

Medical students as research participants: Student experiences, questionnaire response rates and preferred modes

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Background. Research projects frequently include students, a potentially vulnerable population, as participants.

Objectives. To determine University of the Free State (UFS) medical students' experiences as research participants. Response rates to and preferences for hard copy and electronic questionnaires were also investigated.

Methods. All 804 UFS undergraduate medical students in 2020 were approached to participate in this cross-sectional survey. Fourth- and fifth-year students and one-half of the third-year class were approached in person to complete anonymous hard copy questionnaires in a class setting. First- and second-year students and the other half of the third-year class were contacted electronically to complete anonymous electronic questionnaires.

Results. Response rates to hard copy questionnaires were at least ~45% of the entire year group (and >70% of those to whom the questionnaire was distributed in class) compared with approximately a third of those contacted electronically. Students who responded to electronic questionnaires preferred electronic completion, whereas those who responded to hard copy questionnaires preferred the hard copy format, except fifth-year students. The majority of students (except those in their first year) had previously been approached to participate in research projects. Between a fifth and a third of all year groups indicated that they had refused participation at least once. More than a third of fifth-year students experienced insufficient time to decide on participation. Up to a quarter of third- to fifth-year groups had felt pressurised to participate.

Conclusion. Hard copy questionnaires in class, the preferred data collection method for many students, produced better response rates but placed potential pressure on students to participate.

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At the University of the Free State (UFS), Bloemfontein, South Africa, undergraduate medical students perform a research project as part of their training. These projects frequently include students as research participants, in particular medical students. This approach may be seen as unfairly targeting easy-to-reach student populations who are potentially vulnerable, especially in terms of giving valid informed consent.^[1,2] As stated in the Department of Health's document *Ethics in Health Research: Principles, Processes and Structures*, the recruitment and selection of participants should be 'based on sound scientific and ethical principles'.^[3]

Joubert *et al.*^[4] reviewed the selection and inclusion of students as research participants in undergraduate medical student projects conducted at the School of Medicine, UFS, from 2002 to 2017, to assess ethical conduct. The percentage of undergraduate medical student projects that included students as participants increased during the study period, from 0% in 2002 to 26.9% in 2017. The selection and inclusion of students as research participants appeared to be well motivated (i.e. the students who were studied were appropriate, given the study topic or literature), with the possible exception of undergraduate residence students. For the latter group, there was less motivation as to why they, specifically, were selected; they probably served as easy-to-reach proxies for all undergraduate students. The study findings indicated that in these undergraduate medical student projects, using students as research participants, anonymity is frequently ensured, incentives are not abused to encourage participation and consent procedures are followed as stipulated by the appropriate ethics committee.^[4]

Flowing from the abovementioned retrospective review, we identified the need to obtain student input regarding their willingness to participate or vulnerability experienced as research participants and the impact of timing and time demands as to their participation. These findings could assist in developing appropriate guidelines regarding the inclusion of students in research projects in our setting, as has been done at other institutions. At the University of Pittsburgh, for example, in the policy and procedures document 'Research involving students as research participants', a specific section deals with medical students as participants. One of their requirements is that the School of Medicine's Research on Medical Students Review Committee must approve the research proposal before it is submitted for ethics approval. This requirement aims to 'balance the needs of researchers with the interests and availability of the medical students being solicited as research subjects'.^[5]

From experience, we knew that hard copy questionnaires for completion in or after a formal class generally have good response rates (>80%), but that teaching staff and the ethics committee were becoming increasingly concerned regarding the potential negative impact on academic time and voluntariness of participation. We therefore decided to enquire from students whether they preferred electronic or hard copy completion of questionnaires.

Aim and objectives

The primary aim of the study was to determine UFS medical students' experience regarding participation in research projects as students, with an emphasis on ethical aspects such as voluntary informed consent. As

secondary objectives, response rates and preferred modes of questionnaire completion were also investigated.

Methods

This was a quantitative cross-sectional study. All 804 students in the 5-year undergraduate medical programme at UFS in 2020 qualified for inclusion in the study, as the only criterion was that a participant had to be a registered UFS medical student at the time of the study.

An anonymous self-administered English questionnaire (English being the language of instruction at UFS) was used to collect information. The face-to-face hard copy data collection for the project was planned to take place from February to April 2020. Because of the COVID-19 pandemic, the university closed for the autumn holiday earlier than anticipated in March 2020, and face-to-face teaching did not resume owing to the national lockdown, which started on 27 March 2020. At that stage, only the fourth- and fifth-year students had completed the hard copy questionnaires (February 2020). The study was introduced to them by the first author (GJ) at the start of a formal programme management session, for completion after the same session and placement of questionnaires in a box. Owing to poor attendance (<50%) at these programme management sessions by 3 of the 10 clinical fourth- and fifth-year groups, a second attempt was made to approach these groups for participation by electronic distribution of questionnaires, with frequent reminders. The information document and questionnaire clearly indicated that those who had participated before should not complete the questionnaire again.

Subsequently, the proposed methodology of the project, consisting of the completion of hard copy questionnaires, was expanded to include online questionnaires for some year groups. For first- and second-year students, the questionnaire was distributed electronically to their official UFS student email addresses during July 2020, using the Evasys online survey system (Evasys, Germany), while all their teaching and learning were conducted online. On returning to face-to-face teaching and learning, the third-year class was split into two groups for all their training activities to adhere to COVID-19-related space and distance requirements, and it was decided to use this opportunity to approach one of the groups electronically and the other at a face-to-face session. This was done during September 2020.

A convenience sample of 4 interns participated in a pilot study at the Department of Family Medicine. No changes to the questionnaire were required. These questionnaires were not included in the main study.

Results were summarised by frequencies and percentages. Open responses were categorised into themes emanating from answers provided.

Ethical considerations

The protocol and two sets of amendments regarding the planned data collection methods (due to lockdown-related changes from face-to-face teaching to online teaching to a blended model during 2020) were approved by the Health Sciences Research Ethics Committee of UFS (ref. no. UFS-HSD2020/0015/2403). Appropriate UFS gatekeeper authority approval was also obtained. Questionnaires were anonymous and students were informed that their participation was voluntary and that they may withdraw at any time during questionnaire completion. The first author, whose contact details appeared on the information sheet and who distributed the hard copy questionnaires, had no academic or other contact with the first- or second-year students, and the distribution of questionnaires to third- to fifth-year students took place after her academic contact with the students

had been completed. Responses to open-ended questions were reported in such a manner that a specific project or person could not be identified. The anonymous paper and electronic questionnaires and the full electronic data set and back-up are in the safekeeping of two of the researchers and will be kept for 10 years.

Results

Response rates to hard copy questionnaires distributed in a class setting varied between 44.7% (fourth-year students) and 64.7% (third-year students) of the entire year group, and 70% of those to whom the questionnaire could be distributed (as they were present in class), compared with approximately a third of those who were targeted for electronic completion (Table 1). There was a low electronic response rate by fourth- and fifth-year students (<30%), who were initially targeted for hard copy participation and thereafter contacted electronically owing to poor class attendance of some clinical groups. Because of these low response rates and the further complexity of additional non-representative subgroups, these electronic responses of fourth- and fifth-year students were not included in the analyses.

The majority of all groups, except first-year students, preferred immediate completion in class (Table 1). The main reason for this, according to students' open responses, was so that they would not forget to do so. Students who responded to electronic questionnaires preferred electronic completion, whereas students who responded to hard copy questionnaires generally preferred this mode of delivery, except in the case of the fifth-year students. The main reasons for preferring electronic completion were that students could do it in their own time and give sufficient thought to it, whereas students who preferred hard copy questionnaires gave as reasons that such completion was easier and quicker.

Between a fifth (21.1% of fourth-year students) and a third (31.3% of second- and fifth-year students) of participants indicated that they had been approached to complete a questionnaire, where it was not clear whether it was for research purposes (Table 1).

Except for first-year students, the majority of responding students had been approached previously to participate in research projects as students (Table 2). The percentage is close to 90% for third- to fifth-year students. No association was found between having been approached for participation in a project previously and preference for electronic or hard copy questionnaires (data not shown). However, in the first two year groups, those who had been approached for participation were much more likely to prefer completion in their own time than those who had not yet been approached (data not shown).

The majority of all students who have been approached for participation were approached specifically as medical students (Table 2). For third- to fifth-year students, the main factor that motivated them to participate was that the researchers were medical students. For first-year students, the main factor was contributing to research and for the second-year group the time that participation required. Between a fifth and a third of various year groups indicated that they had refused such participation at least once, mainly due to time constraints.

More than a third of fifth-year students have experienced not being given sufficient time to decide whether they wish to participate (Table 2), mainly because a questionnaire was distributed for immediate completion. Fifth-year students were the year group where the highest percentage indicated that students are approached to participate in research projects too frequently, and where the lowest percentage indicated being positive

Table 1. Response rates and questionnaire completion preferences by year group

Student year group (questionnaire type)	First (electronic)	Second (electronic)	Third (electronic)	Third (hard copy)	Fourth (hard copy)	Fifth (hard copy)
Response rate, <i>n</i> (%)						
Of the year group	64/178 (36.0)	64/206 (31.1)	23/68 (33.8)	44/68 (64.7)	59/132 (44.7)	70/152 (46.1)
Of those present in class*				†	59/64 (92.3)	70/98 (71.4)
Completion preferences (timing), <i>n</i> (%)						
Immediately in class	31/64 (48.4)	37/64 (57.8)	14/23 (60.9)	35/42 (81.4)	46/59 (78.0)	37/65 (56.9)
At own time elsewhere	33/64 (51.6)	27/64 (42.2)	9/23 (39.1)	7/42 (16.3)	13/59 (22.0)	28/65 (43.1)
Depends on the questionnaire format‡	0	0	0	1/42 (2.3)‡	0	0
Completion preferences (format), <i>n</i> (%)						
Hard copy	11/64 (17.2)	18/64 (28.1)	6/23 (26.1)	23/43 (53.5)	36/58 (62.1)	31/66 (47.0)
Electronic	53/64 (82.8)	46/64 (71.9)	17/23 (73.9)	17/43 (39.5)	20/58 (34.5)	33/66 (50.0)
Both‡	0	0	0	2/43 (4.7)	2/58 (3.5)	2/66 (3.0)
Depends on the situation‡	0	0	0	1/43 (2.3)	0	0

*Only applicable for the distribution of hard copy questionnaires.

†No record was kept regarding how many students were present in the class.

‡These options were not provided on the questionnaire and were included by students.

regarding participation in research as a student. Up to a quarter of the third- to fifth-year groups indicated that they had felt pressurised to participate. According to open responses, this was mainly because questionnaires were distributed in class and the researchers were waiting for completion.

Nearly half of some year groups indicated that there were certain times at which it was inappropriate for students to be approached for research project participation (Table 2). Predominantly examination, test or clinical round times were indicated as such in open responses, while class time and free time were also mentioned. Similar percentages indicated that they have experienced being approached for participation in a project that they considered meaningless. Few students indicated that they had been informed of the findings of the project.

Discussion

Hard copy questionnaires distributed in a class setting had higher response rates than electronic questionnaires, although the response rate was low owing to poor class attendance at the programme management sessions. Recent surveys^[6,7-10] conducted at our medical school (where class attendance is compulsory) using hard copy questionnaires distributed at academic contact sessions have reported response rates of $\geq 70\%$, particularly in first- to third-year students. Clear guidance regarding acceptable response rates and expected differences between hard copy and electronic questionnaires is not apparent from the literature, with numerous surveys among health science trainees not reporting response rates.^[11] Blumenberg and Barros^[12] reported that web-based recruitment in public health research generally has lower response rates than other approaches.

Due to the increasing concern of staff members, students and the ethics committee regarding the impact of student research participation during class time, electronic questionnaires may soon be the only approach available for surveys among students, and ways of improving response rates need to be explored. Official UFS student email addresses were used to approach students for electronic participation in this study, and students had been informed at the onset of online teaching and learning due to the lockdown (from 20 April 2020) that all university correspondence would make use of these email addresses only.

In the context of recruiting women for a birth cohort study, Blumenberg *et al.*^[13] found Facebook to have the highest recruitment success (30.6%),

with email and WhatsApp having lower but similar percentages (24.9%). They found the recruitment success of their approaches depended on socioeconomic factors and urged researchers to consider the specific target group when deciding on an approach. Although one would consider that a group of medical students would be fairly homogenous regarding access to electronic devices and data, responses to the question regarding the preference of the mode of questionnaire completion indicated that, even during mainly online teaching and learning, some students struggled with access to electronic data. Connectivity issues or lack of data could have contributed to the low response rate, as not all students were prepared for the sudden transition to online learning and teaching. The university instituted a vulnerable student task team to support students with devices and data (e.g. students were given access to data via GlobalProtect VPN). Electronic questionnaires to first- and second-year students were distributed a few months after these supportive actions had been implemented.

With continuing blended learning, students may become more used to all aspects of their training having some online component. This approach may enhance response rates to electronic questionnaires in the future. It remains important that students are well informed regarding whether a questionnaire relates to a research project or their teaching and learning (such as module evaluations). With increased research regarding teaching and learning, this difference may be difficult to distinguish and researchers have to make clear statements in this regard. It is of concern that between a fifth and a third of year groups reported that they have been approached to complete a questionnaire, where it was not clear whether it was for research purposes. Projects in which research is conducted by lecturing staff of the student participants need particular clarity regarding purpose and participant rights to refuse or withdraw. Kumar and Murugan^[14] explored specific ethical challenges in medical education research for student participants. In our study, in most year groups, $<40\%$ stated that a motivating factor for participation was that the researcher was a lecturer. These percentages are generally much lower than those reported for the researcher being a peer (medical student).

Many students preferred hard copy questionnaires for immediate completion, as it ensures that they complete the questionnaire easily and timeously. However, student responses indicated that they could feel

Table 2. Responses of students who were approached for participation in a research project because they are students

Student year group (questionnaire type)	First (electronic), n (%)	Second (electronic), n (%)	Third (hard copy/ electronic), n (%)	Fourth (hard copy), n (%)	Fifth (hard copy), n (%)
Ever been asked to participate in a research project (excluding this one) because you are a student?	21/64 (32.8)	39/64 (60.9)	60/67 (89.6)	53/59 (89.8)	65/70 (92.9)
If yes, number of times (median)?	2	3	2	4	4
If yes, approached specifically as medical student?	12/21 (57.1)	30/39 (76.9)	57/60 (95.0)	53/53 (100.0)	64/65 (98.5)
Factors which influenced participation					
Researchers are medical students	5/21 (23.8)	16/39 (41.0)	43/60 (71.7)	41/53 (77.4)	49/65 (75.4)
Researchers are other students	6/21 (28.6)	8/39 (20.5)	23/60 (38.3)	19/53 (35.9)	16/65 (24.6)
Topic of project	12/21 (57.1)	17/39 (43.6)	25/60 (41.7)	25/53 (47.2)	22/65 (33.9)
Value of project	12/21 (57.1)	17/39 (43.6)	26/60 (43.3)	20/53 (37.7)	24/65 (36.9)
Time that participation would require	5/21 (23.8)	20/39 (51.3)	33/60 (55.0)	31/53 (58.5)	32/65 (49.2)
Anonymity of participation	3/21 (14.3)	10/39 (25.6)	26/60 (43.3)	25/53 (47.2)	32/65 (49.2)
Researcher is a lecturer	0 (0)	8/39 (20.5)	15/60 (25.0)	15/53 (28.3)	23/65 (35.4)
Lucky draw	5/21 (23.8)	4/39 (10.3)	7/60 (11.7)	4/53 (7.6)	9/65 (13.9)
Incentive	2/21 (9.5)	2/39 (5.1)	8/60 (13.3)	6/53 (11.3)	7/65 (10.8)
No specific factor	4/21 (19.1)	6/39 (15.4)	8/60 (13.3)	7/53 (13.2)	11/65 (16.9)
Contributing to research knowledge	16/21 (76.2)	17/39 (43.6)	23/60 (38.3)	27/53 (50.9)	27/65 (41.5)
No effort required	4/21 (19.1)	8/39 (20.5)	19/60 (31.7)	16/53 (30.2)	16/65 (24.6)
Own medical student research project had students as participants	0 (0)	3/39 (7.7)	12/60 (20.0)	14/53 (26.4)	22/65 (33.9)
Other	0 (0)	0 (0)	2/60 (3.3)	0 (0)	1/65 (1.5)
Feel that students are approached to be research participants					
Too frequently	5/21 (23.8)	7/39 (18.0)	13/58 (22.4)	16/53 (30.2)	31/64 (48.4)
Just right amount of time	11/21 (52.4)	22/39 (56.4)	37/58 (63.8)	35/53 (66.0)	29/64 (45.3)
Too seldom	5/21 (23.8)	10/39 (25.6)	8/58 (13.8)	2/53 (3.8)	4/64 (6.3)
Feeling about participating in research projects as a student					
Positive	11/21 (52.4)	18/39 (46.2)	32/58 (55.2)	28/53 (52.8)	17/63 (27.0)
Neutral	10/21 (47.6)	20/39 (51.3)	25/58 (43.1)	22/53 (41.5)	46/63 (73.0)
Negative	0 (0)	1/39 (2.6)	1/58 (1.7)	3/53 (5.7)	0 (0)
Ever declined to participate in such a study?					
Yes	4/21 (19.1)	13/39 (33.3)	20/60 (33.3)	14/53 (26.4)	15/65 (23.1)
Ever felt pressurised to participate?					
Yes	1/21 (4.8)	4/39 (10.3)	15/60 (25.0)	12/53 (22.6)	15/64 (23.4)
Ever felt you were not given sufficient time to decide whether you wish to participate?					
Yes	1/21 (4.8)	1/39 (2.6)	12/58 (20.7)	13/53 (24.5)	23/64 (35.4)
Feel that there are specific times or situations when it is inappropriate for students to be approached to be participants in research projects					
Yes	8/21 (38.1)	19/39 (48.7)	17/58 (29.3)	25/52 (48.1)	27/60 (45.0)
Ever felt that the project was meaningless?					
Yes	12/21 (57.1)	16/39 (41.0)	16/59 (27.1)	25/53 (47.2)	26/63 (41.3)
Ever been informed of projects' findings?					
Yes	1/21 (4.8)	4/39 (10.3)	9/58 (15.5)	6/53 (11.3)	8/64 (12.5)

pressurised to participate in such situations and have limited time to make a decision with regard to participation. Researchers need to be aware of and try to circumvent these potential drawbacks, which can impact on ensuring voluntary informed consent. Researchers should, however, also realise that numerous emailed reminders to complete electronic questionnaires can also be seen as infringing the voluntary nature of participation. Therefore, our local ethics committee has recently requested that emailed reminders are kept to a minimum. It is encouraging that some students reported that they

refused participation, which indicates that they are aware of their right to refuse or withdraw.

When the study was performed, all teaching and learning in the first 2 years of the programme was online, which may be a reason for these groups' preference for online questionnaire completion. These two year groups – in particular the first-year group – were those least likely to have been approached for research participation previously and therefore lacked experience in this regard. However, it was found that those who had

been approached for research participation did not differ from those not approached as to their preferred questionnaire format. It is interesting to note that in all year groups (except the fifth-year group), students' preferred questionnaire format was the one in which they were approached for this project. Even in the third-year class, those who were approached for electronic completion preferred this mode, whereas those in the same year group who were given hard copy questionnaires preferred the paper format.

At the time of questionnaire completion, only the first-year students had not yet received research ethics and methodology training as part of their programme. Second-year students had already at that stage written their research project proposals and all other year groups had completed their research projects. This difference in research exposure may explain the difference in responses regarding having felt pressurised to participate, with the lowest percentage in the first-year group. The somewhat more negative responses by fifth-year students could be due to their longer exposure as potential student participants or feeling more at ease to express themselves more truthfully.

Given the emphasis on research in the medical programme at our university, with research modules stretching over 5 of the 10 semesters, the students' further exposure to research as project participants should be seen as a valuable addition to their research training. We have, for example, seen students commenting on the phrasing of questions or answer options on questionnaires or querying an ethical aspect of projects they were approached to participate in. Their positive (or non-negative) approach to research participation should, however, not be abused.

Of concern is that fairly large percentages of students indicated that they have been approached for a project that they considered meaningless. Given that all projects at our institution have to be approved by an institutional ethics committee, the fact that students consider the project meaningless may be due to lack of time taken by the researcher to explain the research project clearly, or insufficient time given for participants to read information documents. A low percentage of year groups reported that they had been informed of project findings.

Conclusion

Many students preferred hard copy questionnaires for immediate completion, as these ensured that they completed the questionnaire easily and timeously. This data collection method also had the highest response rates. However, student responses indicated that they could feel pressurised to participate in these situations and had limited time to make a decision regarding participation.

Students' positive (or non-negative) approach to research participation should encourage research in the medical student population, but should not be abused.

Recommendations

It should be investigated whether the use of students' personal email addresses would enhance response rates. It can also be researched which web-based approaches are the most appropriate for the target group of students.

Researchers should choose well-motivated projects for which students are the appropriate study participants and explain the research project and its value clearly to potential participants.

Questionnaire distribution and collection of hard copy questionnaires should allow sufficient time for information documents to be read attentively and questionnaires to be completed, with no hovering about by researchers checking up on who is completing the questionnaire and who is not. Other approaches regarding the return of hard copy questionnaires can also be investigated.

Inappropriate times for approaching students for participation, such as test and examination weeks, could be clearly stated on the ethics committee or gatekeeper approval documentation.

Given the official electronic platforms available to all students, researchers could post a short summary of results, and place relevant publications in a designated spot for research on students.

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