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## **Future physician-scientists: let's catch them young! unravelling the role of motivation for research**

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## Supplements

### Overview

Appendix A – Interview guide used within our qualitative study (**Chapter 3**)

Appendix B – Overview of all emerged themes and sub-themes within our qualitative study (**Chapter 3**)

Appendix C – Questionnaire used within our studies (**Chapter 4, 5, 9, 10**)

## Appendix A: Interview guide used within our qualitative study

Interview guide exists out of 3 topics: background, perceptions of research, and motivation for research. These three subjects will be discussed within the interview. The topics are comprised of numbered questions, which will be asked to start the interview and discussion with the individual students. The sub-questions will only be used when a student does not seem to understand the questions or does not know what to answer (which almost never occurred during the actual interviews).

### 1: Background

1. What is your educational background?
2. Why did you choose Medicine?
3. Do you have previous experiences with research? If yes, could you elaborate?

### 2: Perceptions of research

1. How do you perceive conducting research?

*Sub-question:*

- *What are the activities of a researcher?*
- *What are the abilities you should have to perform research?*
- *What can you do with research?*
- *For whom is research important?*

2. To which extent do you believe that research can be used as a physician? And in what way do you think physicians can use research?

*Sub-question:*

- *Should physicians use research in clinical practice?*
- *Should physicians conduct research?*

### **3: Motivation for research**

1. Are you planning to conduct research yourself?

If yes:

What motivates you to conduct research?

If no:

What demotivates you to conduct research?

If unknown:

Ask what could motivate or demotivate to conduct research hypothetically

2. Elaborating on the counterpart of the first question

## Appendix B: Overview of all emerged themes and sub-themes within our qualitative study

Themes	Sub-themes
1 Research processes	1.1 Create research questions 1.2 Come up with methods 1.3 Gather data 1.4 Process data 1.5 Create results 1.6 Draw conclusions 1.7 Report
2 Research goals	2.1 Create new knowledge or refine existing knowledge 2.2 Solve problems 2.3 Answer questions 2.4 Find a given fact or pattern 2.5 Progress in science and healthcare 2.6 Development and improvement of medicines 2.7 Development and improvement of illness treatment 2.8 Better physicians 2.9 Improve work experience of physicians 2.10 Improve patient experience and trust 2.11 Improve organisation within the hospital 2.12 Intellectual development of physician-scientist 2.13 Prestigious for the career development of the physician-scientist 2.14 Improve education
3 Research characteristics	3.1 Hard 3.2 Detailed and careful 3.3 Intensive 3.4 Challenging 3.5 Large scaled 3.6 Useful 3.7 Additional obligations 3.8 Unilateral work environment
4 Research topics	4.1 Healthcare 4.2 Prevention 4.3 Organizational
5 Research requirements	5.1 Collaboration 5.2 Finance 5.3 Ethical approval

Themes	Sub-themes
6 Motivating factors	6.1 Personal development 6.2 Acknowledgment or rewards 6.3 Contributing to knowledge or patient care 6.4 Curiosity 6.5 Different fun parts of conducting research 6.6 Variety 6.7 Ability to work independently 6.8 Topic 6.9 Opportunity to network 6.10 Possibilities to conduct research available 6.11 Research orientation 6.12 Collaboration 6.13 Inspiring role models 6.14 Need for extra challenge
7 Demotivating factors	7.1 Content 7.2 Other priorities 7.3 Lack of time 7.4 Mental pressure 7.5 Lack of support 7.6 Inadequate atmosphere or collaboration 7.7 Lack of or disappointing results 7.8 Lack of contribution 7.9 Difficulty 7.10 Gathering and processing of data 7.11 Statistics 7.12 Less attractive than clinical practice 7.13 Lack of autonomy 7.14 Misfit with personality

## Appendix C: Questionnaire used within our studies

Students received the instruction to score items on a 7-point Likert scale, defined as:

1 'totally disagree' – 7 'totally agree'.

### Intrinsic motivation for research

1. Doing research is interesting
2. Doing research is fun
3. Doing research is challenging
4. I like solving puzzles and problems
5. I am able to develop myself by doing research

### Extrinsic motivation for research

6. I think that doing research is useful for my resume
7. I think that doing research could help me to distinguish myself from others
8. I think that doing research could help me to get a good job in the future
9. I think that doing research improves my chances for my preferred residency spot

### Research self-efficacy

10. I feel I am good in doing research
11. I feel I am competent enough to do research
12. I feel I master the skills to do research

### Perceptions of research

13. It is important for medical professionals to have scientific skills
14. A scientific educational programme is important for me
15. I enjoy the attention paid to science in this educational programme
16. Medical education should be scientific
17. A doctor should be able to independently do research

### Curiosity

18. I enjoy exploring new ideas
19. Difficult conceptual problems can keep me awake all night thinking about solutions
20. I enjoy learning about subjects that are unfamiliar to me
21. I can spend hours on a single problem because I just can't rest without knowing the answer



- 22. I find it fascinating to learn new information
- 23. I feel frustrated if I can't figure out the solution to a problem, so I work even harder to solve it
- 24. When I learn something new, I would like to find out more about it
- 25. I brood for a long time in an attempt to solve some fundamental problem
- 26. I enjoy discussing abstract concepts
- 27. I work like a fiend at problems that I feel must be solved

