Author's response to reviews

Title: Comparison of two measures of physical work load in hospital personnel: A cross-sectional study

Authors:

Kirsten Nabe-Nielsen (knn@arbejdsmiljoforskning.dk)
Nils Fallentin (nif@arbejdsmiljoforskning.dk)
Karl B Christensen (kbc@arbejdsmiljoforskning.dk)
Jette Nygaard Jensen (jni@arbejdsmiljoforskning.dk)
Finn Diderichsen (F.Diderichsen@socmed.ku.dk)

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Comparison of two measures of physical work load in hospital personnel: A cross-sectional study

Reviewer: Giedrius Vanagas

Copy from reviewer’s report (I): …As psychological work demands authors have presented as a part of study methodology, it would be beneficial to present in table 4 and 5 analysis of data comparing POR in wards to PHT, physical and psychological work demands.

Authors’ answer (I): We understand this as a comment related to the way we include the psychosocial work demands when analyzing the association between physical load and low back pain (LBP). The unadjusted associations between psychosocial demands and LBP are presented in Table 4, and in Table 5 the estimates for the association between LBP and the two measures of physical load are adjusted for differences in the psychosocial demands.

We think that it is beyond the scope of this article also to present the estimates for the adjusted association between LBP and the psychosocial demands since the focus is on comparing two measures of physical load. However, we acknowledge the importance of psychosocial factors in the course of LBP, and on the basis of this comment we stress this in the discussion of the results.

Added to the text (discussion): Also psychosocial factors are found to be of importance, especially in relation to the course of LBP from an acute to a chronic state, and to the degree of disability caused by LBP. The estimates of the association between physical load and LBP have therefore been controlled for differences in psychosocial work factors.

Copy from reviewer’s report (II): Authors should make more attention to methodological limitations of the study.

Authors’ answer (II): In the article we discuss the possibility for differential misclassification and residual confounding. In the revised version we also take up the discussion regarding the methodological problems related to cross sectional studies (selection bias; the healthy worker effect; not being able to determine causal relationships).

Added to the text (discussion): The cross-sectional study design has limitations related to selection bias in terms of the healthy worker effect. This tends to yield conservative estimates of the association between physical load and LBP. However, we expect this bias to equally influence the estimates for both measures of physical load. Moreover, we can not determine causal relationships between physical load and LBP in this study. On the other hand, this study can provide basis for decisions regarding exposure measurement in large scale follow-up studies on causal risk factors for LBP in hospital personnel.

Copy from reviewer’s report (III): Table 4 presenting evidence to the impact on LBP of demographic characteristics and it would be beneficial to discuss why not other study designs were used in the present study and how authors manage with confoundings in present study.

Authors’ answer (III): We acknowledge that when having the aim of studying causal relationships a prospective follow-up study with independent measurements of exposure and outcomes is mandatory. However, in this study the aim was to compare two measurements of physical load among hospital personnel in order to provide the scientific basis for exposure measurements in studies testing hypothesis on causality. As a response to this comment we stress the limitations of cross sectional studies in the revised version of the manuscript (also see answer II).
Reviewer Alex Burdorf

The numbers refer to the comments in the reviewers report.

Ad. 1)
Changed to (abstract): Of these 411 (77%) filled in and returned the questionnaire.

Ad. 2)
The sentence is split up into two separate sentences to make it more comprehensible. It is one of the main points of the study that patient handling tasks (primarily in the orthopaedic ward) could be rather homogenous.
Changed to (abstract): In specialized hospital words patient handling tasks are rather homogeneous. Therefore the daily number of patient handling tasks seems to be a more feasible measure of exposure when assessing the risk of LBP compared to more advanced measures of physical load on the lower lumbar spine.

Ad. 3)
Changed to (introduction): This may also yield smaller risk estimates.

Ad. 4)
These two wards are chosen because they are known to have a high degree of working environment problems (e.g. physical demands, psychosocial demands, and musculoskeletal complaints). However, the distribution of physical and psychosocial demands differs between the wards securing contrast in the exposure variables.
Added to the text (methods): These two wards are included in the study because of their preponderance of working environment problems.

Ad. 5)
As an answer to this very relevant reviewer comment we have estimated the correlation between the two physical load measures. As can be seen these are highly correlated. Moreover, we have estimated to which degree the daily number of patient handling tasks explain the variance in the physical load index.

Added to the text (results): The Spearmann correlation coefficient between the two measures of physical load is 0.596, and the number of daily patient handling tasks explains 33.1% of the total variance of the physical load index.

Ad. 6)
Added to the text (methods): For the two demand scales a high score equals high demands that is potentially negative. For the three latter variables a high score reflects a resource that is potentially positive.

Ad. 7)
Added to the text (statistical analyses): The interrelationship between the two measures of physical load was assessed by computing a Spearman correlation coefficient. The relative contribution of patient handling tasks to the calculated overall load was assessed by computing the fraction of the residual variance explained by patient handling tasks in a variance analysis model for the physical load index. Next, the relative contribution of job category and ward to the variation in the two measures of physical load was assessed by computing the fraction of the residual variance explained.
by job category and ward in variance analysis models for the physical load index and patient handling tasks, respectively.

Added to the text (results): The residual variance not explained by ward and job category for each variable could be ascribed to e.g. individual factors, differences in patient-related factors and misclassification.

Ad. 8)

Please see 5.

Ad. 9)

We agree that with CIs overlapping we can not conclude that the two estimates for the association between LBP and two measures of physical load are significantly different.

Changed to (results): However, when comparing the 6% of the population with the highest physical demands, as measured by each of the instruments, there is evidence that the relative risk of LBP when performing more than 10 daily patient handling tasks is higher than the risk in the high exposure group when using the physical load index. This is also supported by the p-values for each estimate.

Ad. 10)

Is compression force as the essential risk factor for LBP?:

Compression force is probably one important – but certainly not the only – dose measure that may indicate tissue overload and subsequent damage. In this study we are examining two measures of workplace exposure (surrogate measures of dose) that in some way or the other are related to spine compression: The index combines two of the established risk factors (awkward work postures and lifting) in a single number index, while “amount of patient handling” uses task as a measure of exposure, thus combining all potential risk factors involved in the task. Without making any assumption on neither exposure, dose, nor dose-response relationships the purpose of the study was to examine which of the two measures that showed the strongest association with low back pain.

Do risk of awkward posture and patient handling offset each other to a certain extend due to the choice of two wards?:

We understand this as a comment on the high correlation between the two measures of physical load, both being most prevalent among personnel in the orthopaedic ward. That is, when measuring the association between patient handling tasks and LBP the estimates will also to some extent reflect the exposure to awkward postures and vice versa.

Added to the text (discussion): Because of the high correlation between the two types of physical load variables, the estimate for the association between patient handling tasks and LBP will also to some extend reflect the exposure to awkward postures and vice versa.

Is the underlying risk of patient handling not only determined by biochemical load, but e.g. also due to unexpected force?:

We agree, and have therefore added to the text (discussion): One reason could be that each patient handling situation implies a high risk of accidents due to sudden, unexpected loading.

Ad. 11)

Added to the text (discussion): Also the employment of (only) two wards increased the risk of residual confounding since we were not able to control for e.g. dimensions of work culture at the two wards.
Ad. 12)  

Changed to (conclusion): This study shows that among hospital personnel the frequency of patient handling tasks seem to be more strongly associated with LBP than a generic instrument measuring total physical load on the lower lumbar spine.