Is the occurrence of back pain in Germany decreasing? Two regional postal surveys a decade apart

Angelika Hüppe*, Kristin Müller*, Heiner Raspe*

Background: Back pain is often perceived as an epidemic disorder with an ever-increasing prevalence. The objective of this paper is to estimate and compare point and period prevalence rates of back pain from two highly comparable postal surveys, a decade apart within a single regional population in the north of Germany. Methods: In 1991/1992 and 2003 two systematic random samples of German residents of Lübeck aged 25–74 years were independently drawn from the municipal population registry. They received a short postal questionnaire with maximally two reminders. All data were directly standardised on the age, sex, and educational distribution of the merged samples. A sharp decrease in response rates from 81% in the early 1990s to 60% in 2003 required complex considerations of non-response bias. Results: Both the overall and gender-specific point and 1 year prevalence rates of back pain remained fairly stable as well as the rate of severe disabling back pain. The overall prevalence (adjusted for age, sex, and education) of back pain today’ was 39.1% (1991/92) and 38.2% (2003), the 1 year prevalence was 73.3% (1991/92) and 73.8% (2003), and the prevalence of severe pain was 9.9% (1991/92) and 10.2% (2003). Conclusions: The data do not support the widespread public notion of a growing epidemic of back pain in Germany.

Keywords: back pain, cross-sectional studies, epidemiologic methods, prevalence

1 Back pain is the most common cause of severe long-term pain and physical disability, affecting hundreds of millions of people across the world. Also in Germany back pain is still the leading cause of sickness leaves, disability pensions (only recently overtaken in females by psychological disorders), and medical rehabilitation. The extent of the problem and its burden on patients and society has been recognised by the United Nations and WHO with their endorsement of the Bone and Joint Decade 2000–2010. Though a relevant public health problem, back pain is often perceived as an ever-spreading epidemic. However, population-based studies on secular trends of back pain are scarce and their results equivocal. The few available studies, originating from only two countries, refer to variable age groups and time periods (see table 1).

So far, no directly comparable data on epidemic trends have been reported from Germany. The two most recent National Health Surveys (1998 and 2003) addressing representative samples of the population (18–79 years old) both included questions on back pain; however, the differences of methods and instruments are profound. In 1998, a complex self-administered questionnaire was used, in 2003 a telephone interview. In 2003 questions on back pain were asked with a focus on disabling chronic pain, whereas in 1998 back pain prevalence had been assessed within a list of pains from various sites. The authors explicitly advise against comparing the observed 12 months prevalence rates of back pain in 1998 (59.2%) and 2003 (62.0%).

According to a methodologically opaque study about back health—conducted for a major health insurance scheme by a non-scientific organisation—the one year prevalence rate of back pain (‘Have you suffered from back pain during the past 12 months?’) is reported to have increased by more than a quarter between 1998 (53 %) and 2004 (67%). Again the media took up the press reports and reinforced the speculation of a back pain epidemic.

The aim of this paper is to present and discuss data from two highly comparable cross-sectional back pain surveys a decade apart, conducted in a single regional population in the north of Germany.

Methods

Survey 1991/92

In the early 1990s a random sample of 3969 persons (1908 males, 2061 females) aged 25–74 years was drawn from the municipal population register of Lübeck, a town of about 215000 inhabitants in the northwest of Germany. To be included in the survey subjects needed to be of German nationality with Lübeck as their principal place of residence. In Germany mandatory population registers (‘Einwohnermellderegister’) are assumed to cover more than 97% of the entire population. The sample was drawn by using a systematic procedure applied to those (registered) residents (in alphabetic order) who met the inclusion criteria. After selecting a random start point, every kth unit in the subset is selected with k being an appropriately chosen step length.

A six-page questionnaire comprising nine principal questions on back pain was sent by post with a hand signed cover letter and free return envelop. If necessary the first mailing was followed by up to two reminders each after three weeks [for more details see ref. 18].

Survey 2003

In 2003 and within the German Back Pain Research Network GBPARN, we studied an independent random sample of 2441 inhabitants of Lübeck (1184 males, 1257 females) of the same age range with nearly identically methods. The same sampling method as described above was used.
Table 1 Population-based cross-sectional studies of trends for back pain prevalences

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Time period</th>
<th>Age group</th>
<th>Prevalence</th>
<th>% Increase (–)</th>
<th>% Decrease (–) with CI*</th>
<th>Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leino et al.²</td>
<td>Finland</td>
<td>1985–1992</td>
<td>15–64</td>
<td>1 month</td>
<td>m: −2.8 [-5.9 to +0.4]</td>
<td>w: −0.1 [-3.1 to +3.0]</td>
<td>No change</td>
</tr>
<tr>
<td>Manninen et al.⁸</td>
<td>Finland (farmers)</td>
<td>1979–1992</td>
<td>18–64</td>
<td>1 year</td>
<td>m: −10.9 [-8.4 to −13.4]</td>
<td>w: −12.9 [-10.1 to −15.8]</td>
<td>Decrease</td>
</tr>
<tr>
<td>Heistaro et al.⁹</td>
<td>Finland</td>
<td>1972–1992</td>
<td>30–59</td>
<td>1 month</td>
<td>m: +2.1 [-5.3 to +1.2]</td>
<td>w: +1.0 [-2.1 to +4.2]</td>
<td>‘Fairly stable’</td>
</tr>
<tr>
<td>Palmer et al.¹⁰</td>
<td>UK</td>
<td>1987/8–1997/8</td>
<td>20–59</td>
<td>1 year</td>
<td>m: −16.2 [-13.0 to −19.2]</td>
<td>w: +10.0 [-7.2 to −12.8]</td>
<td>Increase</td>
</tr>
<tr>
<td>Pitkala et al.¹¹</td>
<td>Finland</td>
<td>1989–1998/9</td>
<td>75–85</td>
<td>Daily back pain during the previous 2 weeks</td>
<td>–3.5 [-7.2 to −0.1]</td>
<td>Decrease</td>
<td></td>
</tr>
<tr>
<td>Hákala et al.¹²</td>
<td>Finland</td>
<td>1991–2001</td>
<td>12–18</td>
<td>Back pain at least weekly in the past 6 months</td>
<td>m: +1.0 [-0.3 to +2.3]</td>
<td>w: +3.0 [+1.6 to +4.4]</td>
<td>‘Is becoming more common’</td>
</tr>
<tr>
<td>Harkness et al.¹³</td>
<td>UK</td>
<td>1954–1994</td>
<td>18–64</td>
<td>Back pain ‘now’</td>
<td>m: +9.2 [+5.6 to +12.7]</td>
<td>w: +8.7 [+5.3 to +11.9]</td>
<td>Increase</td>
</tr>
</tbody>
</table>

*Confidence interval for the difference calculated according to Altman et al.; if necessary numbers required for calculation estimated from graphs.

m, men; w, women; CI: 95% confidence interval.

Questionnaire

Point and 12 month prevalence were measured by two yes/no-questions: ‘Do you have back pain today?’ and ‘Did you additionally experience back pain in the last 12 months?’

The estimate of the one-year-prevalence was based on both questions demanding at least one ‘yes’. Questions on back pain were preceded by a region of interest drawing (figure 1) accompanied by a written explanation: ‘Different people have a different understanding of the word ‘back’. We use the term ‘back pain’ for pain in the hatched area of the mannequin.’

A simple grading scheme for current back pain was used that combines two variables, actual pain intensity and self-reported physical functioning. The first is measured by an 11-point numeric rating scale (0 = currently no back pain to 10 = intolerable back pain), the latter by the Hannover Functional Abilities Questionnaire HFAQ. The HFAQ is a short self-administered questionnaire composed of 12 items used for the assessment of the level of functional status in activities of daily living. The subject is asked to rate if he or she is able to perform the activities (e.g. to put on one’s socks) on a three-point scale (1 = yes, 2 = yes, but with trouble, 3 = no or only with help). The overall score is expressed by an aggregate value of functional capacity ranging from 0 (no functional capacity) to 100% (complete functional capacity). The proposed grading scheme allows to classify back pain patients into four hierarchical grades of current severity: grade 0 = no back pain present, grade 1 = back pain with low intensity (<5) and low disability (functional capacity, HFAQ >70%), grade 2 = back pain with high intensity (>5) or high disability (HFAQ < 71%), grade 3 = back pain with high intensity and high disability. The HFAQ has been used in both national and international studies.

Because in 2003 additional questions about health care utilisation were used the 2 questionnaires differed in length, in 1991/1992 it comprised 6, in 2003 11 pages.

Non-response bias

To estimate direction and amount of non-response bias we used two methods, ‘wave analysis’ and telephone interviews among non-responders.

‘Wave analysis’ is an indirect method based on systematic differences between early and late responders and their extrapolation to non-responders. We assume (model 1) non-responders to have the same prevalence of back pain as those who responded to the first or second reminder. The combined prevalence from the two reminders is applied to the non-responders. Combining these results with those of the responders yields an overall estimate for the entire study populations. Model 1 was used for both surveys.

In contrast to wave analysis interviewing non-responders offers more direct information. In 2003 a short telephone interview with 100 non-responders was conducted as a result of consecutively contacting a random sample of 432. In model 2 we assume that all non-responders have the prevalence
follows Fisher and Van Belle.27 Education level. The statistical comparison of the adjusted rates for males and females, rates are directly standardised to age and (CL) are calculated. When prevalence is reported separately for those who replied to the first or second reminder.

Table 2 Description of the samples

<table>
<thead>
<tr>
<th>Sample characteristics</th>
<th>1991/92</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial sample size</td>
<td>3969 (51.9% female)</td>
<td>2441 (51.5% female)</td>
</tr>
<tr>
<td>Not contactable*</td>
<td>111 (2.8%)</td>
<td>22 (0.9%)</td>
</tr>
<tr>
<td>Refused participation</td>
<td>192 (5%)</td>
<td>135 (5.6%)</td>
</tr>
<tr>
<td>No reaction</td>
<td>557 (14.4%)</td>
<td>828 (34.2%)</td>
</tr>
<tr>
<td>Valid responses</td>
<td>3109</td>
<td>1456</td>
</tr>
<tr>
<td>Response rate (among contactable)</td>
<td>80.6%</td>
<td>60.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
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</thead>
<tbody>
<tr>
<td>Female</td>
<td>1606 (51.7%)</td>
<td>793 (54.5%)</td>
</tr>
<tr>
<td>Male</td>
<td>1503 (48.3%)</td>
<td>663 (45.5%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group</th>
<th>1991/92 (n=2441)</th>
<th>2003 (n=1201)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25–34</td>
<td>705 (22.6%)</td>
<td>252 (17.3%)</td>
</tr>
<tr>
<td>35–44</td>
<td>614 (19.7%)</td>
<td>354 (24.3%)</td>
</tr>
<tr>
<td>45–54</td>
<td>693 (22.2%)</td>
<td>270 (18.5%)</td>
</tr>
<tr>
<td>55–64</td>
<td>549 (17.6%)</td>
<td>296 (20.3%)</td>
</tr>
<tr>
<td>65–74</td>
<td>541 (17.4%)</td>
<td>284 (19.5%)</td>
</tr>
<tr>
<td>Missing</td>
<td>16 (0.5%)</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School education</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Up to 9 years</td>
<td>1753 (57.1%)</td>
<td>629 (43.2%)</td>
</tr>
<tr>
<td>10 years</td>
<td>989 (31.7%)</td>
<td>536 (36.8%)</td>
</tr>
<tr>
<td>12/13 years</td>
<td>327 (10.5%)</td>
<td>273 (18.8%)</td>
</tr>
<tr>
<td>Missing</td>
<td>49 (1.6%)</td>
<td>18 (1.2%)</td>
</tr>
</tbody>
</table>

* a: Due to death, mailing errors and subjects moving out of area
  b: Calculated with regard to the total sample minus not contactable subjects

obtained from this group of contactable non-responders. Model 2 was used for survey 2003.

Statistics

All analyses are performed using SPSS for Windows, version 12.0.1. Prevalence rates are directly standardised on sex, age, and education level of the combined responding samples. The three variables are relevant risk factors of prevalence and severity of back pain.24–26 Ninety-five per cent confidence limits (CL) are calculated. When prevalence is reported separately for males and females, rates are directly standardised to age and education level. The statistical comparison of the adjusted rates follows Fisher and Van Belle.27

Both surveys were approved by the university’s ethics committee.

Results

Table 2 describes both samples. The response rates differ clearly, mainly due to a much greater proportion of people not showing any reaction after three mailings in 2003 (~34%) than in 1991/1992 (~14%).

In comparison to 1991/1992 in 2003 slightly more responders were female ($\chi^2 = 3.19, P = 0.074$), and more responders were older than 54 and fewer below 35 years of age ($\chi^2 = 36.19, P < 0.001$). In 2001 the rate of persons with limited education was lower ($\chi^2 = 91.57, P < 0.001$). The differences have to be accounted for in further analyses.

Prevalences

The prevalence of back pain ‘today’ (directly standardised on the age, sex, and educational level of the combined samples) remained fairly stable: in 1991/1992 it was 39.2% (95% CL: 37.52–41.0%) and is 38.2% (95% CL: 35.40–40.9%) in 2003. Equally, the 1 year prevalence rate was 75.3% (95% CL: 73.8–76.8%) in 1991/1992 and 73.8% (95% CL: 71.4–76.3%) in 2003. The prevalence of severe pain (grade 3: high pain intensity and high functional disability) too remained virtually unchanged: 1991/92: 9.9% (95% CL: 8.8–11.0%); 2003: 10.2% (95% CL: 8.6–11.9%).

Table 3 gives the three prevalence rates stratified by gender. We observed no significant change from 1991/1992 to 2003.

The results from the three mailings (wave analysis) from the two studies are shown in table 4.

The data indicate that responders to the first mailing were more likely to report back pain than those who replied to the first or second reminder.

Following the proposal of Papageorgiou et al.28 to estimate prevalence rates for surveys with incomplete response we applied the combined prevalence from the two reminders (directly adjusted for age, sex, and education; data not shown) to the 20% and 40% non-responders, respectively. Combining these results with those of the responders to all three mailings yields two overall estimates for the entire study populations (model 1, see table 4). The data support the impression of a slight decrease in the prevalence rates of back pain ‘today’ and ‘in the past 12 months’ and a stable situation for severe disabling back pain.

In 2003, 100 out of 432 (23%) randomly selected non-responders were interviewed by telephone. These contactable non-responders report back pain at prevalence rates even lower than those derived from the latest responders (see table 4). According to the data from the telephone interview in 2003 the prevalence among contactable non-responders is clearly lower than that of the late responders. Introducing this known rate into a second (again weighted) estimate of the true prevalence of back pain ‘today’ would lead to an even lower overall rate for 2003 (model 2, see table 4).

Discussion

Our data do not support the widespread public notion of an ever-increasing epidemic of back pain in Germany. Because the two population-based studies conducted ~10 years apart used nearly identical methods and questions their comparability is high.

However, one important difference has to be considered: In 2003 the response rate (60.2%) was much lower than in 1991/1992 (80.6%), a problem that seems to reflect a general trend.28,29

Directly comparing the two groups of responders (as we did first) rests on the assumption of identical prevalence rates among non-responders. This is unlikely to be valid as for instance Papageorgiou et al.28 have shown that persons who responded to a comparable health survey are usually more likely to suffer from the complaint(s) in focus. And early responders seem even more often affected. Thus non-response bias is highly probable and may become more relevant with decreasing response rates. Our data partly clarify its direction and extent and support the hypothesis of at least no change or even a decrease of back pain over a decade in an urban German population.
The aim of our study was to analyse the prevalence of back pain. Our world).

In this respect our data are comparable with the Finnish studies from table 1 which cover a comparable age range. They report similar results: no change or decrease in back pain. In contrast, the two British studies observed increasing prevalence rates. A recent study of national differences in back pain and self-perceived disability between the United Kingdom and Germany resulted in prevalence rates markedly different between the two countries. Past and current back pain was more frequent among German participants. Could it be that Germany has already reached the peak of the ‘epidemic’ and is now on the decline?

One has to be aware that comparisons of absolute frequencies of back pain between countries and even regions may be impeded by different semantic concepts (cf. the German back as indicated in figure 1 versus the low back of the anglophone world).

The aim of our study was to analyse the prevalence of reported back pain in Germany over the past 10 years. Our epidemiological data seem to be in accordance with data from work disability statistics of the major statutory health insurance scheme of Germany with a high proportion of blue collar workers, the so-called AOK (German acronym for General Regional Health Insurance). For back disorders (ICD-10 M40–M54) the data for West Germany show a slight rise between 1986 and 1994 followed by a steady decrease till 2003 with, for example, 39 303 disability days per 10 000 insured (without retired persons) in 1991/1992 versus 30 952 days in 2003. During this period the German law and system of disability payment did not change. This argues against a relevant role of ‘nomogenic’ factors in the evident decrease in back pain-related disability and the likely decrease in reported back pain.

Acknowledgements

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Key points

• In many European countries back pain is a highly frequent disorder and leading cause of work disability, medical rehabilitation, and invalidity pensions.
• It is often perceived as an ever-spreading epidemic, though data from repeated surveys are scarce and contradictory.
• Data from two highly comparable surveys in North Germany safely exclude an increase of back pain prevalence between 1991/1992 and 2003.
• A decrease seems more likely especially when considering the very low prevalence among a group of ‘contactable’ non-responders.
• It seems possible that (in Germany) the back pain epidemic is already on the decline.

References


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