

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Partial sick leave associated with disability pension - propensity score approach in a register-based cohort study
AUTHORS	Kausto, Johanna; Solovieva, Svetlana; Virta, Lauri; Viikari-Juntura, Eira

VERSION 1 - REVIEW

REVIEWER	Kurt Svärdsudd Emeritus professor of general practice Uppsala University Sweden I have no competing interests regarding this manuscript
REVIEW RETURNED	06-Aug-2012

GENERAL COMMENTS	<p>This is a well-written manuscript on the possible association of partial sick leave and partial disability pension. I have a few comments.</p> <ol style="list-style-type: none">1. Page 3, Summary, Key messages. The term sick leave is used throughout the text except here where sickness leave is used. This inconsistency should be changed.2. All countries have their own health insurance plan. In order to better understand the text I suggest a new subsection in the Methods section, immediately before the subsection 'Data source and population', where the authors may give a brief description of the national health insurance in Finland. Parts of the text in the present subsection 'Data source and population' may be moved to this new subsection. The new subsection may be labeled 'Setting' or something similar.3. The sampling criteria for subjects on partial sick leave seem to be different from those used for subjects on full sick leave. As I read the text no restriction regarding sick leave diagnosis was used for the latter. If this assumption is correct it would explain some of the results regarding diagnosis prevalence differences between the two groups. It might also have affected the analyses. The authors should give the rationale for the different sampling frames and also comment on potential consequential bias in the analyses.4. Page 6, outcome measures. The text needs to be clarified. Are only those who were granted their disability pension on the last day of 2008 sampled? Or does it mean that all who were granted a disability pension up until the last day of 2008 were sampled?5. Page 7, subtraction of days. Subtraction of days might make number of days more equal in the two groups, but it may create a
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	<p>problem known as left truncation of follow-up time. This circumstance and its effects should be commented on in the text.</p> <p>6. Page 8, line 2. 'Fitness of the model was assessed'. How?</p> <p>7. Tables. No crude data are shown in the tables. I suggest a new Table 1 showing the crude data in the two groups on which the analyses are based, including missing data.</p> <p>8. Page 19. The last line seems to be misplaced, should perhaps appear somewhere else.</p> <p>9. The reference list is located after the tables, which is unorthodox.</p> <p>10. All things considered, the manuscript confirms results from other studies. Moreover, to me it is rather self-evident that if there is a remaining partial work capacity during the sick leave that remaining capacity should exist also when a disability pension is granted. If no association between partial sick leave and partial disability pension had been found it may have been due to administrative routines. The matter has been briefly touched in the discussion section. However, the authors may have had a rationale for association. I would like to see that rationale worded more explicitly and a broader discussion of this matter.</p>
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REVIEWER	<p>Daniela Andrén Örebro University School of Business Örebro, Sweden</p> <p>I do not have any competing interests.</p>
REVIEW RETURNED	28-Aug-2012

GENERAL COMMENTS	<p>Summary of the paper This study aims to estimate the effects of partial sick leave on transition to disability pension applying propensity score methods. The results show that there was no effect on the total rate of disability pensions, but positive effect was found when full and partial disability pensions were analyzed as separate events: partial sickness leave reduced the risk of full disability pension by 6% and increased the risk of partial disability pension by 8% compared with full sick leave.</p> <p>General Comments This is well-organized and generally well-written study. However, I have several reserves regarding the design of the analyzed/final samples, the outcome measure(s) and the conclusions of the study. Given that there are only a few studies on the effects of partial sick leave (on few outcomes), I have reasons for constructive criticism, which will be presented in the following small sections</p> <ol style="list-style-type: none"> 1) Title 2) Abstract and Summary 3) Terminology
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	<p>4) Institutional Setting and Data</p> <p>5) Empirical analysis</p> <p>2</p> <p>Detailed comments</p> <p>1. Title</p> <p>a) It is difficult to accept this long title after reading the paper.</p> <ul style="list-style-type: none"> • the first part of the title can suggest that this study analyze subjects on sick leave due to musculoskeletal and mental disorders o but the final sample is limited to four most prevalent diagnostic groups - mental and musculoskeletal disorders, traumas and tumors. • it is not clear why to add the rest of the title (i.e., -propensity score approach in a register-based cohort study) o should the reader believe that the result reported in the first part of the title is related to the method of estimation and/or the data (i.e., register data) used in the analysis? <p>2. Abstract</p> <p>a) the Conclusions seem to cover more than it is done in the study.</p> <ul style="list-style-type: none"> • "Findings suggest that combining work with partial sick leave provides a means to increase work participation at population level. The use of partial sick leave could be encouraged among men". o no information or/and special analysis was done on work participation! <p>Which is the connection of this finding with the aim and the analysis of the paper (i.e., the effects of partial sick leave on transition to disability pension applying propensity score methods).</p> <p>b) Settings: Some clarification is needed here.</p> <ul style="list-style-type: none"> • there is not clear which population is analyzed in this study! o Based on the very clear description of the data, I expect that the final sample is representative for the population of employees on long-term sick-leave due to one of four most prevalent diagnostic groups (mental and musculoskeletal disorders, traumas and tumors). • working population with long term sickness absence might includes employees, self-.employed (working part- or full-time) and (part-time or fulltime) unemployed. The authors should complete the description of data and/or institutional setting with this "selection" issues. <p>3</p> <p>c) Participants</p> <ul style="list-style-type: none"> • given that the study aims to estimate effects, it is expected to find, a presentation of the two analyzed groups ('i.e., subjects on partial sick and those on full-time sick leave) in terms of treatment/intervention and control groups. <p>d) Outcome measure</p> <ul style="list-style-type: none"> • even though the abstract's space is very limited, a better presentation of the three-category measure would make easier for the reader to understand the
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	<p>Abstract's section that presents Results (see more questions later!).</p> <ul style="list-style-type: none"> • why the occurrence of the event is checked in last day of 2008? o given that final sample includes (almost) all recipients of partial sickness benefit whose sick leave period had ended between 1 May and 31 December 2007, the definition (in the main text) must have some more support (from institutional settings) and even a test of the robustness. o otherwise, the interpretation of the results should take in consideration this aspect (i.e., "one year after finishing the treatment) <p>e) Results</p> <ul style="list-style-type: none"> • the results are presented in general terms (ignoring almost all selections filers) o it is not clear if the results are specific only for this study (which has a special design with several filters). o are the results driven by the method of estimation? o there is no sensitivity analysis related to the estimation method. • without making clear the population used to extract the final samples from might give a wrong message to policy makers! o part-time sick leave benefit does not reduce the risk of full disability in general! I would suggest that the results of this study show that part-time sick leave benefit offered to employees who have been paid the regular full sickness benefit uninterrupted for at least 60 days of payment (weekdays) due to four most prevalent diagnostic groups reduces their risk of full disability. <p>4</p> <ul style="list-style-type: none"> • the second key-message in the Summary could be replace o this study does not analyze the net effect of the use of partial sick (on work retention) o the statement is an indirect conclusion of the empirical results of the paper. o given that the outcome measure is defined only with respect to the disability event, the "work retention" could be incorporated in two categories: "no disability" and "partial disability" pension. This holds for both the three-category measure and the binary measure for the occurrence of disability pension. <p>3. Terminology</p> <p>Given that there are not many papers on this topic, a clear definition of the concepts is needed.</p> <p>a) Partial and part-time sick leave (absence/compensation/benefit).</p> <ul style="list-style-type: none"> • Are these concepts substitutes? • The paper used mostly the "partial", but there are also "the full and parttime sick leave groups (first paragraph, page 7). <p>b) disability pension.</p> <ul style="list-style-type: none"> • is there any institution setting that makes clear the difference between permanent and temporary disability pension? • is any medical certificate required by the insurance to prove the state of permanent and temporary disability? • how is the state of (partial or full-time) permanent and temporary disability
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	<p>connected to the employee's work capacity/incapacity?</p> <p>c) Work ability/capacity/incapacity The present study refers few times to work ability (objectives and in the Introduction, and page 17) and once to "work incapacity" (in Abstract).</p> <ul style="list-style-type: none"> • Is there any difference between these concepts? • The economic literature, but also studies from medicine, sociology and management relates the sick listing (in general, and part-time sick listing or part-time sick leave, in particular) to the individual work capacity. Surprisingly, this study it is not clear about this important aspect: "the use of partial sickness benefit is voluntary and the decision between partial and full sick leave ... is taken by the patient, the employer and the physician." (page 5, r. 53-56). • both the concept and the process of judging the employee's work capacity are very important ingredients in the empirical analysis of the effect of "part-time sick leave" treatment assignment. Therefore, additionally to the 5 definition of work capacity and/or work ability, the study needs to describe which are the main factors that are used in the treatment assignment (i.e., it is necessary to understand the whole process of sicklisting): <ul style="list-style-type: none"> o is the medical certificate more important than the employer's possibilities to arrange part-time work/absence for the employees? o can the employee choose to work two days per week instead of working a given percentage each day? o is this treatment assignment totally isolated from other treatments the subjects might receive during the period of partial sick leave? o are all employees working (part-time) during the treatment (i.e., the period of partial sick leave)? <p>d) "PS methods"</p> <ul style="list-style-type: none"> • should be defined without the acronym in the Summary • should be defined in the section "Statistical methods" <p>e) Stratification</p> <ul style="list-style-type: none"> • how is defined the stratification? (i.e., always there is at least one covariate consider in this statistical procedure) <p>f) Hierarchical logistic regression</p> <ul style="list-style-type: none"> • which was the hierarchical structure taken in consideration? <p>4. Institutional settings and data Some institutional characteristics are presented under the section "Data source and population", but some important ingredients are missing:</p> <p>a) no strategy of linking these institutional characteristics (e.g., eligibility and length of eligibility for both full and partial sick leave benefit) to the empirical analysis.</p> <ul style="list-style-type: none"> b) no information about replacement rates is provided • previous literature shows that economic incentives are important c) no information about the part-time sick leave settings is provided
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	<ul style="list-style-type: none"> • are there only two alternatives: 50% and 100%? • if there are three alternatives of (i.e., 25, 50 or 100%) for part-time sick leave how is this aspect handled in the study? <p>d) no information if other (rehabilitation or vocational) program is going on (or not going on) during the analyzed period is provided. This information must be provided.</p> <p>5. Econometrics (model and data)</p> <p>a) Outcome measures Given that the paper focuses on the event of disability (pension), the outcome measure are correctly constructed based on the subject's status with respect disability. Unfortunately, the authors did not inform what is left in the category "no disability".</p> <ul style="list-style-type: none"> • does the subject return to work and work 100%? <p>6</p> <ul style="list-style-type: none"> • does the subject return to work and work part-time? how many percentages and what is (s)he doing the rest of potential working time? • does the subject start an unemployment spell? • does the subject start a rehabilitation or a vocational training program? <p>b) It is not clear the small section " Improving comparability of the studied groups" (pages 6-7).</p> <ul style="list-style-type: none"> • it suggest that the original data is "modified" instead of doing what was stated in the beginning of the section "To improve comparability of the treatment assignment groups, a limited subsample was formed removing subjects with extreme covariate values, as recommended [12]." <p>(page 6)</p> <ul style="list-style-type: none"> • part of the last paragraph (i.e., "After removing subjects with minimum income, unknown occupational group; page 7) is confusing when reading the next paragraph (Imputing missing data), which says that "we carried out multiple imputations for the variable indicating occupational group" (page 7). <p>c) Using the gross income as one of covariates used to match the data could be problematic.</p> <ul style="list-style-type: none"> • if the partial sick leave is connected to the subject's work capacity/ability and the employer's possibility to offer a part-time work for her/him, then which is the mechanism that connect the subject's gross income in the previous year to the fact that (s)he will end up in the treatment or control group? <p>d) It seems that many subjects on full sick leave for relatively long periods are selected out (the average duration decreased from 100 days, in the</p>
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	<p>"before matching" sample to about 25 days in the "after" sample).</p> <ul style="list-style-type: none"> • this design makes almost impossible to identify the mechanism of transition to disability pension, which is usually granted to a person after a relatively long time of sick leave. • this matching aspect seems to be affected by the process of improving comparability of the studied groups: "in order to make the variables comparable in the studied groups, the variable indicating length of sickness absence before treatment assignment was modified in the partial sick leave group by subtracting 60 days from the original variable (to make a comparable "T0-point" for the full and part-time sick leave groups)." (page 7). <p>o the authors should motivate their "modification" of the data with respect the matching process and result (i.e., selection of a sample of subjects on full sick leave with an average duration of about 25 days!).</p> <p>Ignoring all my questions and concerns regarding the final samples analyzed in this paper (which can change totally the results), the Results are presented and commented well. However, some more comments (and indirect policy implications) with respect to NNT (reported in Table 4) would give some more merits to the paper</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: Kurt Svärdsudd

1. Page 3, Summary, Key messages. The term sick leave is used throughout the text except here where sickness leave is used. This inconsistency should be changed.

The inconsistent use of the terms has been corrected.

2. All countries have their own health insurance plan. In order to better understand the text I suggest a new subsection in the Methods section, immediately before the subsection 'Data source and population', where the authors may give a brief description of the national health insurance in Finland. Parts of the text in the present subsection 'Data source and population' may be moved to this new subsection. The new subsection may be labelled 'Setting' or something similar.

A new subsection called "Institutional setting" has been added to the Methods-section as suggested. Finnish sickness benefit and disability pension schemes are now summarized briefly in this subsection.

3. The sampling criteria for subjects on partial sick leave seem to be different from those used for subjects on full sick leave. As I read the text no restriction regarding sick leave diagnosis was used for the latter. If this assumption is correct it would explain some of the results regarding diagnosis prevalence differences between the two groups. It might also have affected the analyses. The authors should give the rationale for the different sampling frames and also comment on potential consequential bias in the analyses.

The sampling criteria for subjects on partial sick leave and those on full sick leave were the same. As regards the diagnosis, it was stated under "Data source and population" that "All recipients of full sickness benefit, whose sick leave had ended with a continuous phase of at least 60 days of payment with the abovementioned diagnoses within the same calendar period, were drawn to the control group".

4. Page 6, outcome measures. The text needs to be clarified. Are only those who were granted their disability pension on the last day of 2008 sampled? Or does it mean that all who were granted a disability pension up until the last day of 2008 were sampled?

Information on receiving disability pension was drawn for all individuals, i.e. it did not affect sampling. The exact date when the pension (partial or full) was granted was not, unfortunately, obtainable. Instead we received status information for the last day of year 2008 (whether an individual was on pension or not on that day). The text under "Outcome measures" has been modified accordingly.

5. Page 7, subtraction of days. Subtraction of days might make number of days more equal in the two groups, but it may create a problem known as left truncation of follow-up time. This circumstance and its effects should be commented on in the text.

The total sickness absence (sickness absence prior to + sickness absence in connection with treatment assignment) was similar between the studied groups. However, due to sampling and the eligibility criteria for the partial sickness benefit there was an artificial imbalance in these two variables (the length of sickness absence prior to and in connection with treatment assignment) between the studied groups. This imbalance hampered the estimation of PS and would have led to a very selected subsample. The analyses were, however, also carried out in this subsample and the findings were similar to the ones presented in the ms. Furthermore, since we did not carry out survival analysis, the left truncation of follow-up time unlikely affects our findings.

6. Page 8, line 2. 'Fitness of the model was assessed'. How?

Fitness of the model was tested with the Hosmer and Lemeshow test. This information has been added to page 8.

7. Tables. No crude data are shown in the tables. I suggest a new Table 1 showing the crude data in the two groups on which the analyses are based, including missing data.

A table presenting descriptive data on different samples is added to the revised ms (Table 1). Please also see Figure 1.

8. Page 19. The last line seems to be misplaced, should perhaps appear somewhere else.

The line in question, together with the previous line, have been deleted.

9. The reference list is located after the tables, which is unorthodox.

This has been corrected in the revised version of the ms.

10. All things considered, the manuscript confirms results from other studies. Moreover, to me it is rather self-evident that if there is a remaining partial work capacity during the sick leave that remaining capacity should exist also when a disability pension is granted. If no association between partial sick leave and partial disability pension had been found it may have been due to administrative routines. The matter has been briefly touched in the discussion section. However, the authors may have had a rationale for association. I would like to see that rationale worded more explicitly and a

broader discussion of this matter.

Discussion on the subject has now been broadened to some extent, as suggested.

Reviewer: Daniela Andrén

1. Title

The new suggestion is: Partial sick leave associated with disability pension - propensity score approach in a register-based cohort study.

As suggested by the reviewer, information on diagnoses may be misleading and thus is not included in the revised title. The latter part of the title is needed as the propensity score method is in the focus of the present study as explained in the Introduction part of the ms.

2. Abstract

a) Conclusions seem to cover more than it is done in the study

Work participation is defined differently depending on the discipline and purpose of the study. Often, it is defined as work status, as in this study. It is true that in this paper the outcome (disability pension status) only roughly approximates work participation, as we do not analyze sickness absence and did not, unfortunately, have access to information on possible part-time work (uncommon in Finland), unemployment or rehabilitation of the participants. Thus, term "work retention" has been used throughout the revised ms.

b) Settings: Some clarification is needed here.

The reviewer argues that it is not clear which population is analyzed in the study.

Both employees and self-employed are eligible for partial sickness benefit in Finland. Receivers of the benefit must have been working full time before work incapacity and during this study they must have been paid the regular full sickness benefit uninterrupted for at least 60 weekdays immediately prior to partial sick leave. This information is now provided under "Institutional setting". The same criteria have been used when drawing the control group (page 6).

Thus the sample is representative of working population (full-time workers) with long-term sickness absence due to musculoskeletal or mental disorders, traumas or tumours. This is now stated more clearly in the setting part of the abstract.

c) Participants:

Terms treatment group and control group have been added to this section.

d) Outcome measure:

As the reviewer mentioned, the space is very limited in the Abstract section and thus a precise description of the categories of the measure is given in Measures section under outcomes.

Unfortunately, only cross-sectional information on the occurrence of disability pension (on the last day of 2008) was obtainable. Please see question 4 above.

e) Results: The results are presented in general terms (ignoring almost all selection filters). Without

making clear the population used to extract the final samples from might give a wrong message to policy makers!

The target population of the study consisted of subjects with a continuous phase of at least 60 days of previous sickness absence due to musculoskeletal or mental disorders or traumas or tumours (page 6). The register provided information on this group of individuals (1047 in the partial sick leave group and 28 380 in the control group). Since it is acknowledged that registers are likely to include erroneously recorded information and missing data, we scrutinized the data by excluding subjects with extreme outliers or questionable information on e.g. income and occupation, as well as subjects with missing data (a total of 3161 individuals). A sample of 26259 individuals was used in estimating propensity score. 436 individuals had died before 31.12.2008 and thus were censored from the analyses resulting in a sample of 25 823 individuals. The presentation of the sample selection was revised and is now described in the revised Figure 1 and the descriptive data is given in Table 1 in the revised ms.

The sample that was used in the analyses did not differ from the initial sample regarding the type of sickness benefit, covariates or outcome (Table 1 in the revised ms). Therefore the results can be generalized to all subjects with a continuous phase of at least 60 days of previous sickness absence due to musculoskeletal or mental disorders or traumas or tumours.

The associations found in the present study, regardless of the estimation method used, were consistent with each other. In addition, the current results were congruent with previous findings from the initial study sample (Kausto et al. 2010).

We clarified the description of sample selection on pages 6 and 7.

The conclusions and the second key message in the summary were revised.

In fact the sensitivity analyses were carried out (though not reported) during modelling of the PS. We also examined whether improvement of sample comparability affected the main findings (please see response to comment 5 above).

3. Terminology

a) Partial and part-time sick leave (absence/compensation/benefit)

Terms partial and part-time sick leave/sickness absence are indeed substitutes in the context of this study. During part-time sick leave working hours must be cut down to 40 - 60% of the regular. This has been added to the ms, under "Institutional setting".

b) Disability pension

A more detailed description of disability pension in the Finnish context is now provided under "Institutional setting".

c) Work ability/capacity/incapacity

Term work ability is used throughout the paper, except once (page 5, last paragraph) the term incapacity is used as a substitute term.

d) "PS methods"

The acronym has been substituted with term "propensity score" in the summary section and defined in the Statistical methods section (page 8), as suggested.

e) Stratification

Stratification is defined in this study as "The process of or result of separating a sample into several subsamples according to specified criteria such as age groups, socioeconomic status, etc." (Dictionary of Epidemiology 2008).

f) Hierarchical logistic regression

In this context, the term hierarchical refers to the fact that in the model, the variables are entered in the model in a specified order to be able to control for the effects of covariates and to test the effects of certain predictors independent of the influence of the others. The following sentence has been added to the ms (page 8): The covariates were entered to the model at the first step and the interaction terms at the second step.

4. Institutional settings and data

The reviewer points out that some information is missing.

a)& b) The criteria for the eligibility and replacement rates are now provided under "Institutional setting".

c) Yes there are indeed only two alternatives for sick leave in Finland: 100% and part-time sick leave with the working hours cut down to 40 - 60% of the regular (please see 3 a) above).

d) Please see above 2 a). Information on vocational rehabilitation was not unfortunately obtainable.

5. Econometrics

a) Outcome measures. Please see question 2, Conclusions (above).

b) The section "Improving comparability of study groups" has been revised.

c) Income is one of the factors that may contribute to selection into partial sick leave and partial disability pension. It has been suggested in Finland, that partial sickness benefit would possibly be more profitable for those with higher income.

d) The purpose of the PS matching was to simulate a RCT in order to be able to estimate the true effect of partial sick leave on work retention. In order to render the studied groups "exchangeable" they had to be matched on covariates. Therefore the modification of the sickness absence variable was carried out.

In the final conclusions we summarized the possible implications of the findings based on both the ARR and NNT, though not specifically mentioning these terms.

VERSION 2 – REVIEW

REVIEWER	Kurt Svärdsudd Emeritus Professor of Family Medicine Department of Public Health and Caring Sciences Uppsala University Sweden
REVIEW RETURNED	03-Oct-2012

GENERAL COMMENTS	All my comments have been responded to. I have no further
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comments.
