

## 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

<b>TITLE (PROVISIONAL)</b>	Does socially differentiated cardiac rehabilitation affect the use of health care services after myocardial infarction? A ten-year follow-up study
<b>AUTHORS</b>	Hald, Kathrine; Meillier, Lucette; Nielsen, Kirsten; Breinholt Larsen, Finn; Johansen, Martin; Larsen, Mogens; Nielsen, Claus; Christensen, Bo

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Carl J Lavie MD Ochsner, USA
<b>REVIEW RETURNED</b>	29-Apr-2019

<b>GENERAL COMMENTS</b>	This is a solid study and paper that is publishable, but this probably would not make priority at highly competitive Journals or ones with Impact Factor > 3ish. They could include some recent papers promoting Cardiac Rehabilitation( Kachur S et al. Prog Cardiovasc Dis 2017; 60: 103-114; Fletcher GF et al. JACC 2018; 72: 1622-1639; Lavie CJ et al. Can J Cardiol 2016; 32: S365-S373.)
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<b>REVIEWER</b>	Chun Shing Kwok Keele University, United Kingdom
<b>REVIEW RETURNED</b>	07-Aug-2019

<b>GENERAL COMMENTS</b>	<p>Dear Editors and Authors,</p> <p>Thank you for the opportunity to review this manuscript on socially differentiated cardiac rehabilitation intervention to reduce social inequalities. I hope my comments will help improve the manuscript.</p> <p>The abstract should contain some numerical results with an indicator of statistical significance.</p> <p>A key element that needs further understanding is the extent to which there is a problem that the intervention aims to address in the population that is studied. What is the uptake of cardiac rehabilitation in Denmark or in the studied population? Is there a problem with uptake of cardiac rehabilitation among those socially disadvantaged? Also what are the event rates like for the outcomes of interest in the population studied? If the event rates are low it will be challenging for any intervention to show any difference.</p> <p>Was there a power calculation to determine the sample size?</p>
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	<p>How was death dealt with? Patients may have died who were also at high risk of use of health services if they had lived. Did the intervention impact mortality?</p> <p>How long was the intervention in total? It is not clear when phase IIIR finishes from the beginning.</p> <p>Potential reasons for their findings should be discussed. One issue is that for a study of long follow up, the association between exposure and outcome weakens with further time from intervention as other events may occur which are more linked to future outcome.</p> <p>The study is non-blinded and the implications should be discussed.</p> <p>Were there any improvements in compliance to secondary prevention medications as a result of intervention?</p> <p>The cost of implementing the cardiac rehabilitation intervention should be discussed in relation to potential benefit.</p> <p>The authors should clarify the nature of the Danish Healthcare system. Is it free or public or cost for health services? This is important because if there is a cost for care, patients who are of lower income may choose not to receive care. Similarly, if there is no cost for healthcare patients may have frequent contact with health services because it is free.</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Carl J Lavie MD

Institution and Country: Ochsner, USA

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

Please leave your comments for the authors below:

This is a solid study and paper that is publishable, but this probably would not make priority at highly competitive Journals or ones with Impact Factor > 3ish. They could include some recent papers promoting Cardiac Rehabilitation (Kachur S et al. Prog Cardiovasc Dis 2017; 60: 103-114; Fletcher GF et al. JACC 2018; 72: 1622-1639; Lavie CJ et al. Can J Cardiol 2016; 32: S365-S373.)

Author: The publication of Kachur et al. 2017 is a part of the references used in the study (reference 3).

Reviewer: 2

Reviewer Name: Chun Shing Kwok

Institution and Country: Keele University, United Kingdom Please state any competing interests or state 'None declared': None

Please leave your comments for the authors below:

Dear Editors and Authors,

Thank you for the opportunity to review this manuscript on socially differentiated cardiac rehabilitation intervention to reduce social inequalities. I hope my comments will help improve the manuscript.

The abstract should contain some numerical results with an indicator of statistical significance.

Author: P-values have been added to the abstract results on page 3.

A key element that needs further understanding is the extent to which there is a problem that the intervention aims to address in the population that is studied. What is the uptake of cardiac rehabilitation in Denmark or in the studied population? Is there a problem with uptake of cardiac rehabilitation among those socially disadvantaged? Also what are the event rates like for the outcomes of interest in the population studied? If the event rates are low it will be challenging for any intervention to show any difference.

Author: In the introduction of the publication it is established through the evidence from reference 5-10 that the population which is studied (patients with low educational level and patients who are living alone) has a higher probability of readmissions and emergency department use (page 5). Because of this we wanted to examine if a socially differentiated cardiac rehabilitation (CR) intervention could help these patients. The patients of interest are the patients who actually participate in CR and thus we have not studied the number of and the characteristics of the patients who did not participate. The cardiovascular event rate has been examined in a previous BMJ Open publication (reference 13) and it was found that the intervention had no significant effect on this: On page 16 in the present study it is mentioned that: "Risk of selection bias in relation to all-cause mortality when using data on yearly survivors is low, as it previously has been established that all-cause mortality in the study population was not associated with the exposure<sup>13</sup>". Thus the present study deals with the use of health care services in the study population.

Was there a power calculation to determine the sample size?

Author: No power calculation was performed to determine the sample size. A discussion of this missing power calculation was added to the manuscript on page 18.

How was death dealt with? Patients may have died who were also at high risk of use of health services if they had lived. Did the intervention impact mortality?

Author: On page 16 it is mentioned that: "Risk of selection bias in relation to all-cause mortality when using data on yearly survivors is low, as it previously has been established that all-cause mortality in the study population was not associated with the exposure<sup>13</sup>". In a previous BMJ Open publication we have established that the intervention did not impact mortality in general and did not impact mortality different between the two groups which were compared (Reference 13).

How long was the intervention in total? It is not clear when phase III R finishes from the beginning.

Author: The intervention lasted up to 12 weeks and phase III CR is a life-long effort. These informations have been added to the manuscript on page 8.

Potential reasons for their findings should be discussed. One issue is that for a study of long follow up, the association between exposure and outcome weakens with further time from intervention as other events may occur which are more linked to future outcome.

Author: The association between exposure and outcome has been addressed in the manuscript on page 18.

The study is non-blinded and the implications should be discussed.

Author: The implications of the non-blinded design of the study have been discussed on page 17.

Were there any improvements in compliance to secondary prevention medications as a result of intervention?

Author: This matter has been addressed in a previous publication: Hald K, Larsen FB, Nielsen KM, Meillier LK, Johansen MB, Larsen ML, Christensen B, Nielsen CV. Medication adherence, biological and lifestyle risk factors in patients with myocardial infarction: A ten-year follow-up on socially differentiated cardiac rehabilitation. *Scan J Primary Health Care*. 2019;37(2):182-90. No long-term significant improvements in compliance to secondary prevention medications of the intervention were found.

The cost of implementing the cardiac rehabilitation intervention should be discussed in relation to potential benefit.

Author: Due to the fact that the conclusion of the study was: "The present study found no persistent association between the socially differentiated CR intervention and use of health care services in general practice and hospital in patients admitted with first-episode MI during a ten-year follow-up" it is not relevant to discuss cost benefit or other health economic aspects of the intervention. The intervention is not significantly more effective than standard treatment and it costs more.

The authors should clarify the nature of the Danish Healthcare system. Is it free or public or cost for health services? This is important because if there is a cost for care, patients who are of lower income may choose not to receive care. Similarly, if there is no cost for healthcare patients may have frequent contact with health services because it is free.

Author: The Danish health care system is tax-funded and free of charge for all Danish citizens. This information has been added to the manuscript on page 7.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Chun Shing Kwok Keele University, United Kingdom
<b>REVIEW RETURNED</b>	13-Sep-2019
<b>GENERAL COMMENTS</b>	Thank you for making the revisions in response to my comments. I would just like to add that please do not put "P=0.00" and instead put "P<0.01" in the abstract. Congratulations on

