Author's response to reviews

Title: Copula based prediction models: An application to the aortic regurgitation study.

Authors:

Pranesh Kumar (pkumar@kfshrc.edu.sa)
Mohamed M Shoukri (shoukri@kfshrc.edu.sa)

Version: 2 Date: 22 January 2007

Author's response to reviews: see over
Dear Puebla:

Thanks for your email message of January 10, 2007 regarding the above referred manuscript.

As for the comments of both referees, we have addressed them in the revised manuscript and have checked that the revised manuscript conforms to the journal style.

Further, point-by-point responses to the referees concerns are provided as follows:

Referee 1: Douglas Curran-Everett

General: We thank the referee for his general remark and appreciate that he as a reader enjoyed the contents of the article. It is indicative of the fact that we have been successful in introducing to our readers in medical sciences a new copula based prediction approach as a better and more appropriate alternative to the conventional regression based method.

Major Compulsory Revisions: None.

Minor Essential Revisions:

1. Abstract. We have shortened the abstract by about 23% (From 54 lines to 42).

2. Significant digits. We agree with the referee for the inconsistency in reporting the significant digits in the original manuscript. Since the ejection fraction sometime is also described in percent, we have changed all numerical results to the four decimal places.

Discretionary Revisions. None.

Quality of Written English. We have checked the entire revised manuscript for the language corrections.

Referee 2: Eric Lim

General: We appreciate that the referee found Archimedean copulas approach as a predictive tool interesting.

Major Compulsory Revisions:

1. With due regard to the referee’s observation on missing good argument in favor of suggested alternative approach to the conventional regression approach, we would like to convey that this point has been discussed in the background section and also
pointed out in the conclusion. We re-state some of the main
drawbacks of regression prediction model which uses the
correlation as a measure of dependence structure: correlation is
not a complete description of dependence between two quantitative
variables. Even when there is a linear relationship, correlation
is strongly affected by the extreme endpoints which are generally
the case in clinical studies; correlation is not invariant under
non-linear strictly increasing transformations. Further, a recent
NCI sponsored workshop in 2004 emphasized a need for evaluating
conventional prediction models currently in use and exploring and
developing better prediction methodologies. These are the issues
raised against the conventional prediction model and the copula
has been used to overcome these limitations.

Regarding comments on the complexity of the suggested method with
little advance in terms of precision and accuracy, we differ from
this observation. As a matter of the fact, simplicity of the
suggested method is in the implementation of the algorithm for
generating Archimedean copulas using the Microsoft Excel.
Further, as pointed out by the referee that there is little
appreciation in precision and accuracy using copula model, the
prime issue is the choice of appropriate methodology. In the
revised version, we have made these observations clear and more
visible (please refer to the last paragraph on p.3 and 4; first
paragraph on p.4; first paragraph in discussion on p.15).

2. We agree with the referee’s remark on the validation based on the
same data set. Since the available data set from the patients
enrolled in the study was smaller in size, we could not split it
into another subset for validation purpose. Further, since the
primary purpose of this article is to describe an alternative
prediction approach to the conventional regression model, we have
carried out validation using the same data.

Minor Essential Revisions:

1. Some ejection fraction measurements are disconcerting. This is a
good observation and we agree. However being data small in number
and also for ethical reasons, we didn’t modify or change such
data. The presence of extreme measurements on lower end
strengthens the argument in favor of copula over the traditional
correlation measure.

2. Further, this remark is true that data series was small and
variability in the ejection fraction measurements high. The
coefficients of variation for pre-operative and post-operative
ejection fractions are 21.37% and 36.31% respectively. However as
we said above that our primary aim is not to quantify the
accuracy and precision but to point out at the correct and
appropriate alternative approach to the conventional regression
model.

Discretionary Revisions. None.

We look forward to hear a final decision on the paper.
With best regards,

Pranesh Kumar, PhD
Department of Biostatistics, Epidemiology and Scientific Computing,
King Faisal Specialist Hospital and Research Center, Riyadh 11211,
Saudi Arabia.