

Encouraging primary care research: evaluation of a one-year, doctoral clinical epidemiology research course

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ABSTRACT

Objective: Research and PhDs are relatively rare in family medicine and primary care. To promote research, regular one-year research courses for primary care professionals with a focus on clinical epidemiology were started. This study explores the academic outcomes of the first four cohorts of research courses and surveys the participants' perspectives on the research course. **Design:** An electronic survey was sent to the research course participants. All peer-reviewed scientific papers published by these students were retrieved by literature searches in PubMed. **Setting:** Primary care in Finland. **Subjects:** A total of 46 research course participants who had finished the research courses between 2007 and 2012. **Results:** Of the 46 participants 29 were physicians, eight nurses, three dentists, four physiotherapists, and two nutritionists. By the end of 2014, 28 of the 46 participants (61%) had published 79 papers indexed in PubMed and seven students (15%) had completed a PhD. The participants stated that the course taught them critical thinking, and provided basic research knowledge, inspiration, and fruitful networks for research. **Conclusion:** A one-year, multi-professional, clinical epidemiology based research course appeared to be successful in encouraging primary care research as measured by research publications and networking. Activating teaching methods, encouraging focus on own research planning, and support from peers and tutors helped the participants to embark on research projects that resulted in PhDs for 15% of the participants.

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KEY POINTS

- Clinical research and PhDs are rare in primary care in Finland, which has consequences for the development of the discipline and for the availability of clinical lecturers at the universities.
- A clinical epidemiology oriented, one-year research course increased the activity in primary care research. Focus on own research planning and learning the challenges of research with peers appeared to enhance the success of a doctoral research course.
- A doctoral research course encouraged networking, and the course collaboration sometimes led to paper co-authoring.
- In the Nordic countries, the primary care health professionals are used to working in multi-professional teams. A multi-professional strategy also seems fruitful in doctoral research education.

Background

Clinical research is in global decline,[1] which has consequences for clinical practice and for the availability of clinical lecturers at the universities. In the Nordic countries there have been efforts to increase primary care research.[2,3] Primary care and family medicine have been practised for a long time; however, the academic discipline is still young and lacks traditions.[4] In the current world, specialized medicine develops

rapidly and health care becomes increasingly costly. Strong and sound general practice is needed for the coordination of health care of people of all ages.[5]

In Finland, the primary care system is well developed. However, research has not been among its stated tasks until 2011, when multi-professional research became an activity for health centres in the updated Health Care Act. So far, the five general practice university departments have been responsible for primary care research.

Nevertheless, undergraduate teaching tends to fill the schedules of teachers, and there have been few PhDs in the field of primary care. Also, since there are no specific research institutes for general practice in Finland, funding is scarce and general practice has challenges in creating competitive grant applications.

At the University of Helsinki, in 2007, we set out an endeavour to encourage primary care research. We searched for models of doctoral research schools that might suit primary care researchers, general practitioners (GPs), and other health professionals. An example was found in the city of Pori, where there has been active primary care research collaboration.[6] A health services research course at McMaster University, Canada, where the first author (HL) participated, served as an example for the course described in this study.

We started the primary care research course at the University of Helsinki in the autumn of 2007. Each course consisted of 12 teaching modules with between-session assignments and a four-hour, half-day seminar. The aim of the course was to help the participants plan a research proposal, which they presented in the closing session of the course for an English-speaking opponent. Since primary care in Finland covers other allied health professionals – nurses, dentists, physiotherapists, and psychologists in addition to GPs – we applied a broad definition of primary care and welcomed all primary care professionals to the course.

The aim of this study was to assess the academic outcomes of the first four primary care research courses, which were conducted in the period 2007–2012, and to present our method of postgraduate research education for primary care researchers.

Material and methods

Description of the research course

The research course was planned to support those primary care researchers who aimed at embarking on a PhD project in the catchment area of Helsinki University. The specific aims were to teach clinical epidemiology research skills to potential primary care researchers and to help them network. The course spanned a one-year period, with three-week intervals between the modules and a longer break for Christmas and summer holidays. Since the demand for doctoral research teaching in the area was limited we took a half-year break between the courses to recruit new students. The second course, therefore, started in January 2009, the third in August 2010, and the fourth in January 2012.

Before commencing the first research course in 2007, we contacted all primary care physician managers in the Helsinki University catchment area, senior researchers

that we knew were active in research, and also invited their PhD students to participate. The programme of the research course was available on the university web pages but it was not otherwise actively marketed. The teachers at the course included the professor of general practice (KP), an adjunct professor of general practice (HL), and a third tutor with a PhD. KP and HL tutored all courses and the third tutor varied according to availability.

We developed teaching modules that we expected to help the students to build their critical thinking and understanding of research methods (Table 1). This system was influenced by the teaching of research methods at McMaster University, and for most of the modules we added readings by the evidence-based medicine discipline from McMaster.[7] Each teaching module consisted of 3–5 research papers focusing on basic issues of clinical epidemiology, a problem-based scenario, and assignments that encouraged setting minds toward research planning. The aims of each teaching module are presented in detail in Table 1.

Lecturing was performed as little as possible. The teaching was based on appraising the research papers of each module and on discussions of the progress of the participants' research plans. Each session was planned so that half of the time was spent on the articles and the assignments and the other half on the students' own research planning. From the very beginning the students were encouraged to bring up their research ideas, discuss them, and give and receive feedback on how to improve the design and planning. Every effort was made to foster an atmosphere that was encouraging, supportive, and positive.

Assessment

Since our aim was to expand primary care research, early on we decided to follow up the scientific papers and PhD theses written by the course participants. We also asked for feedback from the students mid-course and at the end of the course on the contents and teaching methods of the courses and used this information to improve the teaching modules. After the four first cohorts of research courses, we designed an electronic follow-up survey for the participants and made a PubMed search to evaluate the outcomes of the first four research courses. We piloted the survey, which covered an assessment of possible motivations for research as well as an evaluation of the research school components, both on a scale from 0 = not important at all to 5 = very important. We also included open-ended questions on the progress of the research work and on the participants' motivation for research.

In January 2014, we sent the survey to all those research course participants who had finished the course between 2007 and 2012. The follow-up period was short,

Table 1. Topics and aims of the 12 modules of the research course.

Topic	Aims
1. Approaches to health care research	<ul style="list-style-type: none"> To understand what health means to different stakeholders: patients, clinicians, health policy-makers To learn how the approach to research and selection of study design depends on the research question
2. Research question	<ul style="list-style-type: none"> To learn how to formulate research questions To use the PICO (patient, intervention, control, outcome) thinking in research question formulation
3. Systematic reviews	<ul style="list-style-type: none"> To learn the process of conducting a systematic review To understand the purpose of systematic reviewing and whether a systematic review might fit into your research work
4. Planning and designing a study	<ul style="list-style-type: none"> To learn about different clinical study designs: <ul style="list-style-type: none"> (a) randomized clinical trials (b) cohort and case-control designs (c) qualitative methods (d) evaluation of diagnostic test properties. To learn the strengths and weaknesses of different designs To learn to apply different designs
5. Sampling	<ul style="list-style-type: none"> To learn about sampling methods in quantitative and qualitative studies To understand the concepts of internal and external validity and their importance in deciding on sampling strategies To understand the strengths and weaknesses of different sampling methods
6. Measurements	<ul style="list-style-type: none"> To learn how to choose outcome measures Strengths and weaknesses of outcome measures
7. Burden of disease	<ul style="list-style-type: none"> To learn basic epidemiological terms such as prevalence, incidence, mortality, case fatality rate, adjustment To learn to describe the burden of disease To be able to calculate and interpret measures of disease frequency
8. Interventions	<ul style="list-style-type: none"> To learn the basics of studying interventions To understand the meaning of effectiveness and how to measure it To understand the strengths and weaknesses of controlled trials
9. Causalities	<ul style="list-style-type: none"> To understand the challenges of studying causation, that association does not imply causation, and how to study risk factors To understand the difference between strength of an association and its statistical significance
10. Diagnostic studies	<ul style="list-style-type: none"> To learn about the rational use of diagnostic and screening tests To understand the clinical usefulness of diagnostic or screening tests
11. Health technology assessment	<ul style="list-style-type: none"> To learn about health technology assessment and the way it utilizes different research approaches on a health care method
12. Closing	<ul style="list-style-type: none"> To present your own research to an external reviewer To learn to join an academic discussion

as health care professionals normally continue their clinical work along with their research and finalizing a PhD takes them more than four years, which is the ideal in Finland. Two reminders were sent for those who did not respond to the survey during 2014. We did descriptive thematic analysis for the open-ended answers concerning the individual motivators for primary care research.

We explored PubMed and tracked all peer-reviewed publications written by the research course participants. Since it was not feasible to plan a controlled study, for background we tracked down all PhDs in general practice departments between the years 2000 and 2014 in Finland and present the data. We searched PubMed during 2007–2014 using the last names and initials of the research course participants to objectively

assess the academic outcomes: the peer-reviewed publications the students had published. Since researchers with the same names had also published papers, from the names of the co-authors and institutions we ascertained that the authors were in fact those attending the research course, and that the course participant had collaborated and co-authored papers; in the calculation of papers we included co-authored papers only once.

Since our study lacked a control group we collected information for a comparison group consisting of all PhDs defended within the discipline of general practice or at the Departments of General Practice or Primary Care in Finland between 2000 and 2014. We searched dissertations from the websites of the five universities with medical faculties in Finland, from our personal networks, and by assessing the articles presenting PhD dissertations in the *Yleislääkäri* (general practitioner journal). The National Supervisory Authority for Welfare and Health's registry revealed if the PhD defendants were registered as health professionals in Finland, and recorded their occupation, specialization, and birth year (<http://www.valvira.fi>).

Results

Trends in PhD theses in Finnish primary care 2000–2014

For the comparison group, we were able to track 104 PhD theses in the discipline of general practice or at the

Table 2. PhDs in the field of primary health care in Finland between 2000 and 2014.

	All (n = 104) n (%)
Women	62 (65)
Mean age at defence	47.4 (range 29–71 years)
Medical doctors	69 (66)
GPs	52 (50)
Geriatricians	3 (3)
Other specialists	8 (8)
Non specialists	6 (6)
Nurses	15 (14.5)
Physiotherapists	2 (2)
Dentists	4 (4)
Psychologists	1 (1)
MSc, not registered as health care professional	13 (12.5)
University of Helsinki	36 (35)
University of Turku	18 (17.5)
University of Tampere	22 (21)
University of Eastern Finland	13 (12.5)
University of Oulu	15 (14.5)

Departments of General Practice or Primary Care in Finland between 2000 and 2014 (Table 2). There were on average seven primary care dissertations per year in all Finnish universities (range 1 to 13). At the University of Helsinki, there was an increasing trend: 13 PhDs between 2000 and 2006, and 23 between 2007 and 2014. Of all the primary care PhDs, 52 (50%) were written by specialists in general practice, on average 3.5 per year. Two-thirds of the PhD candidates were women and their average age at the time of dissertation was 47.4 years (Table 2).

Research course participants

Altogether 46 potential primary care researchers finished the four first primary care research courses at Helsinki University (Table 3). Of these, 36 answered the electronic survey; hence the response rate was 78%. The mean age of the participants at the onset of the course was 46 years (range 28 to 66 years). Nine students (20%) were men. A total of 29 students (63%) were physicians, eight (17%) had a degree in nursing sciences, three were dentists and physiotherapists, and two were nutritionists. Of the physicians, 21 were general practitioners; four were specialists in occupational health, two in geriatrics, one in gynaecology, and one in radiology. Most participants were involved full time in clinical and/or teaching jobs and were able to commit less than 20% of their working time towards research work. Only a few participants had previous research experience, and more than 80% were new beginners in research.

What motivates entry into primary care research?

The research course attendants expressed both internal and external factors that motivated them to engage in research (Table 4). We categorized the open-ended answers and recognized five main themes in the motivation for research: personal and professional growth, curiosity to know more and produce new knowledge, a counterbalance to clinical work, a tempting opportunity, and an external inspiration.

Many respondents explained that they had thought about research for a long time but had lacked the opportunities. Encouragement from a supervisor or a

Table 3. Characteristics of the research course participant 2007 to 2012.

Cohort	Women, n	GPs, n	PhDs by 2014, n (year)	Total number of publications by 2014
Year 2007, n = 11	7	8	4 (2012, 2013, 2014, 2014)	25
Year 2009, n = 11	10	3	1 (2014)	22
Year 2010, n = 13	12	5	2 (2012, 2014)	19
Year 2012, n = 11	8	4	–	13
All, n = 46	37	20	7	79

Table 4. Open answers of the research course participants to question: "How did you get interested in research?"

Theme	Citations
Personal and professional growth	"My career has been about development and projects. Studying and research give good and interesting support to that."
Curiosity to know more and produce new knowledge	"I haven't done research or published anything but I think research stimulates my thinking and refreshes me. Maybe I will still publish something when I have time."
	"Research was a gate for me to the university teaching jobs."
	"Hard to say. Research has always interested me, however it wasn't possible until now."
	"I had a motivation to go deeper into things."
As a counterbalance to clinical work	"Because of my daily work. There was not enough research evidence in my topic of interest."
	"I'd like to perform cost-effective and evidence-based medicine and develop methods to assess the quality and effectiveness of my work."
	"During the studies of physiotherapy I realized how little we truly know of things."
A tempting opportunity	"As a counterbalance to the daily work. I wanted to know deeper why and how."
	"I think research and clinical work complement each other."
External inspiration	"At the workplace there was a suitable project and my boss encouraged me."
	"An inspiring opportunity at the workplace and previous interest."
	"During one PhD celebration party I got an offer of a topic."
External inspiration	"I found an inspiring supervisor."
	"Because of the example of my supervisor and the interest that aroused in clinical work."
	"The research work of my spouse and friends inspired me."

research mentor was a strong factor to pursue research. Often they had a research interest taken from their everyday clinical practice.

In the survey, we also asked the respondents to assess on a scale from 0 to 5 seven potential sources of motivation. Interesting research topic, general interest or curiosity to learn new things, and an inspiring supervisor were among the highest rated sources of motivation (Figure 1). Interests to proceed in career and work as a researcher were less important motivators for the survey respondents.

Participants' assessment of the research course

Generally, participants considered the research course helpful, especially in building their critical thinking and in gaining inspiration and networks for research. We surveyed different aspects of the research course on a scale from 0 to 5 (Figure 2). The students gave highest scores on working with the own research plan, on research designs, and scopes to research planning. The role of course tutors was also highly appreciated.

Academic outcomes

By the end of 2014, the research course participants had been involved in publishing 79 peer-reviewed papers that were indexed in PubMed, and altogether 28 of the 46 participants (61%) had been involved in publishing papers. The participants had also collaborated: in 16 papers (20%) two research course participants were authors. A total of seven students (15%) had defended their PhD theses by the end of 2014. Of them, three were GPs, three nurses, and one a physiotherapist, mean age 43 years.

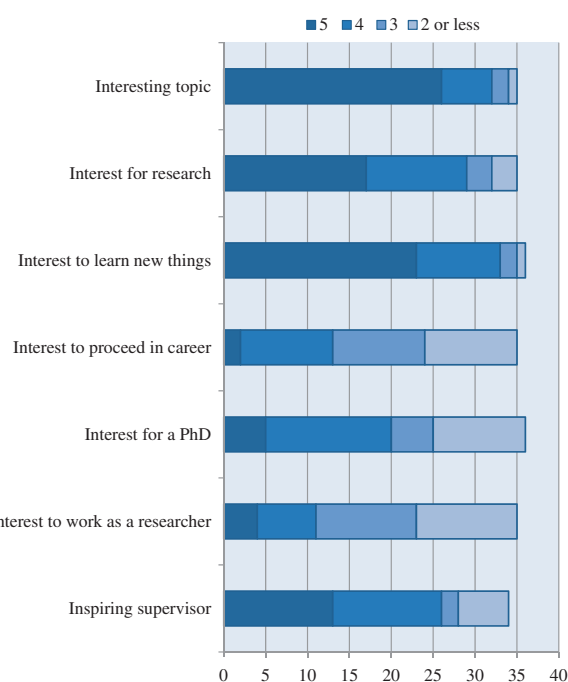


Figure 1. Survey responses to possible motivations for research on a scale from 0 to 5, with 0 = not important at all and 5 = very important.

The published papers covered a variety of health care topics, e.g. clinical aspects on the care of older people, several randomized trials on interventions such as exercise or nutritional interventions, and studies on uncertainty in general practice and on guidelines implementation. The papers had been published in 47 different scientific journals. Figure 3 presents the research course participants and those who defended their theses per the cohort of research course that they attended. By the end of 2014, there were students in the first three research courses who had defended their PhD

thesis. Six of the participants of the latest 2012 course had also succeeded in publishing papers although none of them had yet defended their PhD thesis.

Discussion

A one-year, multi-professional, clinical epidemiology based research course was successful in encouraging

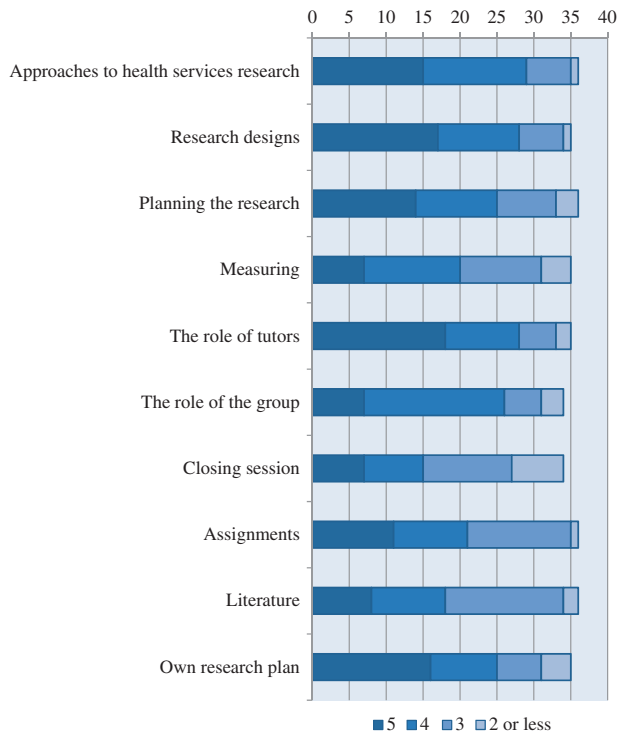


Figure 2. Survey responses: assessment of different components of the research course on a scale from 0 to 5, with 0 = not important at all and 5 = very important.

primary care research. Basic teaching of clinical epidemiology, activating teaching methods, focus on the individual research plan, and an opportunity to learn with peers helped the participants to pursue their plans and embark on a research project. The participant cohorts in our study had finished the research course two to six years before the assessment. Of the participants, 61% had become active researchers publishing papers with the aim of achieving a PhD, and seven (15%) reached that goal.

In Sweden, Professor Anders Håkansson was a pioneer of general practice research. From the University of Lund in southern Sweden he had disseminated research method courses in primary care since 1989.[8,9] He succeeded with two goals: first, in providing fundamental research knowledge for 20% of general practitioners in southern Sweden, and second, in increasing the number of PhD students in primary care. Håkansson had a broader strategy than we had by targeting all general practitioners. Nevertheless, with a narrower scope and rather limited resources, we were able to proliferate primary care research in southern Finland.

The outcome of 79 PubMed peer reviewed research papers and seven PhDs during on average four years shows that the course was feasible and scientifically significant.

Many obstacles hamper primary care research, such as lack of research cultures,[10,11] lack of funding. Ideally, a PhD should take four years. However, considering that nearly all worked full time while pursuing their PhD, we consider this a success and expect several more PhDs to be finished during the coming years. We also plan to

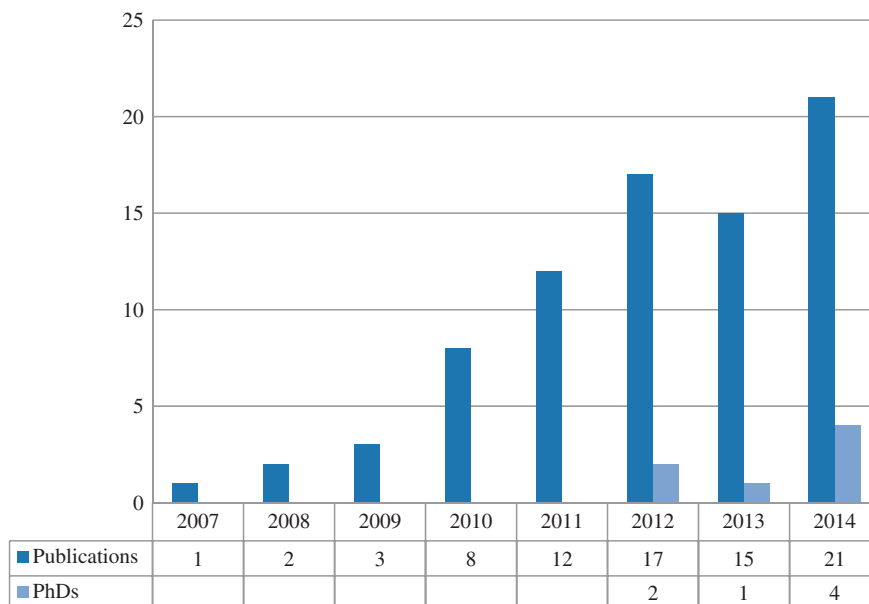


Figure 3. Number of published papers and PhDs by the research course participants by year, 2007–2014.

continue following up these groups of primary care researchers.

There are some previous reports on general practice research training, reporting the development of skills [12] and attitudes,[13,14] but to our knowledge, ours is the first reporting the academic outcomes.

The strength of this study is that it evaluates a real-life experiment in boosting primary care research by a concise doctoral course. Other educators can benefit from the teachings of our experiment. A weakness is that we did not have a control group and we cannot say how many participants would have become successful researchers without our course. Our follow-up survey was not anonymous, which may have prevented some participants from answering. Since some had already finished the course years ago, a thorough evaluation of the course was not possible and we put our focus on the objective, academic outcomes and on participants' views on research interests, motivation, and course elements that they found useful.

On the basis of our study, we cannot judge the relative impact of the research course in relation to other factors in the research achievements of the participants such as the quality of supervision, resources for research, grants, and opportunities to modify workplace demands and do less clinical work in order to pursue research. The research students in our study put great emphasis on encouragement and supervision in their survey responses, the quality of which certainly is a crucial issue. Many of the seven already finalized PhDs belonged to successful research networks focusing on older people's care issues in primary care.

The participants of the research course were often experienced specialists in family medicine or in other disciplines of primary care. They had hoped to become involved in research earlier in their careers but had lacked opportunities or encouragement to carry out a research project. These mature researchers are often highly motivated; alas, their future academic careers are limited in time. Better support for clinical research is needed in order to encourage primary care academics to start postgraduate studies earlier in life.

A research course appeared to be a good way to network. Surprisingly, collaboration that developed during the course ended up in the co-authoring of papers by people who did not know each other before the course. Supervision of PhD work is often done between the student and the supervisor. In our experience, at least part of the doctoral education can be done more effectively in a multi-professional group of researchers. It may also be a step towards primary care research networks, which are needed to support primary care clinical research.[15,16] The positive experience

with the research course has made it a continuing part of the postgraduate medical curriculum at the University of Helsinki.

Conclusions

In conclusion, a research course that provides basic research-methods education and focuses on the planning of individual research interests appears to be successful in encouraging primary care research. In our experience, focus on one's own research planning was an essential part of the learning. The multi-professional working method brought additional knowledge and insights to the education and helped in forming fruitful collaborative networks.

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Disclosure statement

All authors are university general practice lectures. They have all acted in the research course either as tutors (HL, KP, TK) or as an opponent (HT).

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