

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	The incidence and healthcare costs of persistent post-operative pain following lumbar spine surgery in the United Kingdom: a cohort study using the Clinical Practice Research Datalink (CPRD) and Hospital Episode Statistics (HES)
AUTHORS	Weir, Sharada; Samnaliev, Mihail; Kuo, Tzu-Chun; Ni Choitir, Caitriona; Tierney, Travis; Cumming, David; Bruce, Julie; Manca, Andrea; Taylor, Rod; Eldabe, Sam

VERSION 1 - REVIEW

REVIEWER	Adrian Traeger University of Sydney
REVIEW RETURNED	05-Jun-2017

GENERAL COMMENTS	<p>Well written and well conducted study. I have only minor comments.</p> <ul style="list-style-type: none">- the authors are concerned that incidence of PPP found here might be an underestimate. I share their concern. It would be useful for the reader to glean a bit more data e.g. from previous research to provide some context to the figure. The authors mention previous estimates (refs 6-14) but don't given much detail about the quality and credibility of those studies- page 8 line 48 I missed the derivation of the denominator e.g. what % of total lumbar sp surgeries had the full 36 weeks of data to be included- page 4 line 10 the authors only cite biomedical/biomechanical reasons for PPP but surely there are others...?
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REVIEWER	Marc Moisi Wayne State University, United States
REVIEW RETURNED	20-Jun-2017

GENERAL COMMENTS	<p>This is a well thought out study with a large cohort of patients looking at a problem not only in the UK but affecting healthcare worldwide. I think all practicing spine surgeons should read and be aware of this study and ultimately we may be able to devise better ways of pain management for our patients. An excellent addition to the literature.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Adrian Traeger, University of Sydney

Well written and well conducted study. I have only minor comments.

- the authors are concerned that incidence of PPP found here might be an underestimate. I share their concern. It would be useful for the reader to glean a bit more data e.g. from previous research to provide some context to the figure. The authors mention previous estimates (refs 6-14) but don't given much detail about the quality and credibility of those studies

We agree with the reviewer's point and have added a sentence in the introduction to provide more detail on the published literature as follows: "Authoritative publications, mainly large case series and clinical trials, report that 10-40% of all patients who undergo lumbar surgery develop some form of chronic post-operative pain.[6-14] The wide range of estimates reported reflect varying clinical experiences of different institutions and the small samples of patients on which these estimates are based."

To add further context, we added to the discussion some prevalence data from a recent Japanese study:

"Our incidence estimate is consistent with a recent large Japanese study. Using internet-based survey data, the authors found that among 1,842 respondents who self-reported having undergone lumbar surgery in the past 10 years, 20.6% experienced ongoing pain.[28]"

- page 8 line 48 I missed the derivation of the denominator e.g. what % of total lumbar sp surgeries had the full 36 weeks of data to be included.

All patients who met study criteria (any code in the HES data indicating lumbar surgery during a given year plus 12 months pre-surgical data and 24 months post-surgical data) were included in the numerator for a particular year. The denominator included all individuals registered at a CPRD practice in that year who had linked HES data and at least 36 months of data available in CPRD. In order for the numerator and denominator to be comparable, we excluded patients without any linked CPRD-HES data and those who had fewer than 36 months of data available.

In order to make this clearer, we have edited the text, moving this information up in the paragraph and emphasizing how the numerator and denominator were calculated for a given year.

- page 4 line 10 the authors only cite biomedical/biomechanical reasons for PPP but surely there are others...?

We agree with the reviewer's point and have added psychosocial factors (from two references) to the biomedical/biomechanical reasons for PPP as follows:

"Persistent post-operative pain in lumbar surgery patients—more commonly known as failed back surgery syndrome (FBSS)—refers to chronic back and/or leg pain that continues or recurs in some patients following spinal surgery. It may be caused by one or a combination of factors including: residual or recurrent disc herniation, persistent post-operative compression of a spinal nerve, altered joint mobility, joint instability, postoperative myofascial pain development, scar tissue (fibrosis), and/or spinal muscular deconditioning.[1-3] Psychosocial factors that have been identified in this and other chronic post-surgical pain conditions include pre-operative anxiety, depression, poor coping strategies, and pain catastrophizing. Litigation and Worker's Compensation have also been

associated with reports of ongoing pain.[4,5] Patients form a diverse group, with complex and varied aetiologies and symptoms.[6,7]”

Reviewer: 2

Marc Moisi, Wayne State University, United States

This is a well thought out study with a large cohort of patients looking at a problem not only in the UK but affecting healthcare worldwide. I think all practicing spine surgeons should read and be aware of this study and ultimately we may be able to devise better ways of pain management for our patients. An excellent addition to the literature.

VERSION 2 – REVIEW

REVIEWER	Adrian Traeger University of Sydney
REVIEW RETURNED	31-Jul-2017

GENERAL COMMENTS	The authors have adequately addressed my comments.
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