or more attacks in the month prior to participation in the study.

Table 3 shows the level of migraine-related *absenteeism* among migraineurs and among absen-

Table 3

Migraine-related absenteeism per migraine patient and per migraine absentee by survey period

<i>Absenteeism</i>	<i>Number of patients</i>	<i>Average number of days</i>	<i>SD</i>	<i>Median</i>	<i>Total number of days</i>
Last month	314	0.4	2.3	0	126
Last 3 months	305	0.9	4.6	0	259
Last year	287	2.3	11.1	0	658
	<i>Number of absentees</i>	<i>Average number of days</i>	<i>SD</i>	<i>Median</i>	<i>Total number of days</i>
Last month	26	4.6	6.9	2	119
Last 3 months	44	5.9	10.9	2	259
Last year	62	10.6	22.0	3	658

tees. In total, there were 62 migraine absentees who together were absent from work for 658 days over the last year. Therefore, the mean number of working days lost due to migraine in our study population was 10.6 days per year per absentee. Per migraine patient (including non-absentees) this was 2.3 days and per employee 0.4 days. If we extrapolate the latter figure to the total working population in Flanders and the Brussels-Capital Region ($n = 2,885,841$) (12), a total of 1,154,336 working days per year are lost due to migraine.

Extrapolation of the average number of sick leave days among migraine patients, gives an estimate of 4.8 days on the basis of the 'last month' figures and 3.6 days on the basis of the 'last 3 months' figures. The reported figure (2.3) is 48% and 64%, respectively, of these estimates.

Figure 1 shows the distribution of the number of sick leave days per absentee in the last year, the last 3 months and the last month.

In the last month, 154 persons (45.8%) had to interrupt their activities at home on average during 1.7 days. In the past 3 months, 179 persons (53.3%) had to interrupt their activities on average during 2.9 days.

Of the 336 migraine sufferers, 28.3% ($n = 95$) went to see a doctor in the last 12 months. 69% ($n = 232$) regularly use medication every time headache occurs and 6.3% ($n = 21$) use medication every day to prevent headache or to reduce its severity.

Among the 23.7% (66/278) who reported an average of two or more attacks per month, 7.6% (5/66) takes medication every day and each time headache occurs, and 74.2% (49/66) takes medication only when headache occurs.

MIGRAINE-RELATED ABSENTEEISM BY AGE AND GENDER

The annual prevalence of absenteeism among migraineurs is lowest in the age group 25-34 years (15.2%) and highest in the under-25 year age group (35.1%). However, no significant difference could be demonstrated (chi-square test, $p > 0.05$). We also noted a higher prevalence of absenteeism

among men (26.1%) than among women (20.2%), but again the difference was not statistically significant (chi-square test, $p > 0.05$).

The average number of sick leave days among migraine patients was lowest in the 55 years or older group (1.0 day) and highest in the under-25 year age group (2.8 days). Although women suffer more from migraine than men, male migraine sufferers were absent from work for on average 4.2 days and women for 1.7 days. Because of the non-Gaussian distribution of the number of sick leave days, the differences between the groups were tested by means of a Kruskal-Wallis test. These average numbers of sick leave days did not differ significantly between age groups, neither between the genders.

The average number of sick leave days *per absentee* is highest in the 25 to 34-year age group (14.7 days) and lowest in the over-55 age group (5.5 days). This difference is not statistically significant (Kruskal-Wallis test; $p > 0.05$). The difference in the average number of sick leave days between male (15.9 days) and female absentees (8.5 days) is not significant either.

PREVALENCE OF MIGRAINE BY OCCUPATIONAL RISK, INDUSTRIAL SECTOR AND WORKING POSTURES

For the recorded occupational risks we found a slightly increased lifetime prevalence among men who do VDU work (12.5%), who have a mentally stressful job (16.0%) or who are exposed to biological agents (12.7%). Among women we observed an increased prevalence for those exposed to noise (41.2%) and to biological agents (35.7%). The difference was only significant for biological agents among women (chi-square test or Fisher's exact test).

Among men there was an increased lifetime prevalence in the metal industry (16.7%) and in education (20.0%), but only a small group of employees was involved here. Among women there was an increased lifetime prevalence in the food products and beverages sector (61.1%), in the hotels and restaurants sector (43.8%) and in the

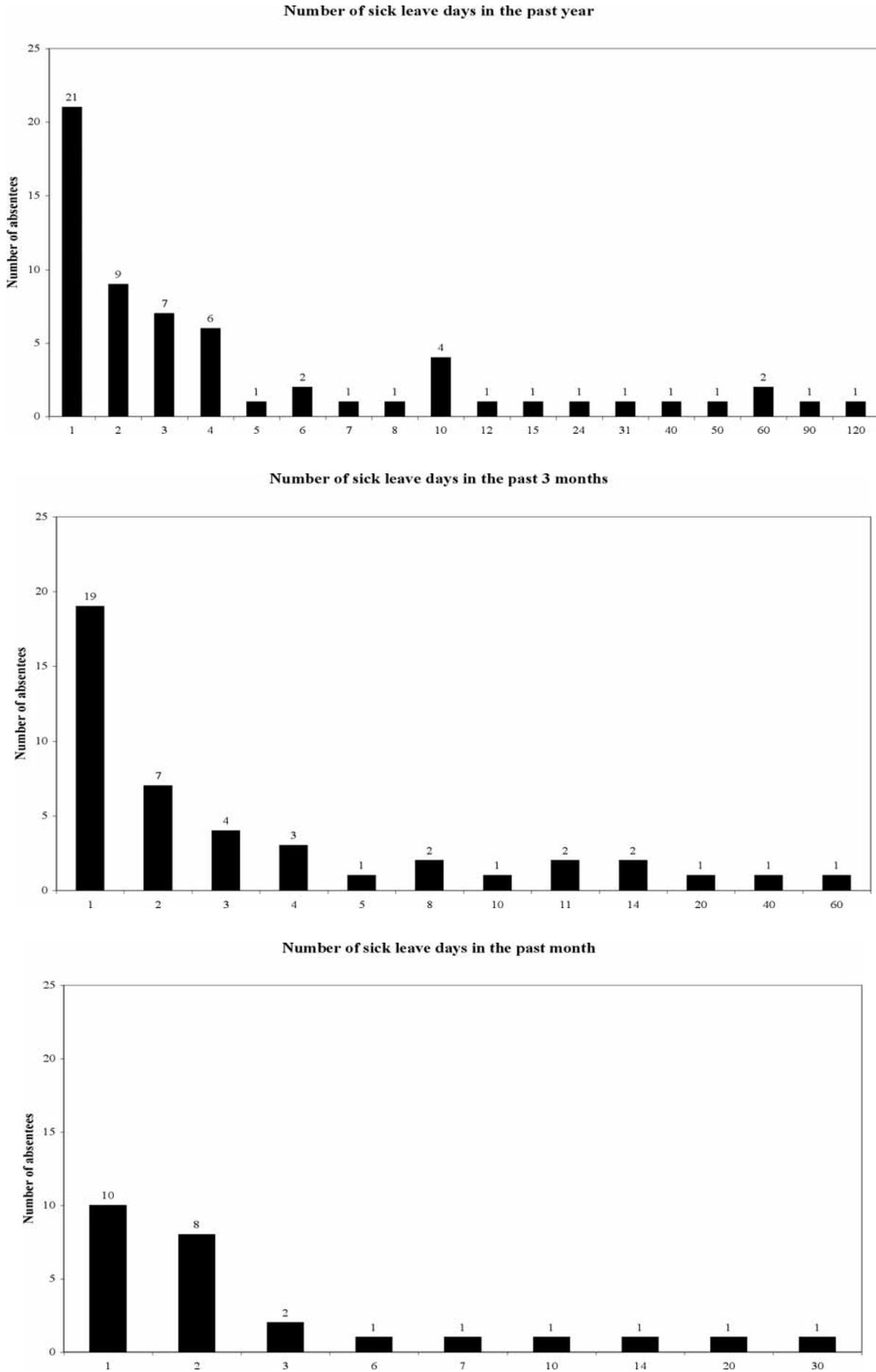


FIG. 1. — Number of lost working days per absentee

recreational activities sector (43.5%), but again this was a small group of employees. These differences are also not statistically significant.

No significant differences (Fisher's exact test) have been noted between the reported working postures sitting, standing and mobile for men and women. A slightly elevated prevalence was seen for men with a combination of working postures (12.5%).

Discussion and conclusion

The lifetime prevalence of migraine in our study is 20.2%, which is relatively high. The prevalence among men is 9.5% and among women 32.0%. These findings are difficult to compare with data from the literature since various types of prevalence rates (year prevalence, month prevalence and lifetime prevalence) are sometimes used without a clear definition, resulting in a wide variation in prevalence figures being reported. The lifetime prevalence in our study however, is comparable with some of the lifetime prevalences cited in the review paper by Bigal (Bigal *et al.* 2004).

Women suffer statistically significantly more from migraine than men. The observation that migraine prevalence reaches a peak in the 35 to 44-year age group and then gradually diminishes in the subsequent age groups was also found by Lipton *et al.* (Lipton *et al.* 2001), using the 1988 IHS-criteria. White collar workers suffer more from migraine than blue collar workers. However, the significant differences for age and job category disappeared when we stratified by gender.

Also the number of attacks among migraineurs is not fully comparable with other studies. On average, migraine sufferers had 20.8 migraine attacks in the past year or 1.78 attacks per month. Also 69% reported two or more attacks in the month prior to participation. Lipton *et al.* (Lipton *et al.* 2001) reported 62% in the category of 1-3 attacks per month (the median), which is rather comparable. However, we pointed to the likelihood of recall bias because over the past month 3.2 attacks were reported in our sample.

In our study, 69% of the migraineurs regularly use medicaments (unspecified) every time headache occurs, compared to the 41% prescribed medication reported by Lipton *et al.* (Lipton *et al.* 2001).

An average of 2.3 sick leave days per year per migraineur was reported, which is lower than in other studies (Bigal *et al.* 2004). The average number of sick leave days per absentee per year was 10.6, and we found no comparable data in the literature.

The average number of sick leave days for the total sample was 0.4 days per year and per employee. If we extrapolate this figure to the total

working population in Flanders and Brussels (NIS 2004), this would count for approximately 1,150,000 sick leave days per year due to migraine.

If we assume that the prevalence of migraine and the absenteeism caused by this in the Walloon region of Belgium shows a trend which is comparable, then for Belgium we can estimate a total of approximately 1,650,000 sick leave days on an annual basis.

Female migraine patients are absent from work for 1.7 days on average, male migraine sufferers for 4.2 days. When we consider the absentees only, on average most working days are lost in the 25 to 34-year age group (= 14.7 days on average) and for the men (= 15.9 days on average).

Women suffer from migraine more than men. However, on average men are absent from work longer or more frequently (though not significantly).

No significant difference was found between age groups with respect to annual prevalence of absenteeism among migraineurs.

There are only minor prevalence differences by recorded occupational risks. However, a significant difference is observed among women with respect to biological agents, in particular among employees in the healthcare sector. We have no straightforward explanation for this difference. No significant difference in prevalence rates could be found either by industrial sector or by working posture.

When we interpret these results, we need to take certain limitations of the study into account :

- The representativity of the sample : we made use of a convenience sample and not a true random sample. However, from the age and gender distributions we assume that our sample gives a fairly good image of the Flemish and Brussels working population. However, in comparing our results with other surveys we have to take into account the differing age structure of our sample which is younger than in general population surveys (e.g. mean age of 39 year versus median age category in the survey by Lipton *et al.* (Lipton *et al.* 2001) of 40-49 years). This means that the age group with the highest prevalence rates (35-44 years) is also the most prevalent group in our study. This could be a partial explanation of the rather high prevalence rates we found.

- The use of the ID-Migraine, which was developed as a screening device for general practice, could introduce overreporting of migraine. However, because we used the screener in healthy employees who do not consult their doctor because they have complaints, an overestimation effect is probably not present. But the validity of the ID-Migraine in this population has indeed not been investigated.

- The effect of reporting bias : the number of sick leave days is very likely to be underreported. The further we go back in time, the greater the

likelihood of recall bias. There was a discrepancy, for example, between the number of attacks and the number of sick leave days reported in the last month, the last 3 months and in the last year. We estimated that underreporting varied between 48% and 72%.

An additional argument for reporting bias is that the answers to the questions about absenteeism for the different periods (last month, last 3 months and last year) have not always been completed correctly. For instance, a small number of absentees indicated that they had been absent in the last month (or 3 months), whereas no absenteeism in the last year had been recorded on the questionnaire.

– The cross-sectional design of the study which precludes the possibility of making causal inferences, for instance on associations between work-related factors and migraine. Because of the design of this study we have no perception of the time relation between the factors, nor of possible selection phenomena.

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