

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	A nationwide prospective cohort study on return to gainful occupation after stroke in Denmark 1996 – 2006
AUTHORS	Hannerz, Harald; Holbaek Pedersen, Betina; Poulsen, Otto; Andersen, Lars; Frank, Humle

VERSION 1 - REVIEW

REVIEWER	Nancy E. Mayo, PhD James McGill Professor Division of Clinical Epidemiology McGill University Health Center Montreal, CANADA
REVIEW RETURNED	31-May-2011

THE STUDY	The study is to identify factors not investigate frequencies. The abstract is very confusing and explained in my review.
RESULTS & CONCLUSIONS	Table 1 needs work. Table 2 does not have a very clear or relevant message. Issue of using logistic regression in absence of rare disease assumption not discussed.
GENERAL COMMENTS	<p>This study is interesting and very strong methodologically. The capacity to link hospitalization data to identify people with stroke to national registries to identify employment is very strong. The results would be interest to many countries. I have only a very few suggestions for improvement. The objective could be worded in a stronger way. As it is worded now, the aim is to “investigate”. This is not an operational word. It would be stronger to have the objective as to identify factors associated with return to work among persons with stroke previously in the work force etc. Etc..</p> <p>Table 1 may pose some difficulty for interpretation for the average clinical reader. The outcome is return to gainful employment and the odds ratios are expressed at less than one to indicate that women are less likely to return to gainful employment. Most studies using this analysis have a negative outcome (usually rare) and an odds ratio less than 1 indicates protection for the negative outcome. Here there is a mix of odds ratios some less than one to indicate less likely to have a good even and some more than 1, for more likely to have a good event. Could the reference category be altered to have, as much as is possible, odds ratios in the same direction. I am particularly thinking of gender.</p> <p>Because of the odds ratios being less and greater than 1, the abstract does not seem to have it correct or the wording is confusing.</p> <p>Patients with intracerebral infarction (reference group) had significantly higher chance of returning to work than those with subarachnoid hemorrhage, OR = 0.79 (95% CI: 0.71 – 0.88), and intracerebral hemorrhage, OR = 0.39 (0.35 – 0.43). The reader has to realize that referent means 1.0 and that this is greater than 0.79. Similarly, unskilled workers (reference group) had a worse prognosis</p>

	<p>than skilled workers, OR = 1.50 (1.38 – 1.64), technicians and associate professionals, OR = 2.33 (2.05 – 2.65), and professionals, OR = 3.04 (2.70 – 3.43). Again as referent is 1.0, it is less than 1.5. This is very confusing. Also, here the referent category is not the largest. Different wording is in the abstract to refer to the occupational categories than is used in the table. Be consistent. Once confidence intervals are presented, one does not need to present the p values, which of course are very small owing to the large sample size. It would be helpful in the statistical methods section to indicate how the reference category was chosen. It is usually and optimal to be the largest group. If this is the case a sentence to this effect the methods section would be helpful. It would then be appropriate to explain the direction of the odds ratios. A limitation of this study is the use of logistic regression with a 62% event rate, clearly not a rare outcome. Usually the parameter of interest is the relative risk which the odds ratio approximates under the rare disease assumptions. It is possible to do relative risk regression, but in the absence of this model, a discussion on the overestimation of the relative risk with a non-rare outcome is warranted. As the numbers are given in Table 1, the reader who attempts to do some calculations will be mystified as to why they do not get the OR.</p> <p>I am not sure what people will make of Table 2. If the authors were interested in time to return to work they would have used a survival analysis but this was not feasible as stated in the discussion. I am not sure the column percents make a clear message table. Perhaps a cumulative proportion would be of interest with each row adding up to 100%.</p> <p>Table 1 is not very elegantly laid out. The levels of the key variables are compressed which makes it difficult to understand the levels of the variables. Avoid word wrap.</p> <p>There is a typographical error in the first paragraph: returns to work should be return to work. Avoid using the term stroke patient - people with stroke would be more appropriate.</p>
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REVIEWER	<p><i>Ian Cameron</i> Rehabilitation Studies Unit University of Sydney Australia No competing interests to declare</p>
REVIEW RETURNED	04-Jun-2011

THE STUDY	<p>The primary outcome needs further explanation.</p> <p>The supplemental documents are appropriate.</p>
GENERAL COMMENTS	<p>This interesting and important paper considers a national sample of people who had a stroke and who were previously employed. The sample size is much larger than previous studies. The finding of 62% “gainfully occupied” two years after stroke seems high by international standards.</p> <p>Some further explanation is needed for an international audience. “Gainfully occupied” appears to include “self-employed people, assisting spouses and employees”. From Table 2, the percentages in these categories are 5.3, 0.2 and 58.8 respectively. The sum of these percentages is not 62% so I may be misinterpreting the data. I suspect an international audience will want to know the percentage of people with stroke who return to paid employment (and the</p>

	<p>definition of number of paid hours per week that is consistent with this should also be stated).</p> <p>The associations with gainful occupation after stroke are generally as expected. Two issues, however, could be addressed by the authors. Have they considered exploring interaction terms, particularly female gender and less skilled work? Is it reasonable to expect a brain injury rehabilitation centre to influence return at a population level? In other countries only a limited number of people with stroke will have access to these centres.</p> <p>Another issue to be addressed for an international audience is the accuracy of the databases and the linkages on which the project is based. Could the authors provide an estimate of possible error in these areas?</p> <p>Finally the system in Denmark in which the municipal officer determines eligibility for vocational programs or disability pension is different to many countries where this is determined by a medical practitioner. The authors could comment on the generalisability of their findings.</p>
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VERSION 1 – AUTHOR RESPONSE

We appreciate the thorough feedback from the reviewers and the editor. Below is our detailed response to their comments.

Reviewer(s) Reports:

Reviewer: Nancy E. Mayo, PhD
James McGill Professor
Division of Clinical Epidemiology
McGill University Health Center
Montreal, CANADA

Comments:

The study is to identify factors not investigate frequencies. The abstract is very confusing and explained in my review.

Table 1 needs work. Table 2 does not have a very clear or relevant message. Issue of using logistic regression in absence of rare disease assumption not discussed.

This study is interesting and very strong methodologically. The capacity to link hospitalization data to identify people with stroke to national registries to identify employment is very strong. The results would be interest to many countries. I have only a very few suggestions for improvement.

The objective could be worded in a stronger way. As it is worded now, the aim is to “investigate”. This is not an operational word. It would be stronger to have the objective as to identify factors associated with return to work among persons with stroke previously in the work force etc. Etc..

[The last paragraph of the introduction has been changed and now reads: ‘The present study estimates the effect of various predictors on the odds of returning to work after stroke. It covers the total population of 20-57 year-old previously employed hospital treated stroke patients in Denmark 1996 – 2006.’]

Table 1 may pose some difficulty for interpretation for the average clinical reader. The outcome is return to gainful employment and the odds ratios are expressed at less than one to indicate that women are less likely to return to gainful employment. Most studies using this analysis have a negative outcome (usually rare) and an odds ratio less than 1 indicates protection for the negative outcome. Here there is a mix of odds ratios some less than one to indicate less likely to have a good even and some more than 1, for more likely to have a good event. Could the reference category be altered to have, as much as is possible, odds ratios in the same direction. I am particularly thinking of gender. Because of the odds ratios being less and greater than 1, the abstract does not seem to have it correct or the wording is confusing.

Patients with intracerebral infarction (reference group) had significantly higher chance of returning to work than those with subarachnoid hemorrhage, OR = 0.79 (95% CI: 0.71 – 0.88), and intracerebral hemorrhage, OR = 0.39 (0.35 – 0.43). The reader has to realize that referent means 1.0 and that this is greater than 0.79.

Similarly, unskilled workers (reference group) had a worse prognosis than skilled workers, OR = 1.50 (1.38 – 1.64), technicians and associate professionals, OR = 2.33 (2.05 – 2.65), and professionals, OR = 3.04 (2.70 – 3.43). Again as referent is 1.0, it is less than 1.5. This is very confusing. Also, here the referent category is not the largest.

[To increase clarity, we have changed the result section of the abstract. It now reads: 'The odds of returning to work were higher among people with intracerebral infarction, OR = 1.0 (the reference group), than they were among people with subarachnoid hemorrhage, OR = 0.79 (95% CI: 0.71 – 0.88), and intracerebral hemorrhage, OR = 0.39 (0.35 – 0.43). The odds of returning to work were lower among workers in elementary occupations OR = 1.0 (reference group) than they were among workers in occupations that require skills at a basic level, OR = 1.50 (1.38 – 1.64), technicians and associate professionals, OR = 2.33 (2.05 – 2.65), and professionals, OR = 3.04 (2.70 – 3.43). Patients in municipalities with a brain injury rehabilitation centre did not have a better prognosis than patients in other municipalities, OR = 0.91 (0.78 – 1.06). Being a woman, OR = 0.79 (0.74 – 0.84), self-employed, OR = 0.87 (0.78 – 0.96), or \geq 50 years, OR = 0.61 (0.57 – 0.65), was associated with an adverse prognosis.']

Different wording is in the abstract to refer to the occupational categories than is used in the table. Be consistent.

[As seen above, we have now changed the wording in the abstract so that it conforms to the text in the table.]

Once confidence intervals are presented, one does not need to present the p values, which of course are very small owing to the large sample size.

[The P-values have been removed from the table.]

It would be helpful in the statistical methods section to indicate how the reference category was chosen. It is usually and optimal to be the largest group. If this is the case a sentence to this effect the methods section would be helpful. It would then be appropriate to explain the direction of the odds ratios.

[We have added the following text to the end of the method section: 'The reference groups were chosen more or less arbitrarily, before we looked at any results. An odds ratio which is higher than one indicates that the odds of returning to work are higher than they are in the reference group.']

A limitation of this study is the use of logistic regression with a 62% event rate, clearly not a rare outcome. Usually the parameter of interest is the relative risk which the odds ratio approximates

under the rare disease assumptions. It is possible to do relative risk regression, but in the absence of this model, a discussion on the overestimation of the relative risk with a non-rare outcome is warranted. As the numbers are given in Table 1, the reader who attempts to do some calculations will be mystified as to why they do not get the OR.

[We added the following text to the limitation section of the discussion 'Since RTW is not a rare event, the odds ratio can not be used as a proxy for the rate ratio, which makes it difficult to compare the effects obtained in the present study with those obtained in studies that uses time-to-event analysis.']

I am not sure what people will make of Table 2. If the authors were interested in time to return to work they would have used a survival analysis but this was not feasible as stated in the discussion. I am not sure the column percents make a clear message table. Perhaps a cumulative proportion would be of interest with each row adding up to 100%.

[A cumulative proportion with each row adding up to 100% only make sense for absorbing states, i.e. states that are impossible to leave. The only purely absorbing state in the table is the category 'Deceased'.

To make the table more interesting, we have replaced the label 'Pensioners' with the more accurate label 'Disability pensioners' and we have added a comment to the table in the discussion section. The text 'Many people with brain injury return to work too soon and subsequently find that they are unable to continue their employment.[1]' has been replaced by 'Studies show that many people with brain injury return to work too soon and subsequently find that they are unable to continue their employment.[1] Table 2 suggests that this is the case also for some of the people in the present study.']

Table 1 is not very elegantly laid out. The levels of the key variables are compressed which makes it difficult to understand the levels of the variables. Avoid word wrap.

[We have improved the table by removing the P-values.]

There is a typographical error in the first paragraph: returns to work should be return to work.

[The error has been corrected.]

Avoid using the term stroke patient - people with stroke would be more appropriate.

[We prefer the term stroke patient. It gives a clear description of their status at baseline.]

Reviewer: Ian Cameron
Rehabilitation Studies Unit
University of Sydney
Australia

Comments:

The primary outcome needs further explanation.

The supplemental documents are appropriate.

This interesting and important paper considers a national sample of people who had a stroke and who were previously employed. The sample size is much larger than previous studies. The finding of 62%

“gainfully occupied” two years after stroke seems high by international standards.

Some further explanation is needed for an international audience. “Gainfully occupied” appears to include “self-employed people, assisting spouses and employees”. From Table 2, the percentages in these categories are 5.3, 0.2 and 58.8 respectively. The sum of these percentages is not 62% so I may be misinterpreting the data. I suspect an international audience will want to know the percentage of people with stroke who return to paid employment (and the definition of number of paid hours per week that is consistent with this should also be stated).

[We added the following text to the material and method section: “A person is classified according to his/her main income during the year.”

We added the following text to the end of the result section: “The category ‘gainfully occupied’ includes self-employed people, assisting spouses and employees. From Table 2, the percentages in these categories are 5.3, 0.2 and 58.8 respectively. The sum of these percentages is not 62.1% but 64.3%. The reason for the discrepancy is that table 2 only includes people in the age bracket 20-54 years while the main analysis includes people in the age bracket 20 – 57 years.”]

The associations with gainful occupation after stroke are generally as expected. Two issues, however, could be addressed by the authors. Have they considered exploring interaction terms, particularly female gender and less skilled work?

[Further research is needed to explain the gender difference. We agree that an exploration of interaction between gender and occupational factors would be of interest in such research. We believe, however, that research into this area should be preceded by a thorough literature study and a detailed research plan, which is beyond the scope of the present study.]

Is it reasonable to expect a brain injury rehabilitation centre to influence return at a population level? In other countries only a limited number of people with stroke will have access to these centres.

[We have a comment about this in the discussion ‘As only a minority of the patients is treated at a brain rehabilitation centre, our study can not determine the effectiveness of the centres.’]

Another issue to be addressed for an international audience is the accuracy of the databases and the linkages on which the project is based. Could the authors provide an estimate of possible error in these areas?

[We added the following text to the material and methods section:

Accuracy of the databases

Age and gender are part of the personal identification number of the central person register, which is recorded almost without errors. The completeness and accuracy of the data were confirmed in the matching process where we had a 100% match of the files. A person is classified according to his/her main income during the year. The socio-economic categories given above are based on incomes, which are declared to the Danish tax authority. This information should be correct among people who declare their income correctly. The occupational code, which is provided by the employer, is less reliable and is missing for almost 10% of the employees. For circulatory disease, the ICD-10 code of the principal diagnosis given in the hospital patient register has been estimated to be accurate in 73.4% of the records (reference).]

Finally the system in Denmark in which the municipal officer determines eligibility for vocational programs or disability pension is different to many countries where this is determined by a medical

practitioner. The authors could comment on the generalisability of their findings.

[The following text has been added to the discussion: 'It should finally be noted that the present study gives the situation in the Danish population and that the Danish system, where the eligibility for sickness benefit, vocational training and disability pension is determined by a municipal official, differ from that in many other countries where this is determined by a medical practitioner.']

No competing interests to declare.

VERSION 2 - REVIEW

REVIEWER	<i>Ian Cameron</i>
REVIEW RETURNED	25-Jun-2011

GENERAL COMMENTS	The authors have adequately addressed the comments of the reviewers.
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REVIEWER	<i>Nancy Mayo</i>
REVIEW RETURNED	18-Jul-2011

GENERAL COMMENTS	The changes made have improved the paper.
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