

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)	Geographical and ethnic differences of osteoarthritis associated hip and knee replacement surgeries in New Zealand: a population-based cross-sectional study
AUTHORS	Lao, Chunhuan; Lees, David; Patel, Sandeep; White, Douglas; Lawrenson, Ross

VERSION 1 – REVIEW

REVIEWER	Sharon Brennan-Olsen The University of Melbourne, Australia
REVIEW RETURNED	24-Jul-2019

GENERAL COMMENTS	<p>This paper reports on the geographical and ethnic differences in more than 100,000 hip and knee joint replacement performed for a diagnosis of osteoarthritis in New Zealand. The paper is well written and presents important information. I have minor comments as follow:</p> <p>Abstract: Conclusion – last sentence regarding geographical differences appears almost an add-on: please address. Conclusion- you comment on ‘demand’ however there were no data mentioned regarding those with disease who underwent surgery, rather just the numbers that underwent surgery. Those who are more socially disadvantaged are more likely to delay joint replacement due to lack of wealth or support systems on which to draw; indeed this is alluded to within the limitations as written by the authors. Comment regarding the role of social disadvantage is warranted. Please revise discussion and conclusions throughout accordingly.</p> <p>Introduction: It is surprising that no Australian data are considered in the paragraph regarding regional differences in joint replacement, particularly given similarities in populations and geographical location. The introduction is somewhat unnecessarily long with some irrelevant information given the research question – consider shortening by one-third.</p> <p>Methods: There is no mention of minimum age of patients for whom data was extracted</p> <p>General comments: Consider amending ‘gender’ to read ‘sex’ throughout, given that gender is self-determined, and sex is biological.</p>
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REVIEWER	Gary Hooper University of Otago Christchurch New Zealand
REVIEW RETURNED	05-Aug-2019

GENERAL COMMENTS	<p>This study is a retrospective review of national data regarding the ethnicity, age and gender of hip and knee replacements recorded from 2005-2017. The aims were to 1) explore the regional and ethnic differences in rates of publicly funded osteoarthritis associated hip and knee replacement surgery and 2) investigate the mortality after surgery.</p> <p>With respect to the first aim: 1) the authors outline the total numbers of joint replacements by ethnicity but don't break that down within regions. I can see no data showing this difference. There were no data outlining the percentage ethnicity within each DHB to compare. Simple DHB demographics of gender, age and ethnicity undergoing joint replacement compared to the total DHB demographics is likely to show useful information which will enhance the study and give the reader a better understanding of the pattern of public hospital involvement. 2) Also there is no break down of the potential difference in populations between DHBs eg if a predominantly rural DHB has more/less comorbidities than more urban DHBs 3) What was the breakdown in those that had rural addresses compared to those with urban addresses in each DHB (to substantiate your comment that the Southern DHB had a higher rural representation.)</p> <p>With respect to the second aim the NZJR has complete death records for all joint replacements and so I do not understand the lack of data from 2015-17. This data has previously been reported within other joint registry papers (Is single-anaesthetic bilateral primary total hip replacement still safe? A 16-year cohort study from the New Zealand Joint Registry MC Wyatt, JW Hozack, C Frampton, A Rothwell, GJ Hooper ANZ journal of surgery 88 (12), 1289-1293.</p> <p>Safety of single-anaesthetic versus staged bilateral primary total knee replacement: experience from the New Zealand National Joint Registry. MC Wyatt, J Hozack, C Frampton, GJ Hooper ANZ journal of surgery 89 (5), 567-572).</p> <p>Using SMR data has the potential to make the findings more globally useful.</p> <p>Apart from showing this geographical variation of replacement in NZ how can this study help improve patient care? It seems that Maori already have "better access" to public funded replacement surgery is there any other conclusion to give this study wider appeal?</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Sharon Brennan-Olsen
The University of Melbourne, Australia
Please leave your comments for the authors below

This paper reports on the geographical and ethnic differences in more than 100,000 hip and knee joint replacement performed for a diagnosis of osteoarthritis in New Zealand. The paper is well written and presents important information. I have minor comments as follow:

Abstract:

Conclusion – last sentence regarding geographical differences appears almost an add-on: please address.

☐ Response: The conclusions have been rewritten.

Conclusion- you comment on 'demand' however there were no data mentioned regarding those with disease who underwent surgery, rather just the numbers that underwent surgery.

☐ Response: We have changed the "demand and supply" has been changed to the "numbers".

Those who are more socially disadvantaged are more likely to delay joint replacement due to lack of wealth or support systems on which to draw; indeed this is alluded to within the limitations as written by the authors. Comment regarding the role of social disadvantage is warranted. Please revise discussion and conclusions throughout accordingly.

☐ Response: We have added some discussion on SES on access to surgeries (4th paragraph in the discussion). This study did not show any results on SES, therefore we have not added SES in the conclusions.

Introduction:

It is surprising that no Australian data are considered in the paragraph regarding regional differences in joint replacement, particularly given similarities in populations and geographical location.

☐ Response: Thank you for this suggestion. We agree that given that common training of Australian orthopaedic surgeons it is appropriate to reference Australian literature which we have done.

The introduction is somewhat unnecessarily long with some irrelevant information given the research question – consider shortening by one-third.

☐ Response: The introduction has been shorten.

Methods:

There is no mention of minimum age of patients for whom data was extracted

☐ Response: We included all ages of patients with a diagnosis of osteoarthritis. We have added a sentence in the methods "Patients of all ages were included". The minimum age was 14 years for patients undergoing primary hip replacements and 22 years for patients undergoing primary knee replacements.

General comments:

Consider amending 'gender' to read 'sex' throughout, given that gender is self-determined, and sex is biological.

☐ Response: The NMD dataset we used only records self-identified gender information not biological sex data, therefore we cannot change "gender" to "sex".

Reviewer: 2

Gary Hooper

University of Otago Christchurch

New Zealand

Please leave your comments for the authors below

This study is a retrospective review of national data regarding the ethnicity, age and gender of hip and knee replacements recorded from 2005-2017. The aims were to 1 explore the regional and ethnic differences in rates of publicly funded osteoarthritis associated hip and knee replacement surgery and 2) investigate the mortality after surgery.

With respect to the first aim: 1 the authors outline the total numbers of joint replacements by ethnicity but don't break that down within regions. I can see no data showing this difference.

There were no data outlining the percentage ethnicity within each DHB to compare. Simple DHB demographics of gender, age and ethnicity undergoing joint replacement compared to the total DHB demographics is likely to show useful information which will enhance the study and give the reader a better understanding of the pattern of public hospital involvement.

□ Response: We have added Appendix Table 1 and Appendix Table 2 showing the numbers of joint replacements by ethnicity broken down by health network and by DHB, and a paragraph in the results section referencing to these two tables. We also have added two references (ref 35, 36): a Ministry of Health website and a Statistics NZ website showing each DHB's subpopulations by gender, age and ethnicity.

2 Also there is no break down of the potential difference in populations between DHBs eg if a predominantly rural DHB has more/less comorbidities than more urban DHBs 3 What was the breakdown in those that had rural addresses compared to those with urban addresses in each DHB (to substantiate your comment that the Southern DHB had a higher rural representation.)

With respect to the second aim the NZJR has complete death records for all joint replacements and so I do not understand the lack of data from 2015-17. This data has previously been reported within other joint registry papers (Is single-anaesthetic bilateral primary total hip replacement still safe? A 16-year cohort study from the New Zealand Joint Registry

MC Wyatt, JW Hozack, C Frampton, A Rothwell, GJ Hooper, ANZ journal of surgery 88 (12), 1289-1293.

Safety of single-anaesthetic versus staged bilateral primary total knee replacement: experience from the New Zealand National Joint Registry. MC Wyatt, J Hozack, C Frampton, GJ Hooper, ANZ journal of surgery 89 (5), 567-572).

□ Response: Unfortunately, the NZJR would only supply us with date of surgery and type of surgery for data validation with the National Minimum Dataset. The Ministry of Health data is available to academics with ethical approval, but the NZJR is more restricted. We only have the Mortality Collection data that is updated till end of 2015 to estimate the SMR.

Using SMR data has the potential to make the findings more globally useful.

Apart from showing this geographical variation of replacement in NZ how can this study help improve patient care? It seems that Maori already have "better access" to public funded replacement surgery is there any other conclusion to give this study wider appeal?

□ Response: This study aims to identify any regional and ethnic disparities in hip and knee replacement surgeries in New Zealand. Maori generally have poor access to public health service, but not in primary hip and knee replacements. It shows that the NZ public health care system is successful in addressing the access problem in hip and knee replacements for Maori and Pacific population.

VERSION 2 – REVIEW

REVIEWER	Sharon Brennan-Olsen University of Melbourne, Australia.
REVIEW RETURNED	27-Aug-2019
GENERAL COMMENTS	Thank you for the opportunity to review this revised paper. I consider the majority of concerns to have been appropriately

	<p>addressed, however have some minor points that should be addressed, as follows:</p> <p>Page 5: The authors added new text that reads 'Patients of all ages were included'. Please revise this sentence, as this is not precise enough; what is the minimum age? For instance, this should be presented as 'Patients aged from xx years and older were included'. Notably, the age should also be included in the abstract.</p> <p>Page 6: There are two typographical/spelling errors in the newly added text: amend 'data analysis' to read 'data analyses', and amend 'standardised' to read 'standardised'.</p> <p>Page 9: The newly added sentence that reads 'Socially advantaged populations have better access to hip and knee replacements' is abrupt and misleading. I suggest it be revised to read 'In addition, data suggest that socially disadvantaged populations are more likely to have better access to hip and knee replacements compared to their less disadvantaged counterparts'.</p> <p>The conclusion would be improved by the inclusion of a sentence that addresses the implications of these findings.</p>
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REVIEWER	Gary Hooper University of Otago Christchurch New Zealand
REVIEW RETURNED	17-Aug-2019

GENERAL COMMENTS	The authors have addressed most of my questions satisfactorily
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 2
Gary Hooper
University of Otago Christchurch
New Zealand

Please state any competing interests or state 'None declared':
No conflict

Please leave your comments for the authors below
The authors have addressed most of my questions satisfactorily

Response: Thank you for reviewing our paper and the valuable comments!

Reviewer: 1
Sharon Brennan-Olsen
University of Melbourne, Australia.

Please state any competing interests or state 'None declared':
None declared.

Please leave your comments for the authors below
Thank you for the opportunity to review this revised paper. I consider the majority of concerns to have

been appropriately addressed, however have some minor points that should be addressed, as follows:

Page 5: The authors added new text that reads 'Patients of all ages were included'. Please revise this sentence, as this is not precise enough; what is the minimum age? For instance, this should be presented as 'Patients aged from xx years and older were included'. Notably, the age should also be included in the abstract.

Response: We have changed the sentence to "Patients aged 14-99 years were included". This has also been added to the abstract. The abstract has been shortened to meet the word count limit.

Page 6: There are two typographical/spelling errors in the newly added text: amend 'data analysis' to read 'data analyses', and amend 'standardised' to read 'standardized'.

Response: Thank you for pointing out the typos. They have been corrected.

Page 9: The newly added sentence that reads 'Socially advantaged populations have better access to hip and knee replacements' is abrupt and misleading. I suggest it be revised to read 'In addition, data suggest that socially disadvantaged populations are more likely to have better access to hip and knee replacements compared to their less disadvantaged counterparts'.

Response: The sentence has been reworded as required.

The conclusion would be improved by the inclusion of a sentence that addresses the implications of these findings.

Response: Thank you for the suggestion, but we still believe our paper did not show any results on SES, therefore we should not include this in the conclusion.