

tion for publication bias. Moreover, the odds ratio outcome was used exclusively in this investigation. The appearance of a funnel plot can depend on the outcome measure used, and different results might be obtained in some instances if the risk difference or relative risk scale is used. The sensitivity of assessments of publication bias to the outcome measure used requires further investigation.

The idea of adjusting the results of meta-analyses for publication bias and imputing "fictional" studies into a meta-analysis is controversial.¹⁵ We certainly would not rely on results of imputed studies in forming a final conclusion, partly because asymmetry in a funnel plot may be due to factors other than publication bias. Any adjustment method should be used primarily as a form of sensitivity analysis, to assess the potential effect of missing studies on the meta-analysis, rather than as a means of adjusting results themselves.

If, as our study indicates, missing studies change the conclusions in less than 10% of meta-analyses, publication bias, although widespread, may not be a major practical problem. On the other hand, the fact that almost half the funnel plots examined seemed to exhibit some asymmetry leads us to conclude that routine evaluation for this bias should be an important step in any systematic review.

Contributors: AJS had the original idea for the study, extracted the relevant data from the Cochrane Database of Systematic Reviews, and assisted with the interpretation of the results. SJD assisted with the study design, carried out the trim and fill analyses, and assisted with the interpretation of the results. RLT assisted with the study design and the interpretation of the results. KRA and DRJ assisted with the interpretation of the results. The paper was written and revised jointly by all authors. AJS is the guarantor for this paper.

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What is already known on this topic

Meta-analyses are subject to bias because smaller or non-significant studies are less likely to be published

Most meta-analyses do not consider the effect of publication bias on their results

What this study adds

A simple trim and fill adjustment method on studies in the Cochrane database suggests that publication bias may be present to some degree in about 50% of meta-analyses and strongly indicated in about 20%

Publication bias affected the results in less than 10% of meta-analyses

Researchers should always check for the presence of publication bias and perform a sensitivity analysis to assess the potential impact of missing studies

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Back pain in Britain: comparison of two prevalence surveys at an interval of 10 years

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In Britain, as in many other countries, back pain is a major cause of disability, especially in adults of working age. During the decade to 1993, outpatient attendances for back pain rose fivefold, and the number of days of incapacity from back disorders for which social security benefits were paid more than doubled.¹ It is unclear whether this represents an increase in the occurrence of diseases affecting the back or a change in people's behaviour when they have symptoms. To address this question we compared the prevalence of low back pain and associated disability in two postal surveys 10 years apart.

Subjects, methods, and results

Both surveys were approved by the relevant local ethics committees. The first was conducted during 1987-8 and obtained information from 2667 men and women randomly selected from the lists of 136 general practitioners in eight geographically dispersed locations in Britain (59% response rate).² Of these, 2596 were aged 20-59 years at the time of completing the questionnaire. The investigation focused on occupational and other risk factors for back symptoms and included a question about the occurrence of back pain that had

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One year prevalence* of symptoms of low back pain in 1987-8 and 1997-8 in patients randomly selected from general practitioners' lists. Values are numbers (percentages) of patients unless indicated otherwise

	Men						Women					
	No of participants		All low back pain		Low back pain making it impossible to put on hosiery		No of participants		All low back pain		Low back pain making it impossible to put on hosiery	
	1987-8	1997-8	1987-8	1997-8	1987-8	1997-8	1987-8	1997-8	1987-8	1997-8	1987-8	1997-8
Age (years):												
20-29	261	905	91 (34.9)	421 (46.5)	8 (3.1)	11 (1.2)	332	1044	86 (25.9)	402 (38.5)	8 (2.4)	17 (1.6)
30-39	315	1442	120 (38.1)	756 (52.4)	15 (4.8)	39 (2.7)	429	1464	142 (33.1)	600 (41.0)	11 (2.6)	22 (1.5)
40-49	303	1439	112 (37.0)	812 (56.4)	9 (3.0)	61 (4.2)	368	1302	165 (44.8)	624 (48.0)	13 (3.5)	42 (3.2)
50-59	256	1519	103 (40.2)	860 (56.6)	12 (4.7)	49 (3.2)	332	1248	115 (34.6)	639 (51.2)	12 (3.6)	55 (4.4)
Social class†:												
I and II	231	1597	54 (23.0)	732 (45.3)	7 (3.0)	27 (1.5)	347	1210	111 (31.9)	520 (43.4)	6 (1.8)	27 (2.5)
IIIN	131	517	46 (35.1)	246 (47.9)	5 (3.8)	17 (3.4)	189	1253	64 (35.2)	473 (38.0)	6 (3.0)	17 (1.3)
IIIM	414	1287	186 (45.4)	783 (60.8)	11 (2.7)	45 (3.5)	478	204	175 (36.4)	105 (52.9)	21 (4.3)	5 (2.8)
IV and V	282	918	118 (40.9)	537 (58.5)	17 (6.3)	17 (1.9)	289	778	103 (37.4)	378 (48.3)	8 (3.0)	9 (1.2)
Region‡:												
South West	98	435	35 (34.9)	246 (55.9)	2 (2.2)	13 (2.8)	137	323	46 (34.2)	148 (45.8)	3 (2.3)	7 (2.1)
South East	111	212	37 (33.6)	126 (59.6)	4 (3.8)	7 (3.1)	147	264	45 (31.2)	121 (45.8)	4 (2.5)	5 (2.0)
Eastern	155	217	65 (43.3)	112 (52.0)	6 (4.8)	5 (2.4)	196	215	74 (37.9)	82 (38.3)	9 (4.4)	7 (3.2)
Trent	204	763	85 (41.8)	404 (53.2)	11 (5.4)	21 (2.8)	252	724	87 (34.9)	350 (49.0)	8 (3.2)	25 (3.7)
Northern and Yorks	149	1481	69 (48.2)	781 (52.3)	14 (10.3)	48 (3.2)	201	1438	66 (33.2)	615 (43.1)	5 (2.3)	24 (1.7)
North West	126	501	31 (24.4)	277 (54.9)	2 (1.6)	15 (2.9)	192	409	70 (36.3)	176 (42.8)	7 (4.0)	12 (2.8)
Wales	139	316	51 (36.6)	177 (54.9)	4 (3.2)	12 (3.7)	145	255	47 (32.1)	138 (55.3)	3 (2.1)	11 (4.0)
Scotland	153	431	53 (34.4)	240 (55.2)	1 (0.6)	12 (2.6)	191	334	73 (37.9)	159 (48.6)	5 (2.6)	6 (1.9)

*Prevalence by social class and region was directly standardised to the age distribution of the combined samples from both surveys.

†In 1987-8 the social class of married women was classified according to their husband's occupation. In all other cases social class was based on the subject's own occupation. Social class could not be classified for 235 subjects in 1987-8 and 2599 subjects in 1997-8.

‡Prevalence by region is presented for those regions that included towns surveyed in 1987-8. Because the sampling within each region was geographically localised, these rates may not be representative of those in the region as a whole.

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lasted for 24 hours or longer during the previous 12 months in an area between the 12th ribs and the gluteal folds (illustrated with a diagram). Those who reported the symptom were asked whether it had made it impossible to put on hosiery (socks, stockings, or tights).

In the second survey, conducted during 1997-8, questionnaires were completed by 10 363 men and women aged 20-59 years who were chosen at random from the lists of 163 general practitioners across Britain (57% response rate).³ This study was designed to assess occupational exposure to vibration and associated health effects and included the same questions about back pain as the earlier investigation.

Over the 10 year interval between the two surveys, the one year prevalence of back pain (directly standardised to the age and sex distribution of the combined samples) rose from 36.4% to 49.1% (95% confidence interval for difference 10.6% to 15.1%). The trend was consistent across all ages in both men and women, and also within social classes and regions (see table). In contrast, the age and sex standardised prevalence of back pain that made it impossible to put on hosiery fell by 0.7% (-0.1% to 1.5%).

Comment

Over a 10 year interval the one year prevalence of back pain rose by 12.7%, but with no increase in the prevalence of symptoms sufficient to prevent people putting on hosiery. This suggests that the rise in outpatient attendances and sickness absence for back disorders is not explained by a greater incidence of severe back disease. We did, however, find a marked increase in the prevalence of less disabling back pain.

The surveys analysed were based on large samples selected in an identical manner, with wide geographical coverage and similar response rates. It is unlikely that the change can be explained by bias or chance. There may have been an increase in back disorders that do not greatly impair spinal flexion, but a more likely explanation is that cultural changes have led to a greater awareness of more minor back symptoms and willingness to report them, and this cultural shift may also have rendered back pain more acceptable as a reason for absence attributed to sickness.⁴ If this is correct, the solution to the growing economic burden from back pain may lie more in modifying people's attitudes and behaviour than in interventions aimed at reducing physical stresses on the spine.

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Contributors: KTP designed and carried out the second survey. KW designed and carried out the first survey. HB carried out the statistical analysis. CC helped to plan the second survey and the statistical analysis. DC supervised both surveys, wrote the first draft of the paper, and is the guarantor of the work. All authors helped to edit the paper.

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