Author's response to reviews

Title: Becoming a general practitioner - Which factors have most impact on career choice of medical students?

Authors:

Kathrin Kiolbassa (Kathrin.Kiolbassa@gmx.de)
Antje Miksch (antje.miksch@med.uni-heidelberg.de)
Katja Hermann (katja.hermann@med.uni-heidelberg.de)
Andreas Loh (Andreas.Loh@uniklinik-freiburg.de)
Joachim Szecsenyi (joachim.szecsenyi@med.uni-heidelberg.de)
Stefanie Joos (stefanie.joos@med.uni-heidelberg.de)
Katja Goetz (katja.goetz@med.uni-heidelberg.de)

Version: 3 Date: 17 February 2011

Author's response to reviews: see over
Dear editors,

Please find attached our revised manuscript. The title has been changed to: “Becoming a general practitioner – Which factors have most impact on career choice of medical students?” (MS: 1934518419460392). We appreciate the opportunity to revise our manuscript; thereby the comments of the editor and reviewers were very helpful in order to improve the clarity of the paper. Our responses to the comments are given below. We hope that this revised version can contribute to the contents of BMC Family Practice.

Sincerely

The Authors

Editor Comments

Major essential revisions
1) Questionnaire development: it is unclear whether the factor solution reflected the themes generated by the qualitative development. This should be reported. If it does it would reinforce the validity of the sub scale scores.

[Response] We developed the questionnaire items out of influence factors reported in the literature. Unfortunately, precise questions were seldom reported in the studies, so we had to conceive them out of what we interpreted as belonging to the factors. Since some of the factors were not clearly defined, there were naturally overlaps, so we did not expect the factor analysis giving us precisely the factors we had started to work with. Nevertheless, the factor analysis on the questionnaire did reproduce some factors with exactly the items meant for it. There were also no items not “fitting” into a previously known factor.

2) Having performed a factor analysis and created sub-scales it is more appropriate to report sub-scale scores rather than item scores. Include the Chronbach alpha coefficients for each sub-scale.

[Response] Thank you for your advice. We created and reported sub-scales scores and included the Cronbach alpha coefficient for each sub-scale.

3) Reporting sub-scale scores would simplify and enable analysis of whether those who choose GP differ statistically from those who did not. Such an analysis could be performed if only
between those who expressed a preference for GP or another speciality. Care needs to be taken to correct for multiple comparisons either by using a Bonferoni type correction or by state the prior hypotheses and restricting the primary analysis to these.

[Response] We did change the description and analysis of results by reporting subscale scores now, as suggested. We transformed (standardized) all subscales to allow comparisons between subscales even though they have a different number of items. We did test for differences between students choosing general practice and students choosing another specialty using t-tests for independent samples. But we omitted a correction of our tests, since the subscales – as the result of a factor analysis – can be considered to be independent, so a correction is not necessary.

4) Reporting and discussing the sub-scale scores would simplify the discussion.

[Response] Thank you for this comment. After creating the sub-scales, we rewrote the discussion under consideration of sub-scale scores.

Minor essential revisions
1) Engage the services of an English language consultant

[Response] We used an English language consultant.

2) When referring to a sub scale enclose it title in single quotes and capitalise the first letter e.g. ?Image? and ?Variety in job? to explicitly separate sub-scale names from other text. This will make the abstract and body of the paper much easier to follow.

[Response] Thank you for this advice. We added quotation marks following your advice in the main manuscript as well in the abstract.

----------------------

In addition to the comments raised by the reviewers, please address the following editorial points:
1. Please include the email address of all authors and their affiliations in the first page of the manuscript.

[Response] We included the email addresses of all authors and their affiliations in the first page.

2. Ethics - Experimental research that is reported in the manuscript must have been performed with the approval of an appropriate ethics committee.
Research carried out on humans must be in compliance with the Helsinki Declaration (http://www.wma.net/en/30publications/10policies/b3/index.html), and any experimental research on animals must follow internationally recognized guidelines. A statement to this effect must appear in the Methods section of the manuscript, including the name of the body which gave approval, with a reference number where appropriate.

[Response] Please find in the Methods section of the manuscript following paragraph:

Ethics approval: The ethics committee of the Heidelberg Medical School informed us that approval by an ethics committee was not necessary for a study which does not involve patient data. Anonymity of the participating students and data safety were ensured.

3. Copy edit - We recommend that you ask a native English speaking colleague to help you copyedit the paper. If this is not possible, you may need to use a professional copyediting service.

Examples are those provided by the Manuscript Presentation Service (www.biomedes.co.uk), International Science Editing (http://www.internationalscienceediting.com/) and English Manager Science Editing (http://www.sciencemanager.com/). BioMed Central has no first-hand experience of these companies and can take no responsibility for the quality of their service.

[Response] Thank you for your recommendation. We used an English language consultant.
Reviewer's report:
This paper focuses on career choice of medical students at five German medical schools. This career choice and the factors influencing such choice were captured through a 27-item questionnaire. The aim of the paper was more specifically to look at factors relating general practice as a potential profession. Given that there is a quite extensive literature on this topic, I do not feel that the results presented here add anything surprising to what is already known – the main difference is that this is a German study. I realize that English will be the authors’ 2nd language, but there are grammatical errors throughout the paper. For the following points, where I have suggested changes these are major compulsory revisions.

1. Is the question posed by the authors well defined?
The question is well defined.

2. Are the methods appropriate and well described?
The survey allows certain questions to be answered, but does not facilitate an exploration of ‘why’ – there is no free text space for respondents to give reasons for their choices.
[Response] Thank you for your comment. However, there was no free text space for respondents to give reasons for their choices in the questionnaire. We added this point as a limitation of the study.

The questionnaire is introduced as a survey about career choice, but then asks specific questions about general practice without explaining why.
[Response] The questionnaire was developed as a survey about career choice. Although we were especially interested in students choosing general practice in the analysis of the data, we asked no specific questions about general practice in the questionnaire. Maybe this could be a misunderstanding.

The qualitative studies on which the questionnaire is based need to be specified.
[Response] Thank you for this advice. We added following paragraph in the Method section: A questionnaire was developed based on a literature review [27]. Thereafter the technique of “concurrent think aloud” was used to ensure that the items were understandable and unambiguous. Four medical students, 2 vocational trainees, and 2 general practitioners were involved in this process. The technique of “concurrent think aloud” is a well-established qualitative method to monitor the meaning of questions by thinking aloud and addressing all comments and associations [28].

3. Are the data sound?

The data are sound as arising from this type of survey. However the response rate is very low and therefore the generalisability of the findings is questionable.

[Response] Thank you for this comment. We added within the limitations of our study following paragraph: We had a low response rate regarding all medical students in the federal state (BW). Therefore, generalisation of our findings is limited. In addition, this was an exploratory study; p values should be interpreted carefully. Significant results might be due to chance and will need to be confirmed in further targeted studies.

Some students may have chosen not to reply because of the questions relating to general practice. As well as knowing why students choose general practice, it would be interesting to know why they do not.

[Response] Unfortunately, we did not evaluate why students did not choose general practice. We added this aspect in our limitation as follows: For further analysis a longitudinal design would be important to respond to these aspects and to identify reasons for choosing or not choosing a career in general practice.

Answers to the questions about experience of general practice are not discussed. Yet experience of general practice as a student ,ay have positive or negative effects on career choice.

[Response] Thank you for relating to this point. In response to your comment, we analysed the answers to the questions regarding the experiences with general practice. Indeed, students choosing general practice more often had excellent or good experiences, especially as an practical training in general practice: none of them reported poor or bad experiences, whereas the internship of more than 10% of the students choosing another specialty was regarded as “poor” or “bad”. Still, we chose not to include these results in the paper, since only 25% of respondents (323/1299) evaluated their internship in the questionnaire; 64% (834/1299) of the
students stated not having experienced an internship in general practice at all, therefore you need to consider these results with caution.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
Yes.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
The proportions of females choosing obstetrics and paediatrics is very high but this is not discussed.

[Response] Thank you for your comments. We added within the Discussion section following sentences: More female students in our study chose gynaecology or paediatrics and less female students chose internal medicine or anaesthesiology. This is in accordance with international studies showing that women are more interested in gynaecology or paediatrics than men [30-32].

How likely are the data to predict actual choice – particularly for those students in the early years of their programme?

[Response] Thank you for your comment. However, to answer your question it would be helpful to create a longitudinal study. We added the following sentence within the limitation section: Due to our research design, it was difficult to evaluate possible effects through experiences with general practice i.e. during practical training.

Unfortunately I feel that the conclusions about making general practice more attractive based on this data are fairly simplistic.

[Response] We changed the conclusion in some aspects as follows: In general, the fact that only 1,299 medical students responded to the online survey should reinforce the need for medical schools to recognise that they should put more emphasis on career advice for undergraduates beginning at an early stage in medical training. The results of the study demonstrate that there are differences in the importance of factors between students aiming for a career in general practice and students interested in other specialties. The results of the study demonstrate that there are differences in the importance of factors between students aiming for a career in general practice and students interested in other specialties. Differences were particularly found in items concerning individual aspects and patient orientation. To attract more students to general practice those factors have to be addressed and to be made more explicit to medical
students at an early stage in medical school. Furthermore, conditions for working as a GP have
to be changed according to the expectations of the coming generations of physicians.

6. Are limitations of the work clearly stated?
There needs to be more consideration given to the limitations.
[Response] Thank you for this advice. We rewrote our limitation section with regard to your
comments given before.

7. Do the authors clearly acknowledge any work upon which they are building, both published
and unpublished?
Yes – though there is a lot more literature available on this topic.

8. Do the title and abstract accurately convey what has been found?
Yes.

9. Is the writing acceptable?
English is poor in places
[Response] We used an English language consultant.

Eg – p3 ‘already crossed the age of 60 years’
[Response] Thank you, we changed this sentence.

P4 Medical school – no capital M needed
[Response] Thank you, we changed this word.

10. Specific points:
There is no mention of whether ethical approval was obtained - or considered.
[Response] Thank you for this comment. We added in the Method section following paragraph:
Ethics approval: The ethics committee of the Heidelberg Medical School informed us that
approval by an ethics committee was not necessary for a study which does not involve patient
data. Anonymity of the participating students and data safety were ensured.

In the 1st paragraph of the introduction is stated: ‘it is already known that…’ this still needs a
reference and some might say that an increase in physicians is not the answer – or not the only
answer, in that other healthcare professionals might be better placed to interact with patients with ongoing long term conditions.

*Response* Thank you for this comment. In response, we deleted this sentence from our manuscript.

For an international readership more information is required about specialist and GP training in Germany – when do medical students have to choose their careers? What are the reasons known why general practice has been less popular in Germany? Are there similar reasons to other countries as discussed in the international literature? Are GPs in Germany self-employed or salaried? Are the data about choice of rural practice applicable to Germany?

*Response* Thank you for this advice. We added more information concerning your questions in different parts of the Introduction section.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests
Reviewer's report

Title: Becoming a general practitioner? - Which factors have main impact on career choice of medical students

Version: 2 Date: 22 November 2010
Reviewer: Adrian Hastings

Reviewer's report:

General comments
The issue of career choice amongst medical students is important and many countries experience the same phenomenon as the authors report of fewer students choosing primary care, which is usually the speciality providing the greatest number of training grade posts. The authors have found papers from many different countries for which they are to be congratulated. This does make their statement that there is little evidence for the reasons for the relative unpopularity of general practice unsupported.

[Response] Thank you for this comment. We added in the Introduction section following paragraph: In an international study, the Commonwealth Fund interviewed GPs from 7 countries to compare aspects of their daily work and quality of health care: German GPs had a higher workload and were more dissatisfied with their work than their colleagues from other countries [23]. and later in the Introduction following sentence: Moreover, there is no structured vocational training for GPs and vocational training has a poor image compared to other countries of Western Europe [26].

Overall the paper can make a significant contribution to the evidence about variations in this problem around the world. However, to be published substantial revisions will be needed.

Essential revisions
The title of the report and the aim indicate that the paper is about factors influencing career choice for general practice amongst students in one state of Germany. As such comparing students opting for general practice as their first choice with five other specialities makes the presentation of the data unnecessarily complicated. Particularly as responses of 591 students choosing 20 other specialities were not included in the analysis. I suggest that in rewriting the paper dichotomisation of responses should be by GP versus all other specialities.

[Response] We thank the reviewer for his helpful input. As suggested, we compared the responses of students favouring general practice with the responses of all students choosing another specialty. We hope thereby the focus of our manuscript becomes clearer.
I assume the questionnaire was administered in the German language. The authors should review the translation of the items and the anchors on the Likert response scale with a translator who is a native English speaker. In particular I am unsure how to interpret the differences between ‘rather agree’, ‘partly agree’ and ‘rather do not agree’.

[Response] The translation of the items was edited. Additionally, we changed the responses on the Likert scale to the according English terms (‘Strongly agree’ – ‘Agree’ – ‘Neither agree nor disagree’ – ‘Disagree’ – ‘Strongly disagree’).

I congratulate the authors on using a factor analysis to justify allocation of statements to the seven domains. Having done so they should use their five point rating scale as an interval scale (converting degree of agreement to a number 1-5) and report the differences in mean responses to each of the domains. It is not legitimate to dichotomise the responses with three points on the scale indicating agreement and two disagreement.

[Response] We recalculated and reported sum scores for the domains. To allow comparison between domains with a different number of items, we standardized each sum score to a 0-100 scale with lower scores indicating higher importance.

I did not understand the comment that the denominator was not known. The results section states there are 12,062 medical students in BW, so I have assumed this is the potential number of respondents. The authors should explain why their response rates is only just over 10% and whether this has biased their results.

[Response] Thank you for this comment. We added some sentences in our limitation as follows: A basic limitation of our online survey is that we can not calculate an exact response rate, because it is not sure whether all 12,062 students have received the invitation for the survey. Furthermore, due to the voluntary participation a selection bias in favour of students more interested in the issue of career choice (and probably more reflected) can not be excluded. Moreover, we added following sentences in our limitations: We had a low response rate regarding all medical students in the federal state (BW). Therefore, generalisation of our findings is limited.

The authors should I believe have considered and referenced the work of A Grant of the Open University in developing the Sci 59 as it gives well evidenced insight into factors that might affect medical student and training grade doctor choices of career.
[Response] Thank you for this reference advice. We added within the Discussion section: Our established instrument of career choice for medical students is comparable to other existing international instruments such as the Specialty Choice Inventory Sci45 [37], for career guidance for specialty or the questionnaire from Wright et al. [38].

If the presentation of the data can be simplified along the lines I suggest and my concerns about the translation of the items and the scale anchors then the paper can be published.

[Response] Thank you for this suggestion. The items and the scale were translated by an English language consultant.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests
Reviewer's report
Title: Becoming a general practitioner? - Which factors have main impact on career choice of medical students
Version: 2 Date: 24 November 2010
Reviewer: Lorelei Jones

Reviewer's report:
Becoming a general practitioner? – Which factors have main impact on career choice of medical students.
Thank you for inviting me to review the above paper. I recommend publication subject to the following minor essential revisions:

Introduction:
In the introduction the authors state that: ‘it is already known, that the demographic development and the increase of chronic diseases lead to the requirement of more physicians’. It would be more accurate to phrase this in terms of a ‘concern’ or an ‘argument’ and to provide references.
[Response] Thank you for this comment. However, we deleted this sentence from our manuscript

Findings:
The most interesting finding is that only 7% of medical students are interested in a career in general practice, while it appears that GPs make up approximately 50% of the medical workforce. I recommend that more emphasis is given to this finding (and the implications) in the abstract/discussion/conclusion.
[Response] Thank you for your recommendation. We now emphasized this finding in the abstract/discussion and conclusion.

P6. The finding that 67% of the students favouring general practice are female is difficult to interpret. Given that 60% of the sample (and the population) are female it is unclear if this finding is significant. It appears a much lower proportion than would be expected and much lower than Obstetrics and Gynaecology (94%) and Paediatrics (81%). Does this mean that general practice in Germany is equally attractive to men and women?
[Response] As a consequence to your comment, we looked further into the expected and observed gender distribution within the specialties. A chi-square test confirmed the results suggested by the descriptive statistics: general practice is – as you suspected – indeed equally
attractive to men and women, whereas there are gender differences in obstetrics and gynaecology, paediatrics, internal medicine and anaesthesiology. We included these in the Results section and changed the discussion accordingly.

Again an interesting finding that I would like to see addressed in the discussion.

[Response] We added following paragraph in the Discussion section: More female students in our study chose gynaecology or paediatrics and less female students chose internal medicine or anaesthesiology. This is in accordance with international studies showing that women are more interested in gynaecology or paediatrics than men [30-32].

Please provide absolute numbers as well as proportions when presenting findings (e.g. 6.8% (88/1299) favoured general practice).

[Response] We changed the presentation of the findings as suggested.

Discussion:
Authors are commended for addressing the limitations of their study in the discussion. In addition to making it difficult to calculate a response rate (which they mention) the survey is also subject to volunteer bias. While this in itself does not to my mind rule out publication, I recommend the authors acknowledge this limitation and the implications for the interpretation of their findings.

[Response] Thank you for this advice. We added following sentences in our limitations: Due to voluntary participation it could be assumed that only students responded who were keen on taking part in this survey. Our results may apply only to overambitious students.

P 8. The authors claim to use a ‘validated’ questionnaire. The authors describe the development and piloting of their questionnaire although I’m not sure this constitutes ‘validation’. I recommend the authors expand on what measures were taken to strengthen the validity of their study, for example, by noting any consistencies/inconsistencies with similar surveys. It is helpful that the authors have included their survey instrument.

[Response] We added in the Method section following paragraph: An exploratory factor analysis using the principal component method performed on the 27 items constituted 7 subscales which were determined by scree test and eigenvalues > 1. The solution was rotated using varimax rotation. The results of the factor analysis including the Kaiser-Meyer-Olkin measure of sampling adequacy, the factor loadings of the items and the internal consistency of the factors
(Cronbach’s alpha) can be found in Table 1. These 7 factors collectively explained 63% of the variance in the responses.

The complete description of the development and validation process of the questionnaire including consistencies/ inconsistencies with similar surveys has been submitted elsewhere.

Tables:
Table 1: I recommend the headings ‘Sample’ and ‘Population’
[Response] Thank you for your recommendation. We changed the heading to ‘Sample’.

Table 5. Guidance is required on how to interpret this information.
[Response] Guidance is given in the Method section as follows: An exploratory factor analysis using the principal component method performed on the 27 items constituted 7 subscales which were determined by scree test and eigenvalues > 1. The solution was rotated using varimax rotation. The results of the factor analysis including the Kaiser-Meyer-Olkin measure of sampling adequacy, the factor loadings of the items and the internal consistency of the factors (Cronbach’s alpha) can be found in Table 1. These 7 factors collectively explained 63% of the variance in the responses.

Discretionary revisions:
P3. ‘The number of those who complete residency has been decreasing since 1995 and has reached the lowest number in 2009’. It would be helpful if the authors could provide actual figures.
[Response] Thank you for your advice. We added the actual figures as follows: The number of those who completed residency has decreased from 4,828 in 1995 to 1,168 in 2009 [4].

Round up/down all decimals to nearest whole number.
[Response] All numbers were rounded up/down.

The authors may which to consider the issue of how medical students are recruited. If they are students who have excelled in science subjects at school then this may influence the small number attracted to general practice. It also appears that some doctors will change to general practice when they are older. The authors may wish to consider how easy it is for doctors to do this.
[Response] Thank you for this comment. We added within the Introduction following sentence: *In Germany, physicians are able to choose training in a specialty at any time independent of their age or final grade.*

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:** I declare that I have no competing interests
Thank you for asking me to review this paper addressing factors influencing career choice of medical students at five German medical schools. It made interesting reading. The topic is relevant to a medical education readership and the findings are important if not very surprising or new. The introduction is pertinent though not very extensive in its review of existing literature in this area. It might have been helpful to provide clearer context by including more details of the historical, political and financial background to German healthcare provision as this may not be familiar to all readers. International comparisons would also have been relevant here since financial and social recognition of generalists versus specialists does vary from country to country and will influence career choice for future doctors.

[Response] Thank you for your advice. We added within the Introduction section following paragraph related to historical, political and financial background:

In an international study, the Commonwealth Fund interviewed GPs from 7 countries to compare aspects of their daily work and quality of health care: German GPs had a higher workload and were more dissatisfied with their work than their colleagues from other countries [23]. Germany is based on a Social Security Health care system and is funded by means of earmarked premiums. The system is more loosely organised than systems with National Health Services like in The United Kingdom, Spain and Sweden [24]. The German state has less influence and the system has a more pluralistic structure, with stronger influence of health care providers and social insurances. In systems with National Health Services, a referral from a GP is important for access to specialized care [25]. In contrast, GPs in Germany do not function as gatekeepers but patients have free access to ambulatory specialist services [25]. Moreover, there is no structured vocational training for GPs and vocational training has a poor image compared to other countries of Western Europe [26]. In Germany, physicians are able to choose training in any specialty at any time independent of their age or final grade.
The fact that only 1299 students out of a possible pool of 12,062 responded to the on-line survey is disappointing but nonetheless useful information was obtained, generating a worthwhile discussion. Its particular value I feel is to reinforce the need for all medical schools to recognise the need for greater attention to career advice for undergraduates from an early stage in their training.

[Response] Thank you for your suggestion. We reworked on the Discussion section including the limitations and conclusions.

Furthermore, we added in the conclusions: In general, the fact that only 1,299 medical students responded to the online survey should reinforce the need for medical schools to recognise that they should put more emphasis on career advice for undergraduates beginning at an early stage in medical training.

In answer to your specific editorial questions:
1. The question posed by the authors is well defined
2. The methods are appropriate and well described.
3. The data appear sound.
4. The manuscript adheres to the relevant standards for reporting and data deposition.
5. The discussion and conclusions are well balanced and adequately supported by the data.
6. Limitations of the work are clearly stated.
7. The authors clearly acknowledge any work upon which they are building though could expand in this area
8. The title and abstract do accurately convey what has been found. I would however suggest slight re-working of the title as follows: Becoming a general practitioner – Which factors have most impact on career choice of medical students?

[Response] Thank you for your recommendation. We changed the title into: Becoming a general practitioner – Which factors have most impact on career choice of medical students?

9. The writing is acceptable.
I would support the publication of this paper following some expansion of the introduction placing the work in a more international context.

[Response] We re-worked on the introduction and placing the work in a more international context. Please see for your first comment.

Level of interest: An article of importance in its field
Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

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