Epidemiology of low back pain

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Spinal disorders

Low back pain is an enormous and important clinical and public health problem. Although admittedly common, its epidemiology is difficult to determine precisely. There is a problem of definition and classification. For example, the results of a survey will depend on definitions of the severity of pain, period of pain, medical attention required, disability caused by, etc. Further, there is a measurement problem since back pain can exist without objective evidence and pain cannot be directly measured. In addition, poor recall, influence of legal, social, psychological and work-related factors, and the intermittent nature of back pain creates validity and reliability problems. Thus, the data are to be viewed as an approximation.

Background—where we stand today

Frequency

75–85% of all people will experience back pain (BP) in some form during their life. National statistics from the United States indicate a yearly prevalence in the 15–20% range. Back pain is the most frequent cause of activity limitation in people below age 45, the second most frequent reason for physician visits, the fifth most frequent for hospitalization, and the third ranking reason for surgical procedures. About 1% of the U.S. population is chronically disabled because of BP and another percent is temporarily disabled. About 2% of the U.S. work force have compensable back injuries each year, for a total of over 500,000 injuries (Andersson, 1997).

National statistics from European countries reveal that 10–15% of all sickness absence is due to back pain, a percentage that has remained constant in spite of rising absolute numbers of lost work days per worker. The 1-year prevalence of back pain in European countries varies from 25–45%. Chronic BP is present in 3–7% of the adult population.

Cross-sectional studies from several countries provide support for the national prevalence numbers. Although there are large differences in study design and methodological quality, there are remarkable similarities in the estimates of lifetime incidences and point prevalences (Table 1). The lifetime incidences vary from 50 to over 80% with average incidence of 60%.

Table 1. Prevalence and lifetime incidence of low back pain in different cross-sectional studies

Author (s)	Lifetime incidence	Prevalence % Point	Period	Study group N	Age	Gender
Biering-Sorensen	62.6	12.0	—	449	30–60	M
Biering-Sorensen	61.4	15.2	—	479	30–60	F
Hirsch et al.	48.8	—	—	692	15–72	F
Hult	60.0	—	—	1193	25–59	M
Frymoyer et al.	69.9	—	—	1221	28–55	M
Nagi et al.		18.0	—	1135	18–64	M, F
Svensson et al.	61	—	31	716	40–47	M
Svensson et al.	67	—	35	1640	38–64	F
Valkenburg et al.	51.4	22.2	—	3091	20+	M
Valkenburg et al.	57.8	30.2	—	3493	20+	F
Magora	—	12.9	—	3316		M, F
Gyntelberg	—	—	25		40–59	M
Papageorgiou et al.	59.0	—	35	1884	18+	M
Papageorgiou et al.	59.0	—	42	2617	18+	F
Walsh et al.	58.3	—	36	2667	20–59	M, F

The prevalences for ongoing back pain are 15–30%. Women and men have similar prevalence rates and in most studies, the highest prevalence rates occur in the 40–60 year age group.

A large number of studies of occupational low back pain show major differences between industries and occupations (Andersson 1997). Because the work environment is highly selective, because exposure is often uncertain, and because individual, social and legal factors influence work absence and disability, much of this data are difficult to evaluate and compare. Despite these limitations, there appears to be an association between back pain and (1) heavy physical work, including lifting, bending and twisting, (2) static work postures, including long term sitting, (3) vibration, and (4) psychosocial work factors such as work dissatisfaction.

Anthropometric influence on low back pain is uncertain. Tallness appears to be a risk factor for sciatica and disc herniation, and significant overweight increases the risk of back pain in general (Andersson 1997, Heliovaara 1987).

Natural history

Back pain has a favorable natural history. Most patients recover quickly and without residual functional deficits. Most cases of back pain are resolved within 2–4 weeks, and 90% recover by 12 weeks. Unfortunately, recovery after twelve weeks is slow. Fewer than 50% of patients off work for low back pain for more than 6 months return to work, and virtually nobody returns to work after two years of absence (Spitzer et al. 1987, Waddell 1987). Among factors which negatively influence recovery are the presence of leg pain, compensation, high age, psychological factors, and physical work factors. None of those are particularly useful as predictors of chronicity because the interaction of different factors is so complex.

Recurrence of low back pain is very frequent with rates of up to 50% in the year following the initial episode (Andersson 1997).

Health care utilization

It is quite clear from statistics that health care utilization for back pain is very high, and in some aspects increasing. In 1990 there were about 15 million office visits in the U.S. for "mechanical low back pain", accounting for about 2.8% of all office visits (Hart et al. 1995). Considering the fact that visits to allied health professionals including chiropractors were not included, the actual number of office visits was probably over 30 million per year. Among MD's and DO's the number of visits in 1989–1990 was only slightly higher than in 1980–1981 (when it was 12.2 million). Another U.S. study included chiropractors and divided the office visits into "episodes of spine care" which were defined as all visits believed to be associated with a particular episode of back pain (Shekelle et al. 1995). By this definition there were 9.1 episodes per 100 person-years. Only persons up to age 65 were included. European statistics are similar. In 1992–1993 there were 7 million visits to general practitioners for back pain in the United Kingdom. The annual "patient consulting rate" in the UK has been estimated at 5.5–7.5% of the adult population. Swedish statistics from 1987 estimates the number of outpatient visits for back pain to 790,000 or 8.9 per 100 person-years.

Disability trends, unfortunately, indicate a substantial rise. The incidence of sick listing for back pain in Sweden increased from 3% of the population in 1980 to 8% in 1987 (by a factor of 2.66). At the same time there was an increase in the average sickness absence period from 25 days in 1980 to 40 days in 1987. Even worse is the change in the number of permanently disabled in Sweden which increased by 6,000% from 1952 to 1987 (Nachemson, 1991). From 1983/84 to 1993/94, the number of days in Great Britain (GB) during which sickness and invalidity benefit was paid for spinal disorders increased by 266% from 28.9 to 105.8 million (Underwood 1997).

The annual rate of operations for herniated lumbar discs varies dramatically between countries. It has been estimated that the rate per 100,000 is 10 in Great Britain, 20 in Sweden, 35 in Finland, and over 100 in the U.S. Over 95% of operations are at the L4 and L5 levels. The mean age at surgery is 40–45 years. Men are operated on twice as often as women.

The rate of all back surgeries is also higher in the U.S. than in other developed countries. In 1988–1989, the likelihood of having back surgery was 40% higher in the U.S. than in the Netherlands, which had the second highest frequency of back operations, and 5 times higher than in Scotland and England (Cherkin et al. 1994). The back surgery rates in two Canadian provinces were a third to a half of those in the U.S. Over the 11-year period from 1979 to 1990, the number of adult low back operations in the U.S. increased by 55%, from 102 per 100,000 to 158 per 100,000. This increase has continued. From 1992 to 1996 the number of patients operated on for spinal conditions increased by 14% (476,000 to 543,000). This means that the overall back surgery rate in 1996 was 209 per 100,000. Fusion procedures increase the most. Thus, 228,000 fusions were performed in the U.S. in 1996, of which about 50% involved the cervical spine.

Cost

The cost of the back problem to society is difficult to

determine precisely. Generally, the cost components include direct cost (evaluation and treatment costs, wage loss, disability costs, etc.), indirect cost (opportunity cost, loss of production, hiring costs, etc.), and social cost. The direct cost in the U.S. for workers' compensation back injuries has been estimated in the late 80's to be between 10 and 15 billion dollars (Webster 1994). While low back cases contributed about 16% of all workers' compensation cases and that time, they were responsible for 33% of the total costs. These percentages have remained fairly unchanged. 25% of cases contribute 96% of cost, indicating the importance of chronic and complex cases. Thus, while the median case in 1989 cost $396, the mean cost of a low back case was $8321. Indirect costs are at least as high as direct costs. This would bring the 1989 workers' compensation number to between $20 and $30 billion. Between 1986 and 1989 the mean cost per case rose almost twice as fast as the consumer price index, the mean cost of indemnity payments per case rose at over twice the rate of the mean national wage, and the mean cost per case rose somewhat faster than the mean increase in overall medical costs. Another estimate based on the State of California costs for workers' compensation back injuries arrived at a similar number for 1988 ($26.8 billion) (Pope et al. 1991).

Non-work-related back pain also contributed to the cost. Not only are there direct costs related to the evaluation and care of non-work-related back pain, but there are also indirect costs as pain interferes with work capacity in various ways. These cases have been estimated to contribute another $10–15 billion.

Data from other countries are similar. In 1994 the cost of low back pain to the United Kingdom was estimated at 6000 million pounds (ECU 8350 million, $10 billion) (Underwood 1998). This estimate was based on combining health care costs, Department of Social Security (DSS) payments and lost production. Health care costs contributed only 12%. DSS payments contributed 24% most of which were compensation for wage loss. Underwood argues that this may be an over estimate reflecting factors other than back pain. This may indeed be true since there is little data supporting an actual increase in the prevalence of back pain (Leino et al. 1994, Leboeuf-Yde and Lauritzen 1995). Other factors such as advancing age, unemployment rates, job dissatisfaction, and socioeconomics may explain part of the disability rather than back pain itself. Similarly, the lost production costs (65%) may also be over estimated. Swedish data probably have similar weaknesses. Assuming a conversion rate of 6 Swedish Crowns per 1 $US, Nachemson (1991) estimated the cost of loss of production because of back pain to be $806 million or about $100 per inhabitant. Converted to the US population, this would be the equivalent of $26 billion. Whether these estimates are absolutely correct or not, they are certainly alarming, particularly since they are increasing.

Prevention

A number of prevention methods have been suggested as strategies to reduce the incidence of low back pain. They include back and aerobic exercises, education (back schools, etc.), back supports, ergonomic interventions at the workplace, and other risk factor modifications (smoking cessation, weight loss, etc.). Recent reviews of the literature are disappointing (King 1993, Lahad et al. 1994). There is limited evidence that exercise can decrease the incidence and duration of back pain episodes. At best the studies suggest a mild effect. The education evidence is also limited and controversial. The other prevention strategies have not been studied with sufficient rigor to allow recommendations. Clearly, this is an area begging for more attention.

Future—where we go from here?

Important epidemiologic data are missing without which the natural history of back pain and factors influencing its development and modifying treatment and cost cannot be determined. We need agreement on definitions and classification. We also need large community-based studies to accurately measure the health and social impact of low back pain. Further, we need to develop methods and study the question of why disability from back pain occurs so as to separate the problem of back pain from the problem of disability caused by back pain.

Prevention strategies must also be developed and evaluated. Even if these do not eliminate the back problem, they may reduce the incidence of back pain episodes as well as the disability caused by these.

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