Author’s response to reviews

Title: A biostatistical support system in health sciences: Is this sustainable in a resource-restricted environment?

Authors:

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Author’s response to reviews:

Reviewer reports:

Reviewer #1: This is an interesting article and timely given the growth of the biostats profession in many universities and hospitals internationally.

Thank you to the Reviewer for the helpful suggestions.

Please address the following comments/suggestions.

The statement that "The expansion of the biostatistical support system has contributed to increased postgraduate outputs in the institution and is financially viable at the current time" is unfortunately not supported by the data or design.

This statement has been changed in the abstract to

“The expansion of the biostatistical support system has indirectly contributed to increased graduations and research publication units in the institution.”

Consider following design and analysis:

1. Compare pre and post period biostats platform and look quantitatively at differences, perhaps via interrupted time series models
We can only do this comparison on the Master of Medicine postgraduate students. This has been added in the discussion section: “One of the reasons for increasing the resources required for training in biostatistics in our institution was the introduction of a requirement by the Health Professional Council of South Africa in 2010 for clinicians, who were specializing in specific disciplines, to undertake a research project as part of their Master’s degree. This requirement became mandatory in 2011. Hence the increase in graduations may also be as a result of this implementation as these students required statistical support for project completion.

2. Compare outcomes between your institution and other comparable ones without biostats support.

We have tried to address this question. However, we are unable to do such a comparison as parameters differ at each institution. For example, it is not clear whether other institutions have biostatistical support services and who comprises their target population. Thus it would be difficult to do a meaningful comparison.

3. Correlate the growth in biostats with growth in high impact publications. i.e. quality instead of quantity

We have added a comment on the increase in high impact publications over the period of time under discussion: “However, there has been a growth in high impact (HI) factor publications (IF ≥ 20). In the period 2000-2012 there were 28 HI publications that increased to 39 over the period 2013-2016 (Health Sciences Research Office annual reports 2008-2016)[22]. It should be noted that this increase might not be directly linked to the Biostatistics support system, as the target of the support system is postgraduate students and more junior researchers. In addition, accompanying the increase of almost 10% in registrations over all the degree types between the periods 2010-2012 and 2013-2017 in the Faculty, the proportion of graduations has increased by approximately 30% over the same period of time.”

There are various other models of providing biostats consult/ collaboration. e.g. hub- and scope model. Pls review and include the following reference: "Essentials of a Successful Biostatistical Collaboration" by CRC Press, 2017.

We have added a paragraph and the reference in the discussion: “As these consultations are provided to individuals from a variety of disciplines by a central group of biostatisticians and biostatisticians-in-training, the model is similar to that of the “Hub-and-Spoke Model” described by Earnest [23]. However, in the case of consultations at Wits, these do not generally result in collaborations in which the biostatistician is included as an author on an article [23].
Figure 3 consider providing proportions over the number of consults as well.

We cannot align the graduation data with the consultations as there were many more graduations than consultations. Not all students come for consultations.

Tone down statements on causation and use association instead.

Thank you for this comment. We have made corrections: (see examples in the results and conclusion of the Abstract):

“A clear rise in the graduations of Masters and PhD students and an increase in research units were observed from 2013-2017, although these cannot be solely associated with the biostatistical support system.”

“The expansion of the biostatistical support system has indirectly contributed to increased graduations and research publication units in the institution.”

Discuss limitation of generalisability, causality and lack of formal statistical evaluation in the discussion

We have added the following paragraph to the text.

“Limitations of study:

This is a cross sectional study and thus there was no intervention, and hence no follow up. There is no control group, as we do not have data for those students not attending the Biostatistical support. While Wits is an institution in a middle-income country, similar data from other institutions in the country are not available for comparison. The number of one-on-one consultations are based on the number of completed evaluations. “

Reviewer #2: The manuscript reports the results of a descriptive study evaluating quality and cost of a biostatistical support services in a South African university. Biostatistical capacity building in Africa is an important topic and the results could potentially be used to inform similar programs in other developing countries. However, in its current state, the manuscript has a number of issues that need to be rectified before it's suitable for publication. My specific comments, queries and recommendations are summarised below.
Introduction:

Overall, I found the introduction to be clearly written but unhelpful in setting the scene for the study. From the introduction presented, it is not clear what the biostatistical support system in question entailed, what assessments of the system have already taken place, and what outcomes one would expect from the system.

On page 5, the authors state that "Expansion occurred in relation to the burgeoning needs of the Wits FHS from 2013 onwards". The nature and extent of this expansion are, however, not clear. Please provide details of what the expansion had entailed. (see below)

This is important information, given that the outcome of the expansion is the central topic of this investigation. I note that the information about the parts of the program that were expanded appears at the start of the results section. If the aims of the study is to describe the kinds of things that happened within the program from 2013 onwards, this needs to be made clear.

Page 6: the authors state that the present study "extends the survey on the feedback and consultations of postgraduate students and staff on the support system [19]". The existence of this previous study needs to be made clear in the introduction and its main findings need to be summarised.

Thank you for these helpful comments. The following has been added to the text:

In the Introduction:

“The system between 2008 and 2012 consisted of modules in biostatistics at entry and advanced level to postgraduate students, a module aimed specifically for supervisors, and one-on-one consultations for students and staff [19, 20]. This system resulted in increased graduations and publications, although we expressed caution in linking these outcomes directly to the system. The setting up of the initial system was carried out on a limited budget but would be affordable to institutions in a resource-restricted environment [19].”

Study aims: the study aims to evaluate quality and financial sustainability of a biostatistical support program, however there is no information on how either quality of financial sustainability were operationalised in the context of this study.

Aims have been edited and objectives to clarify have been added:

“Thus, the aim of the present study was to describe and analyse the nature and quality of the biostatistical initiatives which allowed expansion of the existing support system in the Wits FHS
between 2013 and 2017. In addition, we wished to determine whether the support system is sustainable in terms of financial costs in a limited resource, developing country.

The objectives of this study are to:

I. Describe the initiatives which were added to the existing support system; ii. Assess the quality of the biostatistical support system by the evaluation of the one-on-one consultations and to compare the graduations and publication units in relation to the foregoing assessment from 2008-2012. iii. Determine the current financial budget of the support system.

Methods

Overall, I found the methods section badly structured and un-enlightening. Specifically, the subsections the methods mix together information about the program and information about methods used to collect data for the present evaluation.

Methods section has been edited.

Please re-organise this section to clearly separate information about what the program is/does/looks like and exactly what was being assessed by the present study in relation to the program. Please also provide information on what were the outcomes of interest and how these outcomes were captured/measured.

We have inserted the following under “Study design”: “The following outcomes were assessed: quality of the one-on-one consultations; graduations and publication units compared to those of 2008-2012; financial sustainability of the current support system.”

Under “ Walk in consultations”:

Outcome evaluation of one-on-one consultations were expanded as follows:

“Questions in the brief assessment related to the quality of the consultation which was rated on a Likert scale of 1-4, where 4 was “excellent”. The questions related to learning from the consultation, confidence to analyse independently after consultation and whether the service would be recommended were answered on a scale of yes/no/not sure. The questionnaire was optional and anonymous, was undertaken at the end of a consultation and took no longer than 5 minutes to complete. The questionnaire was then placed in a sealed box.”

We have inserted the following under the “Additional Workshops/modules” for clarity:

“A workshop on data management and analysis, utilizing the postgraduate student/staff’s own data, was initiated in 2014.”
Study design: it is not clear from this section exactly what the design of this study was. The authors make a reference to a past survey and, presumably, a survey was also carried out as part of this study, but this needs to be made explicit.

This has been done (see answer above).

Please also describe the survey instrument - what kinds of questions were asked, how many questions, how long the survey took to complete approximately, where and when the survey was completed, and how it was returned to the researchers.

This has been done (see answer above).

Additionally, need more information on individuals who provided survey responses: were all attendees asked to provide feedback? Do you have information on how many refused to provide feedback or did not return their surveys?

All attendees were asked to provide feedback. Unfortunately, no data on refusals is available, but 75% of the consultees responded over the 5 year period. See “Individuals attending, and evaluation of, one-on-one consultations 2013-2017”.

Statistical analyses are appropriate

Results

Characteristics of those attending one-on-one consultations 2013-2017: this subheading is misleading since the section only reports information in the types of consultations that occurred and there is no information on who the consultees were. Was there any information on demographic characteristics of individuals who provided evaluations of consultations? If so, please add this information in else amend the heading to reflect the section heading.

We have merged two paragraphs and have amended the heading to read “Individuals attending, and evaluation of, one-on-one consultations 2013-2017”.

As this was an anonymous questionnaire no demographic data was requested as this could act as an identifier. Only degree type was requested.

Evaluation of consultations 2013-2017 section: how many evaluations were there in total during the study periods, and the proportion of consultees who provided the evaluations?
The following has been added to the manuscript ” A total number of 1077 evaluations were completed over the period 2013-2017 (Table 1).”

“Approximately 75% of consultees completed the questionnaire over the 5-year period.”

Graduations and research publications section: Please add to this section information on the number of graduations as proportion of total enrolments in a given degree.

In order to comply with the above request we have inserted the following: “In addition, accompanying the increase of almost 10% in registrations over all the degree types between the periods 2010-2012 and 2013-2017 in the Faculty, the proportion of graduations has increased by approximately 30% over the same period of time”.

Also, despite the subheading, this section does not report information on research publications during the study period. Please either include this information or amend the section heading to more accurately represent what is being reported (graduations and research units by publications).

We are unable to provide numbers of publications as the Institute now reflects these as “units” in accordance with the South African Department of Higher Education requirements. We have changed the title of the sub-heading to reflect this as “Graduations and research units by publications”.

Lines 209-210, page 10. Sentence: ”This follows a similar increase in the number of one-on-one consultations between 2013 and 2017 (Table 1)”. Information about the number of consultations is rather out of place in the section reporting on graduations and research by publication.

The sentence has been removed from this section.

The number of consultations over the study period is an important variable in this study.

We have merged two paragraphs as recommended and have amended the heading to read ” Individuals attending, and evaluation of, one-on-one consultations 2013-2017”. We hope that this will clarify the points raised by the reviewer.

Financial aspects section: Overall, I found this section difficult to follow and it is not clear what information is being conveyed here. My suggestion is to present the information in such was as to clearly delineate the following:
a) Overall financial cost of operating biostatistical support services provided;
We have entitled a section “Overall financial cost of operating the biostatistical support service”.

b) Income generated through the provision of biostatistical support services; and
We have delineated a section entitled: “Income generated through the provision of biostatistical support services”.

c) Sustainability of biostatistical support services given the gap between income generated and operational costs
In the discussion we have added sentences on sustainability to a paragraph on finances:

“When compared to the Wits FHS biostatistical initiative in 2012 [19], the current system has increased in cost (2012 - $68000; 2017 - US $96154). However, the cost per graduate in 2017($227) decreased as the number of graduates increased. Hence, the support system is viable in the current economic climate that exists in the institution. However, further increases (eg student numbers or expansion of research areas) will place a burden on the finances of the system.”

Discussion

First paragraph should provide a succinct summary of the study's main findings.

This has been inserted: “The expansion of the modules of the biostatistics support system augmented the need of the increasing student numbers and nature of the research being undertaken. The quality of the one-on-one consultations remained high during the 5-year period reviewed. Concomitant with the increased numbers of consultations was an increase in graduations and research units over the same period. Financial costs of the support system during this period”. 

Lines 309-311: Statement "In relation to keeping costs minimal in a resource-restricted environment, use of tutors for consultations seems a cost-effective alternative in providing a critical mass of assistance and mentors in the Faculty”. This may well be so but from the data presented, it is not clear how the authors arrive at this conclusion.
Tutors are not paid. This is stipulated in section Methods under sub-section “financial costs”. Thus the costs of the system are lower and this improves the “cost effectiveness”.

Minor comments

Please spell out HSRO fully for the first use (start of Financial aspects section).

We have complied with this request

Footnote to table 1: please change "some data was not" to "some data were not".

We have complied with this request.