Reviewer's report

Title: Network meta-analysis of survival data with fractional polynomials

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Reviewer: Nicholas Tibor T Longford

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All items are 'Minor Essential Revisions', unless marked MJR

Detailed comments

Abstract, line 2

which requires ... assumption -- which relies on ... assumption

the next sentence:

The proportional hazards assumption -- This assumption

In extremes cases -- In extreme cases,

cross -- intersect

to the approach where -- to the approach in which

is placed on a single parameter -- is represented by a single parameter

More specific -- More specifically

modeled with -- modeled by

are put on multiple parameters -- are represented by several parameters

(or: a parameter vector)

The advantage of this approach is that -- redundant preamble

can be properly fitted -- can be fitted much more closely

Furthermore, -- redundant preamble to the sentence

Background

See the notes for the Abstract. Avoid duplication of the text from the Abstract.

resulting in violations ... as well. -- so the assumption may be violated.

allowing for comparisons -- enabling us to make comparisons (???)

3rd par.

of survival data where -- of survival data in which
Furthermore, given ... -- With these parametric hazard functions, ...
assumption of linear is avoided -- this is a somewhat overstated claim,
because the assumption would also be avoided by assuming a quadratic
function (a polynomial that is not fractional).
above eq. (2)
is described as: -- is defined as
The displayed eq (4) should be improved, e.g., by copying the vector
of betas for the two cases.
corresponds with -- corresponds to
and bathtub shaped functions. -- and bathtub shaped.
pair wise, pair-wise, pairwise -- use the same spelling throughout
In order -- redundant words (also elsewhere in the MS)
When the networks consists -- When the network consists
effect modifiers -- you should explain/indicate what they are
same true d_{BC} -- this needs a more careful explanation as to
what you mean. (Are there also some false d's??)
MJR, Equation (5).
This is unnecessarily complicated, and need not be related to fractional
polynomials. Whatever model is adopted, described by the function f_X(t),
where X (the subscript) is A, B, or C, we have
( f_C(t) - f_B(t) ) - ( f_B(t) - f_A(t) ) = ( f_C(t) - f_A(t)
The argument at the top of the next page should be reviewed in the light of this.
All other references to eq (5) should be reviewed.
Wording:
Similarly, the transivity -- This _transitivity_ holds for fractional polynomials
of any order. However, it holds for any _models_ (!!!)
The word transivity is misspelt throughout the MS.
alphabetically -- alphabetically
-- you should explain this; I do not understand what you mean in Eq. (6).
You should choose some notation for the vectors, so that they do not have
to be reproduced/duplicated in the text. This is not only a typesetting issue, but also a issue of legibility; it would inform the reader that the same object is meant, without having to compare the multiple indices (across pages), and worry whether the subscripts have the same meaning across the pages.

Where -- where

The vector ... are -- The vectors are (??)

MJR

The page after eq. (6) could be simplified substantially, and would become much easier to read and comprehend. Compact (vector/matrix) notation should be introduced.

page 8, lines 2, 3

Goodness of fit is not a quantity that is _estimated_ -- it is evaluated or computed.

which uses the likelihood function -- this is a near-empty qualification, because the entire analysis is based on the likelihood function. More appropriate would be simply to cite the ubiquitous reference Akaike (1973). The Bayesian IC is _also_ based on the likelihood function, (!!) and the Bayesian framework is not necessary for its application.

Section 'Illustrative Example'

Avoid repeating the verb 'present' in a single sentence.

Eq. (9). You should point out what is the origin of these priors -- that they are noninformative, representing (next to) no prior information. So, Bayesian methods are selected to use prior information, when no prior information is available.

No prior is required for a parameter that has a known value.

MJR, bottom of the page

Since this model reflects the best fit ... This is an exceedingly loose statement, promoting ignorance of model uncertainty.

What if the next best model has different features and suggests something different??

MJR
The analysis should show that cost-effectiveness analysis, or a similar application
would yield very different results if ... were applied. That would support the
contention that fractional polynomials are essential.

page 9, line 4
Review the reference to eq. (5), which has a much wider validity than you claim or
imply.
value of randomization only holds -- rephrase this sentence to make it clearer
middle of the page
may be considered unrealistic -- may be infeasible
[The sufficient statistics from each study would suffice.]
MJR, bottom of the page:
the reference to severe bias sounds hollow without an example.
concluding page:
In view of Figure 1, any reference to asymptotic behavior of some estimators
is completely out of place. In any case, the good properties that you attribute
to fractional polynomials hold much more widely, and thus they advantage is
grossly overrated.
MJR, Section Conclusion:
This contains a lot of redundant verbiage (However, advantage, Furthermore), and
(near) duplication of text from elsewhere in the MS. It is a poor reflection of the
content of the MS.
The WinBugs code could be deleted. It would serve its purpose much more effectively
if it were available for downloading from the journal's or author's website.

Level of interest: An article of limited interest

Quality of written English: Not suitable for publication unless extensively edited

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests.