

Motivating and educating health professionals to work in less attractive specialties

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**Motivating and educating health professionals
to work in less attractive specialties:
*Findings from Vietnam***



NGUYEN THI VAN ANH

**Motivating and educating health professionals to work in less attractive specialties:
Findings from Vietnam**

The research reported here was carried out at:



Maastricht University



Maastricht UMC+

in the School of Health Professions Education



**School of
Health Professions
Education**

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**MOTIVATING AND EDUCATING
HEALTH PROFESSIONALS TO WORK
IN LESS ATTRACTIVE SPECIALTIES:
FINDINGS FROM VIETNAM**

DISSERTATION

To obtain the degree of Doctor at Maastricht University,
on the authority of the Rector Magnificus,
Prof. Dr. Rianne M. Letschert
in accordance with the decision of the Board of Deans,
to be defended in public
on Tuesday 2nd November 2021 at 10.00 hours
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CHAPTER I

General Introduction

Shortage of qualified healthcare workers is an issue that needs urgent attention in many countries. A WHO report in 2016 [1] revealed that the world will be short of 17.4 million healthcare workers by 2030; and the largest shortages of healthcare workers are in South-East Asia at 6.9 million and in Africa at 4.2 million. A common picture in countries in these regions is that doctors and nurses have to attend to hundreds of patients daily in busy hospitals or health centers, and therefore, health care quality cannot be assured. The main cause of shortage in developing countries is insufficient capacity of healthcare workers due to lack of capacity of the education system and limited infrastructure and equipment [2,3]. The mal-distribution of healthcare workers among different geographical and economical areas leads to the paradox of unemployment coexisting with unmet needs. This is the case where medical graduates try to hold on to a position in big cities while health centers in the community are still desperate for skilled healthcare workers [4,5]. Moreover, the migration of healthcare workers from low to higher income countries is also increasing as the health workforce in the latter countries itself is ageing, which in turn leads to retirement rates being high and replacement rates being low [6,7].

Within the overall situation of health worker shortage, current supply of healthcare workers in primary care specialties and in specialties that provide preventive care services in the community, despite their important role in healthcare systems, does not meet needs while demands are particularly acute [8]. For example, in the United States, only 12% of doctors are generalists (i.e. general practitioners, family doctors and other non-specialist medical practitioners) [9]. Meanwhile, in developing countries, professionals in many important occupations in primary healthcare are less available than needed [10-12]. The insufficient healthcare workforce weakens the preventive system, puts a higher burden on hospitals and curative systems, especially during massive crises caused by epidemics such as HIV/AIDS [13] or the Covid-19 pandemic recently [14].

As primary and preventive care receives less attention than it deserves [15,16], consequently, the career of a primary care and preventive healthcare worker is not held in very high regard [17,18]. In comparison with clinical specialties of “high prestige”, these Less Attractive Specialties (LASs) are struggling to recruit students and to retain graduates and doctors to work in the field [19,20]. As medical education has an important effect on specialty choice of students and graduates [21,22], interventions in education could be a potential solution for the problem of health worker shortage in LASs. In order to address the challenge in LASs health worker shortage, this Thesis focuses on studying the career motivation across the spectrum of a specific LAS program, Preventive Medicine (PM), including students, graduates, and practicing doctors. It aims to contribute to the theory development of motivating PM students and graduates to choose LASs as a career, and to develop guidelines of how education can help to decrease the shortage in LASs.

In this General Introduction chapter, first, the literature on career choice and perception of specialty by students in health professions will be briefly discussed. Next, the picture of the preventive care system, the medical education system, and the policies of a developing country,

Vietnam, in addressing the shortage of human resources in preventive care will be introduced. Subsequently, a preview of the needs-based theories of motivation that were used as a theoretical framework for the studies in this Thesis will be presented. Finally, an overview of the dissertation will be presented to describe the research questions and how their answers will contribute to the main goal of the reported PhD project, the preview of each chapter, as well as the matching between the research questions and the corresponding studies and chapters.

1.1 CAREER CHOICES IN HEALTH PROFESSIONS AND THE ROLE OF PERCEPTIONS OF SPECIALTIES

There are fewer medical students choosing LASs than other specialties and this tendency has been reported both in developed [16,18] and developing countries [12,20]. Interest in a career in primary care specialties and specialties that provide preventive care services in the community is declining among students [23,24]. Moreover, students who express their initial preference to LASs in their first year are more likely to change their mind not to choose LASs in the clinical phase or senior year, which may be explained by students' exposure to clinical work and their desire to have a high-prestige career [17,25]. The lack of ambition to pursue a career in LASs is not only manifested among students but also among graduates [26]. Several studies [27,28] revealed the demotivating factors that might impact the retention of physicians in LASs in low-and middle- income countries, such as: low salaries, fewer opportunities for career development, poor infrastructure and resources, and difficult working conditions. Intrinsic factors, such as love for the work or "being useful to society and taking care of people" have also been noted as a motivation for LASs healthcare workers to stay in the fields [29]. In contrast, demotivating factors of working in LASs in high-income countries seem to be more often related to professional isolation, social separation from family and friends, and lack of post-graduate training [30,32].

According to the Bland model of career choice, medical students' career choice is a process resulting from a combination of student characteristics, preferences and values, their perception of the characteristics of a specialty, their expected future career needs, and characteristics of the educational program that they are in [21]. This process is affected by student characteristics such as gender, geographical and socio-economic background, parental profession and personality, as well as characteristics of educational programs such as types of schools, missions, admission and curriculum structures. The Bland model also mentions the importance of perception of the specialty's characteristics as well as future career needs of students and graduates in career choice, and these dimensions were also emphasized and extended in a qualitative study by Querido et al. [32]. In the framework of Querido et al., the theme of Perception of the specialty's characteristics has several sub-themes such as: medical students' experience with the specialty before and during training courses; information about the specialty from the society's view and from student-initiated information collection during training courses, and finally, the market

dynamics of the specialty or the chance to obtain a residency position. Expected future career needs include sub-themes such as: personal needs of working conditions, type of practice, work-life balance and career development; social needs or altruism; and content interest needs such as colleagues' characteristics, types of patients, or intellectual satisfaction.

The connections between these four components and career choices of medical students and graduates in the Bland model and in Querido et al.'s study are used as the theoretical framework in this Thesis (Figure 1.1).

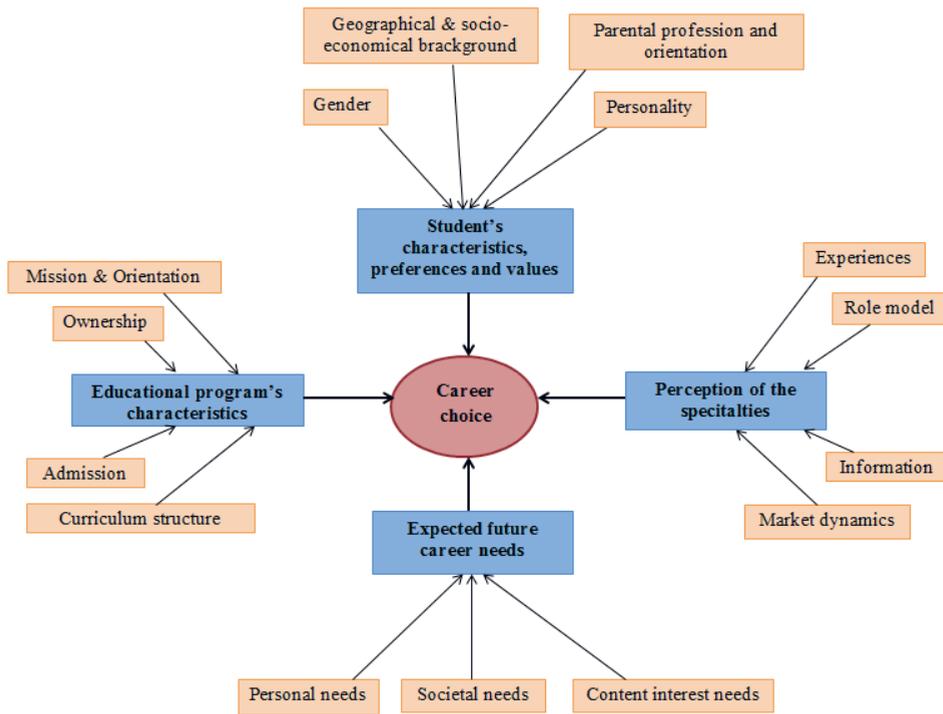


Figure 1.1: Theoretical framework of career choice (adapted from Bland's model and Querido's study)

The literature under the lens of this framework showed that female students have a higher preference for LASs, such as community medicine or family medicine, than their male counterparts [17,25,33]. Students from rural areas (i.e., students of rural origin, grown up in a rural area, or having family who live in a rural area) are more likely to enter practice in the community than those from urban areas [25,34]. Students who have parents working as primary care physicians are more likely to follow their parents' career path [33]. However, several other studies also observed that students who have physician relatives are less likely to practice in underserved communities or enter into a primary care specialty [35,36], and some studies did not even find the association of

this factor in students' career preference of LASs [37]. Therefore, the impact of parental/relative profession and orientation on students' career preference of LASs is not clear yet.

In terms of educational programs, previous studies showed an association between characteristics of medical schools such as ownership (i.e., private or public), admission and curriculum structure, and the number of LASs graduates. For example, students from public medical schools are more likely to pursue a career in primary care than those from private schools [38,39]. Educational institutions which have admission policies favoring the recruitment of students with a rural background or stressing the community-based orientation in the training curriculum produce more primary care graduates [5,40,41]. However, because these studies were conducted among medical students in general to investigate their preference of LASs in final years, it is not known how the characteristics of educational programs will affect career choices of students who have different preferences for a LAS and choose to study a LAS from the beginning until their graduation.

There are studies suggesting the lack of information about LASs as a possible explanation for the reduction of interest in these fields [24,42]. Together with the influence of public perception of LASs as low prestige specialties in medicine [43,44], the misconception of students may lead to their negative attitude toward LASs [45-47]. The gap in students' knowledge of LASs characteristics is becoming gradually smaller with the year of study [45,48] and with experiences with early exposure to practice in the curriculum [49-51]. Although several studies showed an association between students' preferences with their perceptions of a specific specialty [33,34], other authors stated that students' preferences are not always related to their actual knowledge of the specialty [24,45]. Therefore, the association between perception of LASs with the preference of students for these specialties is not clear. In addition, many studies pointed out the influences of increasing early exposure to LASs training at undergraduate level on students' consideration of a career in LASs [50-53]. It is relevant to look further into these suggested findings in a setting where students are trained in a LAS right from the undergraduate level.

Medical students' and graduates' choice of specialty is associated with their needs in the expected future career, and the choice of LASs is no exception. For example, students who have low income expectations and do not plan for a research career are less concerned about prestige, and are more likely to enter into LASs [39,47]. They also prefer a lifestyle-friendly specialty [43,54] and they value the wish to help people [55] or for social commitment [56,57]. Previous studies also reported the trend away from LASs among medical students and graduates as a consequence of misperceptions about marketplace reforms [58], professional development [28] and continuing medical education in LASs [27].

Right from the beginning, enrolling appropriate students who have strong motivation to study LASs is essential [38,59]. It is thus necessary to investigate how students in LASs choose their study, whether they are happy with their choice, whether their knowledge about LASs is accurate, what their future career expectations are, and how information can be provided as an effective method to cultivate their interest and develop their commitment to the specialties, even after graduation.

1.2. PREVENTIVE MEDICAL EDUCATION IN VIETNAM

In Vietnam, although the practice of public health activities has a long history in Vietnamese traditional medicine, the training of preventive medicine and public health sciences are relatively new [60]. Before 1975, the practice of public health activities was the result of the French colonial period and linked with the development of the first aid health system during the Vietnam War. After the War, public health training was started with only two disciplines in medical universities, namely, Hygiene & Epidemiology and Health Organization (or Social Medicine). Not until 1989 was the first Faculty of Public Health established within Hanoi Medical University to train public health professionals who would carry out the extensive public health activities such as hygiene, immunization, and clean water programs [60]. At that time, medical students made their decision of specialty choice in their fifth year (such as Pediatrics, Traditional medicine, Infectious disease, Hygiene & Epidemiology, etc.) and not many of them chose the specialty of Hygiene & Epidemiology. In order to increase the number of healthcare workers in the preventive healthcare system, in parallel with the training program in Public Health at postgraduate level, such as Master of Public Health or in-service training of Hygiene & Epidemiology, several medical universities started to train students in public health at the undergraduate level. These training programs started in 1999, recruiting students from high school, and leading to a Bachelor of Public Health (BPH) degree. These efforts provided a workforce of about 1,500 healthcare workers who have the degree of BPH or higher by 2013 [61].

However, the number of healthcare workers in the preventive healthcare system in Vietnam is still very low. Specifically, there were a total of about 16,500 healthcare workers in 2009, this number increased only by 3.5% (17,100 staff) in 2011, and it only met 42% of the demand for the human resource in the nation-wide preventive healthcare system [62]. In addition, among all the staff working in preventive healthcare centers, the primary institutions responsible for providing preventive healthcare services, only 15% had either basic or in-service training in epidemiology or public health [63]. Together with the economic and social development, the Vietnamese healthcare system also had to be reformed to be able to face many challenges [64] related to changing disease patterns from maternal and child care and infectious diseases to non-communicable diseases and traffic-related injuries [65], an ageing population, inadequate capacity of the health system and health worker shortages [66]. In that situation, the preventive health system needs more workers who have more medical knowledge than BPH to provide both preventive and curative care services for the community. From 2004, in order to address the problem of not being able to convince medical students and medical doctors to practice Preventive Medicine (PM), a separate curriculum leading to an undergraduate degree in PM was developed. The training program started in 2006, and it aims to provide specialized PM medical staff who will work in preventive medical centers and in the community, and leads to a Doctor of Preventive Medicine degree. In 2007, with the financial support and expertise from the Netherlands, the project “Strengthening Teaching and Research Capacity in Preventive Medicine

in Vietnam” was conducted in eight public medical universities in Vietnam [63]. One of the outcomes of this project was a new preventive medicine curriculum to be developed for the fifth and sixth year students for the academic year of 2009-2010. The project also aimed to build research and teaching capacity for the faculties by providing scholarships for teachers to obtain Master and PhD degrees in Dutch universities, through which this PhD project was funded. This thesis arose from the cooperation between the medical universities in Vietnam and Maastricht University in the Netherlands. This unique PM educational system is a new effort to address the problem of PM worker shortage in Vietnam, a low- to middle-income country. It is important to study how it is working and what could be done to improve the quality of the training program to inform not only future developments in Vietnam but also as a reference for other countries trying to improve public health on limited resources.

In Vietnam, the PM doctors’ task is to carry out all the essential elements of primary health care (health promotion, prevention and curative care) except the rehabilitative services. They can officially work in the community or PM centers at different levels of the healthcare system (national, provincial, district, commune), in hospitals (if they take a post-graduate training course in clinical specialties), research institutes, non-governmental organizations or in medical universities/schools [67]. In fact, PM doctors in Vietnam have to cover both preventive and curative duties; they treat common diseases and have to detect and prevent epidemics in the community as well [67]. This requires them to work mainly in the community or in PM centers and to serve a broad range of people.

Six out of 13 medical universities in Vietnam offer PM training. They recruit students who are either high school graduates for a 6-year track or those already holding a bachelor of science degree (in nursing, public health, medical technology, etc.) for a 4-year track. The regular curriculum lasts for six years, with the first two years focusing on basic sciences and basic medical knowledge and skills, the next two years on clinical clerkship, and the last two years on knowledge and skills related to the PM specialty, while the 4-year track only contains the last four years [3]. According to the current student selection system in Vietnamese universities in general, each applicant can apply for studentship positions in two different specialties. The options are named as “first choice” and “second choice”. Universities will consider and select students on the basis of the applicants’ results in the national exam. Applicants who have their “first choice” rejected elsewhere can still be admitted to a different specialty as “second choice” students, as long as their exam results satisfy the enrollment criteria.

Once graduated, healthcare workers in the Vietnamese countryside and rural areas are also faced with challenges such as low income and allowance, difficult working conditions, no prospect of professional development, heavy workload, and the lack of appreciation for preventive specialties from the community at large [68,69]. In addition, the society seems to hold a prejudice against the PM profession, deeming it secondary in prestige to any clinical/hospital profession [24,69]. As a consequence, general medicine is often the “first choice” for students applying to medical universities and, if they do not succeed, they will choose to study preventive medicine, traditional medicine, nursing, and public health as a second chance to enter medical schools.

There are concerns that medical graduates who have completed the PM curriculum will

eventually not opt for a career in PM, but seek a clinical position after taking postgraduate clinical specialty training [69,70]. This concern is derived from practical observations over the years by senior educators and teachers in the PM and the public health (PH) education in Vietnam. Several studies on PH graduates [70,71] revealed that many PH alumni did not have a clear career orientation upon entering PH schools and even when looking for jobs. For example, about 15% of the alumni who graduated as bachelors of PH are working in curative specialties or pursuing a career in non-medical domains [71]. This situation can happen due to a not well-established medical licensing system [3] as there is no regulation of qualification of healthcare workers through a standard national examination. Although the Law on Examination and Treatment requires a health practitioner to have a licence to practice, the procedure of licensing is rather easy and loose as the applicants only need to provide a confirmation by a healthcare facility that they have been practicing for more than 18 months in the specialty. This scenario potentially can be as bad or even worse in case of PM students, who have some similar types of tasks to PH students but receive more medical training. This would be a waste of resources and is regarded as a warning of potential danger for patients who might be diagnosed and treated by “less than competent” doctors.

In that case, it is important to find out what kinds of students are attracted to study in PM and for what reasons, whether there are differences between students who choose PM as their first or second choice in terms of their perceptions of the specialty, their expectations from future jobs and their final career choice. This information can provide a scaffold for career guidance, training activities and educational intervention of medical schools to improve the quantity and quality of PM graduates. Therefore, to begin understanding how PM education in developing countries can be used to meet the demand for healthcare workers in preventive care, this Thesis investigates the motivation of students and graduates who choose to study and work in preventive medicine in the unique setting of Vietnam.

1.3 MOTIVATION AND NEEDS-BASED THEORIES OF MOTIVATION

Motivation is defined as the goad to action, or more specifically, the psychological processes that cause the arousal, direction and persistence of voluntary actions that lead to goal-directed behavior of an individual [72]. From this definition, we first see that motivation is an individual phenomenon, which means that different people have different needs, expectations, values, attitudes, and goals. Secondly, motivation is a multifaceted concept that includes arousal (the degree to which an individual wants and performs a behavior), direction (choice of behavior), and persistence (maintenance of behavior). In this Thesis, the behavior of choosing and staying to work in LASs has been examined under these two aspects. This is because students, graduates and practicing doctors have specific needs to be satisfied at different stages of their experiences and the various roles they play in life. Novice students have different perspectives about the job they will do in the future while graduates and practicing doctors have different life experiences and work expectations. This diversity leads to different levels of choice to study and work in LASs

and to maintain these choices during the study or the working. Therefore, needs-based theories of motivation were chosen as a framework to conduct studies in this Thesis.

One of the most well-known needs-based theories of motivation is Maslow's Hierarchy of Needs, which is based on the premise that human beings have needs that are structured in hierarchical order [73]. According to Maslow, an individual's needs cannot be fulfilled in life unless all five fundamental elements (i.e., physiological needs, safety needs, social needs, esteem needs, and needs for self-actualization) are met (Figure 1.2, left side). When we have satisfied a lower level of needs, we will look to satisfy the ones in higher levels, and thus, the previous needs no longer serve as a motivator. In this Thesis, Maslow's theory is applied to explain work-related needs in an individual's career, specifically in order to understand the work-related needs of LASs' graduates (Figure 1.2, right side).

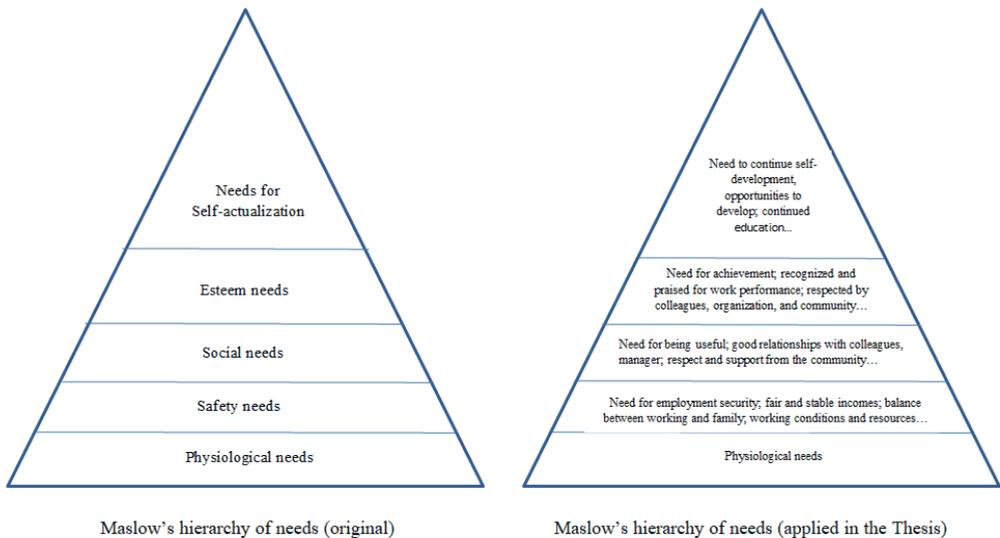


Figure 1.2: Application of Maslow's hierarchy of needs with regards to career choice.

Another theory used in this Thesis to explore the impacts of experiences and roles in life in the career decision of LASs healthcare workers is the Theory of Life Role in Career Development by Donald Super [74]. According to Super, at any stage in life, people can simultaneously take on multiple roles, as a child, a parent, a citizen, a worker, and a homemaker; and increasing the number of roles in one's life may mean less commitment to each of the roles. His Model of Life Span/Life Space [75] is a comprehensive framework to investigate the influences of the important factors on a person as they experience different life stages and changing life roles. Super proposed that people choose occupations and seek career satisfaction through work roles so that they can express themselves and develop their self-concepts. Applying these ideas, the career choice of LASs graduates and doctors is investigated in this Thesis to see whether it is impacted by their duties in many different personal roles they are playing simultaneously, such as the responsibility of taking care of parents, children, and other people, and contributing to community as a responsible citizen.

Among strategies to increase job satisfaction and retention of healthcare workers in LASs, continuing medical education (CME) is mentioned as a potential attractive point for developing countries to motivate LASs doctors to work in the field due to its positive effects on the level of satisfaction and the number of specialist recertification in LASs physicians [76,77]. Self-Determination Theory (SDT) [78], the last needs-based theory of motivation applied in this Thesis, which is often used in the context of medical education [79], is an appropriate framework for studying the effectiveness of CME in motivating LASs health workers. SDT differs from other theories of motivation in that it describes motivation as a spectrum from amotivation (total disengagement), through extrinsic motivation or controlled motivation (people doing an activity under pressure and usually expecting extrinsic rewards to maintain motivation), to intrinsic motivation or autonomous motivation (people engage in an activity because they find it interesting). The theory states that humans have three innate psychological needs: to feel competent, to feel related to others, and to feel autonomous. Intrinsic motivation develops if these needs are satisfied. In this Thesis, SDT is used as the framework to analyze how effective CME activities can provide support to cultivate autonomous motivation of LASs physicians to enter and stay active in the fields by increasing their feeling of relatedness, competence, and autonomy (Figure 1.3). More insights into the application of CME activities as a solution to increase and reinforce the autonomous motivation of practicing doctors to work in LASs are essential to overcome challenges facing countries with poor resources, like Vietnam.

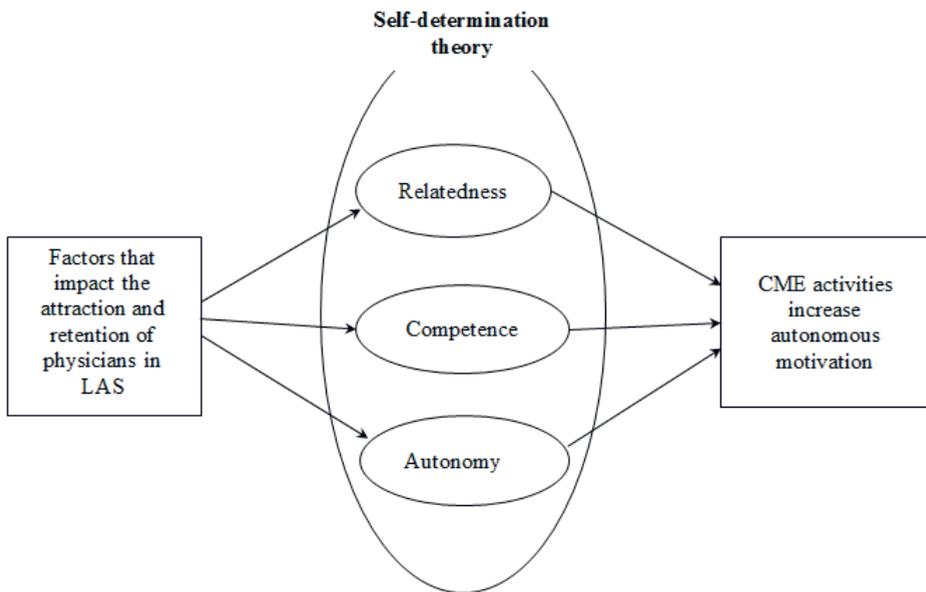


Figure 1.3: Framework visualization of the suggestions under the Self-Determination Theory to conduct effective continuing medical education to address factors that relate to low attraction and retention of LASs.

1.4 THESIS OVERVIEW

The following research questions are addressed in this Thesis:

1. What are the demographic characteristics and career preferences of PM students with PM as first choice and second choice, and which factors are likely to influence their choices?
2. How realistic are students' perceptions of the characteristics of the practice of a PM doctor, and are these perceptions related to their interest in PM or their willingness to work in PM after graduation?
3. What are the reasons related to life roles and motivational factors that lead to PM graduates choosing a PM position and staying in the field?
4. How can CME be designed and implemented to increase physician's motivation to work in LASs?

Figure 1.4 elaborates on how the answers to these four research questions help to reach the main goal of the PhD project.

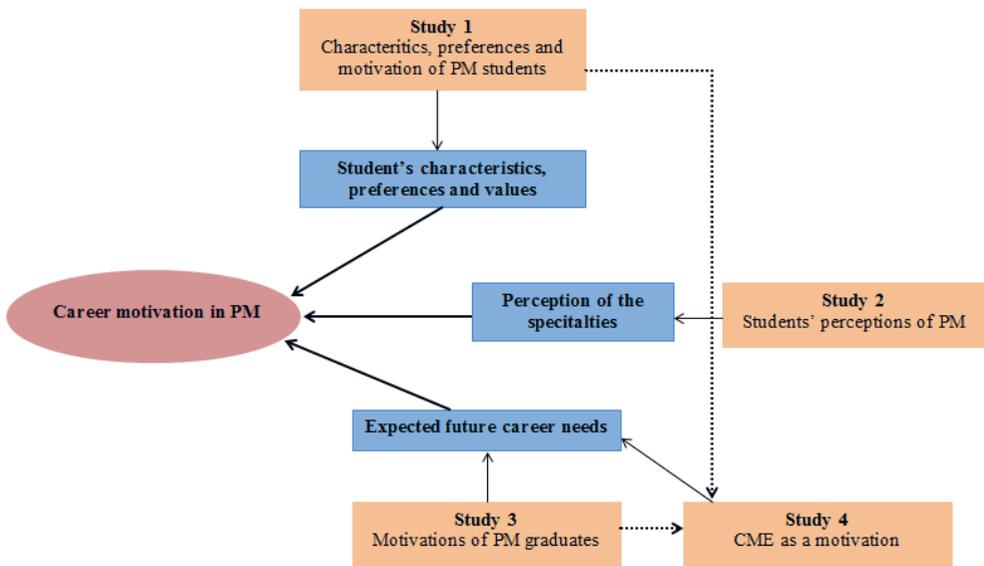


Figure 1.4: Overview of the Thesis

Chapters 2, 3, and 4 answer each of the first three research questions sequentially in the form of empirical studies. These chapters focus on the motivational factors that associate with the choice of PM students and PM graduates. Chapter 5 answers the last research question in the form of a position paper which focuses on developing a practical guideline to make use of CME as a solution

to increase physician's motivation to work in LAS. The answers to the four questions would help to provide information about the factors that motivate students, graduates and practicing doctors to choose PM as their career. This information would contribute in laying the basis for proper educational interventions to address the problem of health worker shortage in similar LASs. Summary of the studies' content in this Thesis is presented in Table I.1.

Table I.1: Summary of the chapters

Chapter	Purpose	Kind of study	Participants	Study instrument	Methods
2	Investigating the motivation of PM students	Cross-sectional study Onsite survey	1386 PM students	A 33-item questionnaire	Descriptive analysis with χ^2 test
3	Investigating the perceptions of PM in PM students	Cross-sectional study Onsite survey	1386 PM students 101 practicing PM doctors	A 41-item questionnaire	Descriptive analysis with t-test and ANOVA
4	Investigating the motivation of PM graduates	Cross-sectional study Online survey	Cohort of 167 PM graduates	A 89-item questionnaire	Multiple regression analyses
5	Developing a guideline for designing and organizing CME	Position paper			Narrative literature review

The first study is presented in Chapter 2, which answers the first research question about the differences between two groups of students for whom PM was their first choice or second choice. In this chapter, a cross-sectional study was conducted involving 1386 PM students from four medical schools in the North of Vietnam. The study participants were referred to as first-choice and second-choice students depending on their preference for PM when entering into medical schools. The study instrument was a structured, written questionnaire which consisted of 33 items in order to investigate the basic personal socio-demographic data of the PM students, their reasons for choosing to study PM, their preferences for PM during the academic course, and their expected career path following graduation.

Chapter 3 answers the second research question by investigating the differences in perceptions of PM specialty of students from PM practicing doctors. Together with the students who were already involved in the first study, 101 practicing PM doctors working in Hanoi were invited to participate in the study. They answered a 41-item questionnaire about six groups of characteristics of the medical professions, and indicated to which degree they think the listed characteristics apply to a PM doctor's daily practice.

Chapter 4 answers the third research question by conducting a cross-sectional study involving 167 graduates who are qualified as PM doctors from a Vietnamese medical school. Based on the theoretical framework developed by combining Maslow's Hierarchy of Needs and Super's Theory

of Life Role in Career Development, an 89-item online questionnaire was sent to the participants. The questionnaire's content focused on investigating the motivation and continuation in PM of the graduates, the major life roles that they were playing, and their satisfaction with their job. These data enabled us to identify which life roles and motivational factors were related to the decision of the graduates to take a PM position and to stay in the specialty, and whether these factors were associated with gender or the preference for PM.

Chapter 5 is a positional paper which addresses the last research question by reviewing the literature related to the use of CME in motivating LASs physicians. Under the light of the Self-Determination Theory, a set of guidelines was developed for designing and organizing CME in such a way that it can help to attract and retain physicians in LASs. For each of the suggestions, specific practical tips and instruments were proposed based on reviewing available literature for the implication of the guideline in different situations.

The Thesis concludes with a General Discussion chapter, which provides a general discussion of the work conducted, as well as theoretical and practical implications of the results, limitations of the reported studies, and suggestions for future research in the field.

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Preventive medicine as a first-
or second-choice course:
A cross-sectional survey
into students' motivational differences and
implications for information provision

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2.1. ABSTRACT

2.1.1. Background

Challenges in recruiting and retaining medical staff in preventive medical specialties have recently been the subject of numerous studies. To improve selection procedures, it is important to understand the career preferences and incentives of students in preventive medicine (PM), who initially marked the program as either their first choice or second choice. 1386 PM students in four Vietnamese medical schools participated in a survey using a structured, written questionnaire. Students were asked about their reasons for entering medical school and studying PM, their perceptions of PM during the academic course, and their expected career path following graduation.

2.1.2. Results

First-choice PM students (group 1) more often had siblings working as a preventive doctor, while second-choice PM students' siblings (group 2) were more often medical students or clinical doctors. Group 1 had gathered more information about PM by consulting their high-school teachers and the national career guide. They were mainly drawn to the PM program by the newness of the profession, the prospect of a high-income job, its low entry criteria and low study burden compared to general medicine, their desire to uphold their family tradition, and to fulfill their family's wish of having a doctor in the family. Group 2 chose to study PM because they wanted to pursue their dream of becoming a doctor. Compared to the first group, their perception of PM more frequently changed during the later years of the curriculum and they more frequently envisioned becoming a clinical doctor following graduation.

2.1.3. Conclusions

Interest in and motivation for PM may be cultivated among prospective or current students by improving information provision, diffusing knowledge, and otherwise acquainting students better with the PM specialty before and during the program.

Key words: career choice, motivation, preventive medicine, first choice, second choice

2.2. BACKGROUND

Despite the important role primary health care (PHC) plays in health care systems, in many countries the career of a primary health worker is not held in very high regard. Consequently, few medical graduates choose to work in this field. In comparison with clinical specialties of “high prestige,” PHC specialties, such as rural health care, occupational health, public health, and preventive medicine (PM), are considered problematic areas when it comes to the recruitment of students and retention of graduates to work in this field [0-2]. According to the 2009 annual report of the Ministry of Health in Vietnam [3], the majority of its university pharmacists (82%), doctors (59%), and nurses (55%) work in urban areas, while the population in these areas accounts for only 27% of the total population. A recent study on the general perception about PHC and career choice at PHC settings among 400 final year medical students in Vietnam revealed that, although almost all students (99%) agreed that PHC is very important, less than 1% of them intended to work in primary care settings (i.e., communal and district health facilities) and only 3.7% of them intended to work as a preventive medical doctor [4].

Other works have proved that medical students’ career preferences are influenced by biographical characteristics such as gender, by having a physician in the family, and urban or rural background [4-9]. Female students show a higher preference for PHC specialties, such as community medicine and family medicine, than their male counterparts [5,5]. It is also reported that students from rural areas (i.e., students of rural origin, grown up in a rural area, or having family who live in a rural area) are more likely to enter rural practice than those from urban areas [6]. Although medical students who have a physician in their family show a higher proclivity to choose non-primary care specialties than other students [5,5], information about this factor in students who choose PHC specialties is absent. Studies have shown a trend toward smaller numbers of students whose top choice is preventive specialties [4,5,7,9]. Plausible explanations for this development include: lack of specialty information [4], equal appeal of several other specialties [5], desire for monetary rewards [7], and lack of interest due to little or negative appreciation of the specialty’s attributes [9]. The lack of ambition to pursue a career in preventive care is not only manifest among freshmen but also among graduates. Students usually become more changeable in their choice of PHC specialties in the clinical phase or senior year, which may be explained by students’ exposure to clinical work and desire to have a high-prestige career [7,8].

Vietnam has created a separate curriculum leading to an undergraduate degree in PM with the aim of providing specialized PM medical staff who will work in preventive medical centers and in the community. Bachelor and Master degrees in public health provide non-medical staff for management of programs which are often PM programs. Concerns have been voiced, however, that medical graduates who have completed the PM curriculum will eventually not opt for a career in PM, but seek a clinical position after taking postgraduate clinical specialty training. That is not the intention but does happen, according to observations by senior educators and teachers in PM and public health education in Vietnam [10], though more evidence is needed to confirm

the observations. Additionally, society seems to hold a prejudice against the PM profession, deeming it secondary in prestige to any clinical/hospital profession. In the study among 400 final year medical students, researchers have found that students recognized the low status of PHC work in Vietnam and did not consider that working in PHC would contribute to their professional advancement [4]. Another study in two provinces in Northern Vietnam found that health workers' willingness to work in rural areas was being compromised by the following factors: low incomes, bad working conditions, and a lack of appreciation of the preventive specialties from the community at large, partly because of their relative unfamiliarity with the profession compared to curative professions [11]. These issues were confirmed by results of another study on job motivation of rural healthcare workers in Vietnam, which listed five main factors discouraging them in their work, including: low income and allowance, difficult transportation, no prospect of continuing development, and heavy workload without clear plans [12].

Further efforts to increase the number of physicians serving in preventive specialties and rural areas have abounded, involving high-school students, medical students, and doctors working in primary health care sectors. Strategies such as adapting student selection and admission procedures, or early exposure of students to training in rural sites have also been adopted to increase rural students' participation and motivation [11, 13]. However, these studies focused on medical students and their motivation to work in preventive specialties after graduation. In the Vietnam situation, we could focus on students who had already made a choice to study PM from the beginning. It would be important to find out what kind of students are attracted to a study in PM and for what reasons, what their perceptions are during the course of the program, and what they expect from their future job. This information might provide a scaffold for career guidance, selection and training activities of the medical school to improve the quantity and quality of PM graduates.

To develop a suitable and effective curriculum that encourages students to study PM and to pursue it as their future profession, it is necessary to elucidate the differences between the students who made a primary choice for PM (group 1) and those for whom it was the second choice (group 2). This study, therefore, investigates the differences between these two student groups with regard to: (1) their personal characteristics; (2) the sources of information about PM they accessed before choosing the specialty; (3) their reasons for entering medical school and studying PM; (4) their perceptions of PM and constancy of that opinion throughout the course; and (5) their expected career path following graduation. The outcome will provide a baseline for further efforts at making sound policy recommendations on how students' motivation to study and work in PM might be increased.

2.3. METHODS

2.3.1. Participants and Setting

This cross-sectional survey was conducted in four medical universities located in Northern Vietnam. At these universities, students are trained to work in different areas of medicine, such as PM, general medicine, traditional medicine, public health, and nursing. To be enrolled in a medical university, each candidate applies for a studentship position in two different areas: their first choice and second choice. Based on the results of a national entry examination, universities consider and select students for the training in either their first or second choice. Candidates who do not get accepted into their preferred program can still be admitted to the second choice area, as long as their exam results satisfy the enrollment criteria for that one.

All 1404 PM students from the first to the sixth year in the four medical universities were invited to participate voluntarily in this study. The rate of participation was very high (1386 respondents, 98.7%), probably because students were invited to participate immediately after attending lectures, while still in the lecture hall, and were given a small financial compensation (2 euros/student) for their time (approximately 20 minutes) on answering the questionnaire. Of these respondents, 936 (67.5%) were students for whom PM was their first choice, and 450 (32.5%) were students whose first choice was general medicine (82.78%), dentistry (9.09%), or other courses (8.14%). Hereinafter we will refer to these groups as “first-choice students” and “second-choice students”. The mean age of the respondents was 21.57 years ($SD = 2.24$), and 61% were female.

2.3.2. Materials

The questionnaire was designed based on existing questionnaires of previous studies on career preference in medicine [2,6,10] as well as on the results of group discussions with students from PM and general doctors’ training courses to create a suitable version for the Vietnamese situation. A pilot study was performed with 12 PM students in Hanoi from different course years to improve the format and the clarity of the items. The final version used incorporated the results from the pilot study.

The questionnaire comprised a series of 33 questions in three parts. The first part included 15 items on basic personal socio-demographic data and parents’ education and profession. These items also asked whether students received any assurance or any other type of assistance from family, relatives, or friends, and whether they expect help to find a job in the health care sector after graduation. The second part contained 15 items about whether PM was their first or second choice when applying to the medical university, reasons for choosing to study PM, who had the biggest influence on their decision to study PM, and their perceptions of PM over time. The last

part consisted of three items about their expectations of future jobs. Participants were asked to tick those predefined options that best fitted their opinion; for some of the items, they were allowed to select more than one option (but maximally three). In each question, there was an option to respond “Other” followed by space to clarify, to give an opportunity for participants to give unrestricted responses.

2.3.3. Data analysis

We conducted a descriptive analysis of the answers. Variability according to preference for PM (first/second choice) was analyzed by comparing the different strata with χ^2 test. Due to the multiplicity of tests, the Bonferroni correction was applied to control for the risk of inflation of type I errors. Results were considered statistically significant if the two-tailed p -value was less than .01. Subsequently, a post-hoc analysis on standardized residuals was used to report exactly which differences were at a level of significance. Data were analyzed using IBM SPSS Statistics (version 20.0).

2.4. RESULTS

2.4.1. Students' personal characteristics

Between first-choice and second-choice students, no statistically significant differences were found in gender, age, or other socio-demographic characteristics such as rural background, parents' education, and parents' medical-related jobs. The only significant differences between them were their year of study and having a sibling with a health-related job (see Table 2.1). In the higher years, there were more second-choice students, while in the basic years (i.e, the more recently recruited) the number of first-choice students was highest. First-choice students more often had siblings working as preventive doctors; conversely, second-choice students more often had siblings who were medical students or clinical doctors. Of all students, 36.51 % (38.39 % first-choice students, 31.25 % second-choice students, $\chi^2 = 3.09$, $p > .05$) said that they were assured of a job in medicine after graduation, aided either by family members or by relatives and friends.

Table 2.1. Comparison between two groups, regarding study level and having sibling working in health-related job

	First-choice students			Second-choice students			χ^2	p
	N	%	Std. R	n	%	Std. R		
<i>Level of study</i>								
	N=936			N=450				
Basic years	396	43.21	3.87	87	19.33	-5.58	98.49	.000*
Clinical years	270	28.85	.41	120	26.67	-.59		
PM years	270	28.85	-4.11	243	54	5.92		
<i>Sibling with a health related job</i>								
	N=298			N=142				
Student in medicine	64	21.48	-1.07	44	30.99	1.55		
Clinical doctor	38	12.75	-.91	27	19.01	1.31	11.65	.009*
Preventive doctor	10	3.36	.93	1	.70	-1.35		
Other medical jobs	186	62.42	.96	70	49.30	-1.39		

Note: * significant difference between first-choice and second-choice students (with Bonferroni adjustment)

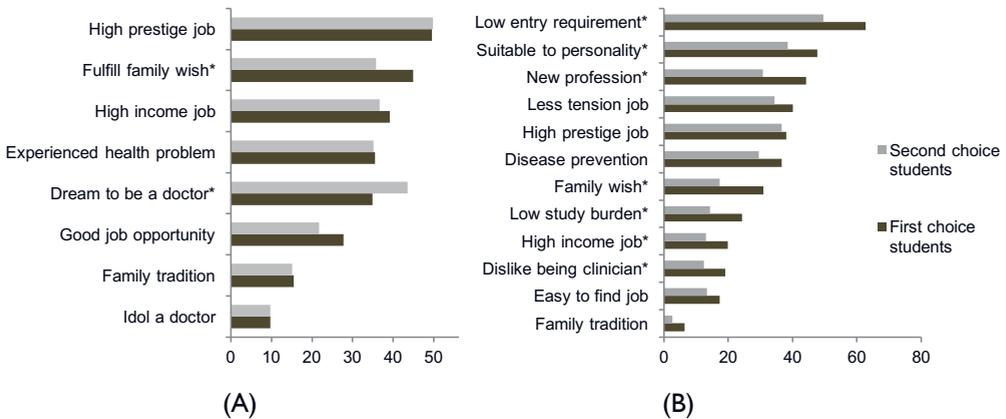
2.4.2. Obtaining information about PM

First-choice students had made more efforts to obtain information from many sources about PM before deciding to choose the specialty than had second-choice students (58.30 % versus 43.80 %, respectively, $\chi^2 = 24.95$, $p < .01$). Among information sources as the media, the national career guide, parents, relatives, high school teachers and friends, students most frequently turned to the media for information about PM, including the Internet, television, and newspapers. However, consultation of two information sources differed significantly between the two groups: high-school teachers ($\chi^2 = 6.94$, $p < .01$) and the national career guide with information about future professions ($\chi^2 = 35.22$, $p < .01$) were more often used by first-choice students than by second-choice students.

2.4.3. REASONS FOR ENTERING MEDICAL SCHOOL AND STUDYING PM

The results on the left in Figure 2.1 (part A) show the significant difference in the reason that the two groups of students were drawn to medical school. While first-choice students were primarily drawn to medical school by the desire to fulfill their family's wish ($\chi^2 = 10.32$, $p < .01$), for second-choice students their own dream of becoming a doctor proved more decisive ($\chi^2 = 9.86$, $p < .01$).

The results on the right in Figure 2.1 (part B) represent the reasons for studying PM. Significantly more often than did second-choice students, first-choice students opted for a study in PM because of the benefits the future profession would bring, being relatively new ($\chi^2 = 22.93$, $p < .01$) with high-income prospects ($\chi^2 = 9.34$, $p < .01$). First-choice students were also more drawn to the program than were second-choice students because of not wanting to become a clinical doctor ($\chi^2 = 9.43$, $p < .01$), the low entry requirements ($\chi^2 = 81.83$, $p < .01$), and the low study burden ($\chi^2 = 18.12$, $p < .01$) specific to PM training. In addition, more than second-choice students, first-choice students held the opinion that pursuing a career in PM suited their personality ($\chi^2 = 10.24$, $p < .01$), and that it would also help them to fulfill their family's wish ($\chi^2 = 28.19$, $p < .01$) and uphold their family tradition ($\chi^2 = 8.94$, $p < .01$).



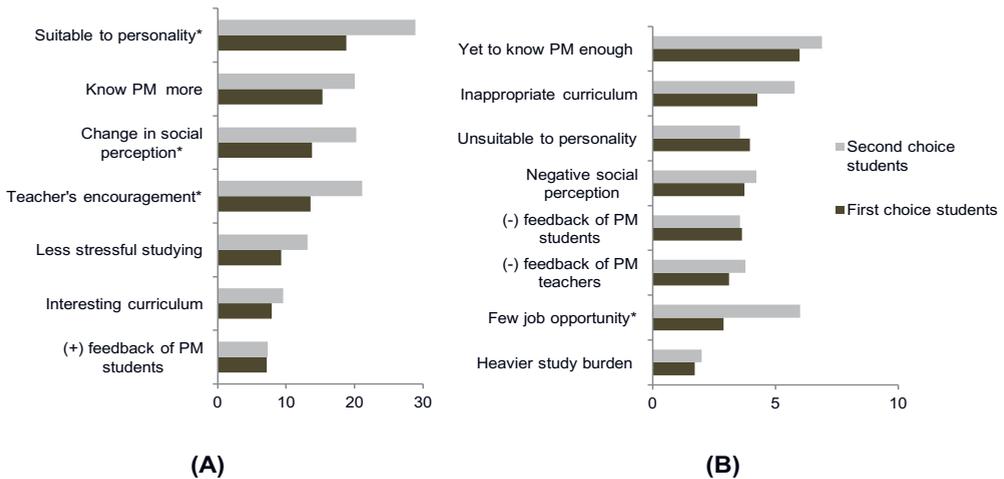
Note: (*) significant difference between first-choice and second-choice students (with Bonferroni adjustment)

Figure 2.1. Reasons for students to enter medical school (A) and study PM (B)

2.4.4. Perceptions of PM students

In the program of their study, second-choice students changed their attitude toward PM more frequently than did first-choice students (57.82% vs. 41.08%; $\chi^2 = 33.65$, $p < .01$). Of the students who changed their attitude toward PM, 72.7% of first-choice students and 77.25% of second-choice students gained a better appreciation of PM ($\chi^2 = 1.65$, $p > .05$). At the time of the survey, however, 40.58% of the second-choice students still regretted their choice to study PM and wished to change to another profession, while only 28.41% of the first-choice students reported similar feelings ($\chi^2 = 22.65$, $p < .01$). Another striking difference was the fact that 55.26% of first-choice students changed their attitude during the pre-clinical years (years 1-2), while 58.36% of the second-choice students only did so during the clinical years (years 3-4) and PM years (years 5-6) ($\chi^2 = 20.31$, $p < .01$).

Figure 2.2 presents the reasons for this change in attitude. It indicates why more second-choice students – as opposed to first-choice students – changed toward a better appreciation of PM: they gained a more positive social perception of the PM profession ($\chi^2 = 9.44, p < .01$), they were encouraged by PM teachers ($\chi^2 = 12.85, p < .01$), and they realized that PM suited their own personality better than initially expected ($\chi^2 = 17.97, p < .01$) (part A). The main reason for lower appreciation of PM by second-choice students was the prospect of fewer job opportunities ($\chi^2 = 7.88, p < .01$) (part B).



Note: (*) significant difference between first-choice and second-choice students (with Bonferroni adjustment); (+) feedback: positive feedback, (-) feedback: negative feedback

Figure 2.2. Reasons making students appreciate PM more (A) and less (B)

2.4.5. Projected career path following graduation

More second-choice students than first-choice students anticipated landing jobs as clinical doctors in hospitals ($\chi^2 = 42.17, p < .01$). Conversely, more first-choice students than second-choice students anticipated choosing a job within the PM specialty ($\chi^2 = 7.76, p < .01$), with second-choice students being more interested in jobs that offer the opportunity to continue their studies ($\chi^2 = 8.06, p < .01$) and that are located at provincial health care centers ($\chi^2 = 9.31, p < .01$).

2.5. DISCUSSION

This study reveals the differences between students in PM who, prior to enrolment, selected the program as their first choice and those who did not. We found that in the higher study years there were a higher proportion of second-choice students, while the earlier years, that is, the later intake, had a higher proportion of students for whom PM was the first study choice. This reflects a trend of students increasingly selecting a study in PM at medical school as their first preference, which bodes well for the recruitment of students in PM. Previous studies on career choice have pointed that medical students who have a physician in the family are more likely than other students to choose non-primary care specialties [5,9]. In our study, although there were no statistically significant differences between the two groups in gender, rural background, parents' education, and parents' medical-related jobs, those students for whom PM was the first choice had more often a sibling working in PM and non-clinical specialties than did second-choice students. This finding reinforces the impact of the "medical family" factor, albeit viewed from the reverse perspective of primary care specialties.

The fact that barely half of the second-choice students collected information about PM before selecting the specialty makes sense, as PM was not their first preference. At the same time, however, the number of first-choice students obtaining information was also surprisingly low – only 58.30% - while one would expect this to be much higher. The finding that more first-choice students had family already working in PM could explain partly for this low number, because they probably know things already without actively searching. However, the overall results suggest that students make their choices without being sufficiently informed about the specialty. A lack of information also arose as one of the factors influencing the tendency to prefer preventive specialties over other specialties [4,9]. Another finding was that students frequently appealed to the media and national career guide for information. However, these sources only provide general and unsystematic information about, for example, the job of a PM doctor, the names of medical schools offering PM training, the number of training places per year, and so forth. In our study, that so many PM students selected general doctor as their first choice at the beginning (82.78%) also reflects the public understanding which is more familiar from the media with the function of the general doctor. This information gap could be bridged by improving the quality of career guidance services to cultivate interest in the health professions among high-school students [15] and by providing the media with more examples of the good work done by PM doctors. In our study, first-choice students frequently turned to their high-school teachers or the national career guide for information about PM, underlining the important role such information sources play for students.

It is not surprising that about 40% of second-choice students regretted their choice and wanted to change profession, at the time of the survey, while close to one third of first-choice students reported similar feelings. More than half of the first-choice students changed their views (toward more or less appreciation of PM) already in the first two years of the program, while

nearly 60% of second-choice students had shifted their grounds in the later years, by the time they did their clinical rotations and had acquired more experience and knowledge of PM. Research on career choice has shown that the way in which students experience family medicine during the later years of the curriculum is a determinant of whether or not they will select this as their specialty [2,15]. The study of Landström et al. in 2014 [16] also emphasized the association between interest in becoming a general practitioner and wanting to insert more general practice in undergraduate training of Sweden medical students. Our data do not allow us to explain this relationship in the context of PM. However, the fact that more second-choice students than first-choice students changed toward a better appreciation of PM suggests that they were insufficiently informed about the profession at the start of the program. This could explain the changeable nature of their opinion about PM.

Our study shows that the incentives to study general medicine and PM, differed in focus. In their ambition to become a PM doctor, first-choice students were largely driven by extrinsic factors, such as: PM is a new profession and high-income job, it has low entry criteria and a low study burden compared to general medicine, and the desire to uphold their family tradition and fulfill the wish of having a doctor in their family. Second-choice students, on the other hand, were drawn to a study in PM mainly by intrinsic reasons, such as “the dream to become a doctor” regardless of specialty, and the belief that a job in the PM sector suited their own personality. This distinction was, in turn, reflected in students’ projections of future jobs: more second-choice students than first-choice students wanted to pursue a career as a clinical doctor working in a hospital, or to stay in the big cities even though much of PM work is at lower levels in the health system. Furthermore, second-choice students also preferred a job which could offer them further study opportunity and at a health care center at provincial level. This finding is consistent with results from a previous study on the PHC specialty choice of 400 final year medical students in Hanoi Medical University, in which Kim et al. found that only 37.3% of medical students thought they could master their professional activities better by working in PHC [4]. Agyei-Baffour and colleagues also reported that medical students’ intrinsic motivation to study medicine (i.e., desire to help others) did not translate into willingness to work in rural areas [6]. Intrinsic motivation results in high-quality learning and creativity, so if students do lack intrinsic motivation, educators should encourage more active forms of extrinsic motivation as an educational strategy [18]. This was reflected in real situation while Landström et al. indicated in their study [19] that if students observed a personal enthusiasm from their general practitioner supervisors, it has a positive influence on their attitude toward the specialty. In the case of PM students, if educators would provide students with more information on PM work and raise awareness of the profession’s virtues during training, this could boost their motivation to study and pursue a career in PM. From our study, second-choice students changed toward a better appreciation of PM after they were encouraged by PM teachers, as well as by realizing that PM suited their own personality better than initially expected, and the more positive social perception of the PM profession when they had more experiences during the clinical years (years 3-4) and PM years (years 5-6).

However, these were only our initial findings and testing this hypothesis could be an interesting new topic for future study.

A limitation of this study was that the survey was conducted only in the four Northern medical universities in Vietnam. There may be differences in demographic characteristics and public perception about the medical profession between different regions of the country, but also between countries, that could influence the career choice of PM of students. Also, the study was a cross-sectional observation which did not include information about the final destinations of the students after graduation. Further investigation in medical schools in other parts of the country and internationally, as well as a student cohort tracer study could reveal more insight in factors that impact on the decision by students to choose and to pursue PM.

2.6. CONCLUSIONS

This study about motivation and career preferences of students in PM revealed differences between students who had PM as their first study preference and those who only selected it as their second choice. These two groups of students differed in the way they retrieved information about the profession, the stability of their opinion about PM, and their motivation to study and pursue a career in PM. Improving information provision about the work of PM, diffusing knowledge, and otherwise acquainting students better with PM before and during the program may help to cultivate their interest and consequently to increase the number of health care staff working in the PM sector. The findings provided lessons from Vietnam which could be useful for other countries in the struggle to promote the fields of public health and preventive medicine.

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APPENDIX 2.I

SURVEY QUESTIONNAIRE ON CAREER CHOICE OF PREVENT MEDICINE STUDENTS

No	Question	Answer	Answercode
A	Personal Information	Tick into the corresponding box	
A1	What year of study are you in currently?	Y1	1 <input type="checkbox"/>
		Y2	2 <input type="checkbox"/>
		Y3	3 <input type="checkbox"/>
		Y4	4 <input type="checkbox"/>
		Y5	5 <input type="checkbox"/>
		Y6	6 <input type="checkbox"/>
A2	What is your gender?	Male	1 <input type="checkbox"/>
		Female	2 <input type="checkbox"/>
A3	Where is your place of birth?	Big cities (as Hanoi, HoChiMinh city)	1 <input type="checkbox"/>
		Other cities	2 <input type="checkbox"/>
		Town	3 <input type="checkbox"/>
		Rural country side	4 <input type="checkbox"/>
		Foreign country	5 <input type="checkbox"/>
		Others:.....	97 <input type="checkbox"/>
		Not know	98 <input type="checkbox"/>
A4	The total length of time you have been living in rural area (including remote highlands and lowlands)	I have never lived in rural area	1 <input type="checkbox"/>
		The number of years
		Not know	98 <input type="checkbox"/>
A5	Grade your attachment to rural area, it means your feeling about the familiarities, fond remembrance when away, or family connection	Feel nothing	1 <input type="checkbox"/>
		Not close	2 <input type="checkbox"/>
		Normal	3 <input type="checkbox"/>
		Close	4 <input type="checkbox"/>
		Very close	5 <input type="checkbox"/>
		Not know	98 <input type="checkbox"/>
A6	Where are you staying for the time being? (Where you reside currently)	At parent's house	1 <input type="checkbox"/>
		At your own house	2 <input type="checkbox"/>
		Dormitory	3 <input type="checkbox"/>
		Rental house	4 <input type="checkbox"/>
		Hotel/hostel	5 <input type="checkbox"/>
		Acquaintant/relative's house	6 <input type="checkbox"/>
		Others (in detail).....	97 <input type="checkbox"/>
A7	Where is your subsidize come from while you study at the medical school?	Parent/family	1 <input type="checkbox"/>
		Scholarship	2 <input type="checkbox"/>
		Part-time jobs	3 <input type="checkbox"/>
		Bank loan	4 <input type="checkbox"/>
		Others (in detail).....	97 <input type="checkbox"/>
A8	Your father's highest level of education?	Post graduate	1 <input type="checkbox"/>
		University graduate	2 <input type="checkbox"/>
		Higher education	3 <input type="checkbox"/>
		Technical high school	4 <input type="checkbox"/>
		High school	5 <input type="checkbox"/>
		Secondary school	6 <input type="checkbox"/>
		Primary School	7 <input type="checkbox"/>
		Illiteracy	8 <input type="checkbox"/>
		Not know	98 <input type="checkbox"/>

No	Question	Answer	Answercode	
A9	Does your father work in health or pharmacy currently? (not counting if your father studied medicine but works outside of health and pharmacy)	No	1	<input type="checkbox"/>
		Clinical doctor	2	<input type="checkbox"/>
		Preventive doctor	3	<input type="checkbox"/>
		Manager (in medical facilities)	4	<input type="checkbox"/>
		Researcher	5	<input type="checkbox"/>
		Medical university/college lecturer	6	<input type="checkbox"/>
		Pharmacist	7	<input type="checkbox"/>
		Others (in detail).....	97	<input type="checkbox"/>
		Not know	98	<input type="checkbox"/>
A10	If in medicine/pharmacy, who does your father work for?	The Ministry of Health	1	<input type="checkbox"/>
		State Hospital/research institution	2	<input type="checkbox"/>
		Medical/Pharmacy/Public Health university/College	3	<input type="checkbox"/>
		Provincial Health Department/hospital	4	<input type="checkbox"/>
		District Health Department/hospital	5	<input type="checkbox"/>
		Commune health center/infirmery	6	<input type="checkbox"/>
		Private hospital/clinics	7	<input type="checkbox"/>
		Pharmacy	8	<input type="checkbox"/>
		Others (in detail).....	97	<input type="checkbox"/>
Not know	98	<input type="checkbox"/>		
A11	Your mother's highest level of education?	Post graduate	1	<input type="checkbox"/>
		University graduate	2	<input type="checkbox"/>
		Higher education	3	<input type="checkbox"/>
		Technical high school	4	<input type="checkbox"/>
		High school	5	<input type="checkbox"/>
		Secondary school	6	<input type="checkbox"/>
		Primary School	7	<input type="checkbox"/>
		Illiteracy	8	<input type="checkbox"/>
		Not know	98	<input type="checkbox"/>
A12	Does your mother work in health or pharmacy currently? (not counting if your mother studied medicine but works outside of health and pharmacy)	No	1	<input type="checkbox"/>
		Clinical doctor	2	<input type="checkbox"/>
		Preventive doctor	3	<input type="checkbox"/>
		Manager	4	<input type="checkbox"/>
		Researcher	5	<input type="checkbox"/>
		Medical university/college lecturer	6	<input type="checkbox"/>
		Pharmacist	7	<input type="checkbox"/>
		Others (in detail).....	97	<input type="checkbox"/>
		Not know	98	<input type="checkbox"/>
A13	If in health/pharmacy, who does your mother work for?	The Ministry of Health	1	<input type="checkbox"/>
		State Hospital/research institution	2	<input type="checkbox"/>
		Medical/Pharmacy/Public Health university/College	3	<input type="checkbox"/>
		Provincial Health Department/hospital	4	<input type="checkbox"/>
		District Health Department/hospital	5	<input type="checkbox"/>
		Commune health center/infirmery	6	<input type="checkbox"/>
		Private hospital/clinics	7	<input type="checkbox"/>
		Pharmacy	8	<input type="checkbox"/>
		Others (in detail).....	97	<input type="checkbox"/>
Not know	98	<input type="checkbox"/>		

No	Question	Answer	Answercode	
A14	Do one of more of your brothers/sisters work in health/pharmacy? (more than one answer possible)	I don't have any sibling	1	<input type="checkbox"/>
		No, they don't work in health sector	2	<input type="checkbox"/>
		He/she doesn't work in health sector	3	<input type="checkbox"/>
		Student in Medicine/Pharmacy	4	<input type="checkbox"/>
		Clinical doctor	5	<input type="checkbox"/>
		Preventive doctor	6	<input type="checkbox"/>
		Manager in health care sector	7	<input type="checkbox"/>
		Medical university/college lecturer	8	<input type="checkbox"/>
		Pharmacy	9	<input type="checkbox"/>
		Others (in detail).....	97	<input type="checkbox"/>
A15	Is there any direct guarantee and influence from your family on the prospect of you getting a job in Health care sector after your graduation?	No, there is not	0	<input type="checkbox"/>
		Number of family members could help you to get a job in health care sector?	
B Career choice				
B1	What is the overall grade of your high school result?	Excellent	1	<input type="checkbox"/>
		Good	2	<input type="checkbox"/>
		Average	3	<input type="checkbox"/>
		Bad	4	<input type="checkbox"/>
		Others (in detail).....	97	<input type="checkbox"/>
B2	Think back when you decided to apply to join the Medical university, what were your most important reasons behind your choice? (if more than one, then indicate their prioritizing by numbering them)	Characteristics of the profession		
		- High moral value and humanity	1	
		- High prestige	2	<input type="checkbox"/>
		- High income prospect	3	<input type="checkbox"/>
		Personal preference		
		- Having an affinity for biology/ chemistry	4	<input type="checkbox"/>
		- Just want to try if I could manage to enroll in medical university	5	<input type="checkbox"/>
		- My childhood dream to become a medical doctor	6	<input type="checkbox"/>
		- Family/own experience of health problem	7	<input type="checkbox"/>
		Influenced by others		
		- One of my idol is a medical doctor	8	<input type="checkbox"/>
		- Guaranteed job opportunity	9	<input type="checkbox"/>
		- Family tradition in health profession	10	<input type="checkbox"/>
		- Fulfilling family's wish	11	<input type="checkbox"/>
		- Following friends' act	12	<input type="checkbox"/>
Others (in detail)	97	<input type="checkbox"/>		
Not remember	98	<input type="checkbox"/>		
B3	Who had the biggest influence on your decision to enroll to the medical school? (if more than one, then indicate their prioritizing by numbering them)	Myself	1	<input type="checkbox"/>
		Father/mother	2	<input type="checkbox"/>
		Sister/brother	3	<input type="checkbox"/>
		Relatives	4	<input type="checkbox"/>
		Friend	5	<input type="checkbox"/>
		Partner/wife/husband	6	<input type="checkbox"/>
		Idolized medical doctor	7	<input type="checkbox"/>
		Others (in detail)	97	<input type="checkbox"/>
		Not remember	98	<input type="checkbox"/>

No	Question	Answer	Answercode	
B4	Which was the level priority of your choice to study Preventive medicine?	First	1	<input type="checkbox"/>
		Second	2	<input type="checkbox"/>
		Third	3	<input type="checkbox"/>
		Not remember	98	<input type="checkbox"/>
B5	If Preventive medicine was not, what was your first choice?	General doctor	1	<input type="checkbox"/>
		Dentistry	2	<input type="checkbox"/>
		Traditional medicine	3	<input type="checkbox"/>
		Nursing	4	<input type="checkbox"/>
		Public Health	5	<input type="checkbox"/>
		Medical technician	6	<input type="checkbox"/>
B6	How did you feel when you had to choose the 2nd choice?	Not remember	98	<input type="checkbox"/>
		Disappointed	1	<input type="checkbox"/>
		Sad	2	<input type="checkbox"/>
		Not so bad	3	<input type="checkbox"/>
		I was accepted, no matter what specialty	4	<input type="checkbox"/>
		Still satisfied because I was accepted by medical school	5	<input type="checkbox"/>
B7	What were the main reasons for your choice of Preventive Medicine? (if more than one, then indicate their prioritizing by numbering them)	Not remember	98	<input type="checkbox"/>
		Characteristics of the specialty		
		Privilege and advantages of a new profession	1	<input type="checkbox"/>
		High salary or easy money-making	2	<input type="checkbox"/>
		Travelling and meeting new people	3	<input type="checkbox"/>
		There is less tension in the job	4	<input type="checkbox"/>
		The high prestige of health jobs in general	5	<input type="checkbox"/>
		Personal preference		
		Suitability to my personality and ability	6	<input type="checkbox"/>
		One of my personal idol is a preventive doctor	7	<input type="checkbox"/>
		Having an affinity for disease prevention	8	<input type="checkbox"/>
		Advance points		
Opportunity of scholarship for studying abroad	9	<input type="checkbox"/>		
Lower entry criteria than other specialties	10	<input type="checkbox"/>		
There is lower study burden than other specialties	11	<input type="checkbox"/>		
It is easier to find a job if I study this specialty	12	<input type="checkbox"/>		
B8	Who had the biggest influence on your choice of Preventive Medicine? (if more than one, then indicate their prioritizing by numbering them)	Influenced by others		
		My idol is a preventive medical doctor	13	<input type="checkbox"/>
		Family tradition	14	<input type="checkbox"/>
		Family's wish	15	<input type="checkbox"/>
		Friends' suggestion	16	<input type="checkbox"/>
		Other (in detail).....	97	<input type="checkbox"/>
		Not remembered	98	<input type="checkbox"/>
		Myself	1	<input type="checkbox"/>
		Father/mother	2	<input type="checkbox"/>
		Sister/brother	3	<input type="checkbox"/>
Relatives	4	<input type="checkbox"/>		
Friend	5	<input type="checkbox"/>		
Partner/wife/husband	6	<input type="checkbox"/>		
Idolized medical doctor	7	<input type="checkbox"/>		
Others (in detail)	97	<input type="checkbox"/>		
Not remember	98	<input type="checkbox"/>		
B9	Had you searched for information about Preventive Medicine discipline before applying to join the medical university?	Yes	1	<input type="checkbox"/>
		No	2	<input type="checkbox"/>

No	Question	Answer	Answercode	
B10	By which media did you find information about Preventive medicine?	Public communication media	1	<input type="checkbox"/>
		Father/ mother	2	<input type="checkbox"/>
		Brother/sister	3	<input type="checkbox"/>
		Relatives	4	<input type="checkbox"/>
		Friends	5	<input type="checkbox"/>
		High school teachers	6	<input type="checkbox"/>
		Other medical students	7	<input type="checkbox"/>
		University enrollment guidance	8	<input type="checkbox"/>
		Others (in detail)	97	<input type="checkbox"/>
		Not remember	98	<input type="checkbox"/>
B11	Have you ever wanted to change the discipline to follow?	Not yet, I'm only in the 1st year	1	<input type="checkbox"/>
		I want or wanted to change to another specialty	2	<input type="checkbox"/>
		I want to change to other professions outside health care	3	<input type="checkbox"/>
		Never	4	<input type="checkbox"/>
B12	Has your attitude towards preventive medicine changed?	Yes	1	<input type="checkbox"/>
		No	2	<input type="checkbox"/>
B13	When did this change happen?	Y1	1	<input type="checkbox"/>
		Y2	2	<input type="checkbox"/>
		Y3	3	<input type="checkbox"/>
		Y4	4	<input type="checkbox"/>
		Y5	5	<input type="checkbox"/>
		Y6	6	<input type="checkbox"/>
		Not remember	98	<input type="checkbox"/>
B14	If applicable, list three reasons for liking PM more (if more than one, then indicate their prioritizing by numbering them)	Interesting syllabuses (plenty practicing)	1	<input type="checkbox"/>
		Less pressure	2	<input type="checkbox"/>
		Changes in society (e.g. job opportunities)	3	<input type="checkbox"/>
		Suitability to my personality and wishes	4	<input type="checkbox"/>
		Gaining better knowledge about the discipline	5	<input type="checkbox"/>
		Positive feedback from senior students in the same discipline	6	<input type="checkbox"/>
		The encouragement and advocating from lecturers	7	<input type="checkbox"/>
Others (in detail).....	97	<input type="checkbox"/>		
B15	If applicable, list maximally three reasons for disliking PM more (if more than one, then indicate their prioritizing by numbering them)	Inappropriate curriculum	1	<input type="checkbox"/>
		Heavier study burden	2	<input type="checkbox"/>
		Fewer job opportunities	3	<input type="checkbox"/>
		Unsuitable to my personality and wishes	4	<input type="checkbox"/>
		Yet to understand enough about the discipline	5	<input type="checkbox"/>
		I see this profession less prestige than other medical specialties (e.g. general doctor)	6	<input type="checkbox"/>
		Negative feedback from senior students	7	<input type="checkbox"/>
		Negative feedback from lecturers	8	<input type="checkbox"/>
Others (in detail).....	97	<input type="checkbox"/>		

No	Question	Answer	Answercode	
C	Choosing future job			
C1	What field would you prefer to work after graduation? (you can choose more than one option)	Yet to decide Preventive Medicine/Public Health Clinical practice in hospital Laboratory/fundamental sciences Any specialty in hospital Foreign Health organization Outside of health system Others (in detail).....	1 2 3 4 5 6 7 97	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
C2	If you want to work in a hospital, where would you prefer to work?	Don't want to work in a hospital Yet to decide State hospitals Provincial hospitals Suburban hospitals Commune hospitals Foreign hospitals Others (in detail).....	1 2 3 4 5 6 7 97	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
C3	Which factors will influence your choice of a future job (if more than one, then indicate their prioritizing by numbering them)	Suitable to my preference and ability Within my specialty Staying in big cities High salary Good working condition Promotion opportunity Chances for further study Travelling abroad Staying close to my family Easy to find a job Working for community in my hometown Others (in detail).....	1 2 3 4 5 6 7 8 9 10 11 97	<input type="checkbox"/> <input type="checkbox"/>

THANK YOU VERY MUCH FOR YOUR TIME!

Working in Preventive Medicine or not? Flawed perceptions decrease chance of retaining students for the profession

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3.1. ABSTRACT

3.1.1. Background

Recruiting and retaining students in Preventive Medical (PM) specialties has never been easy; one main challenge is how to select appropriate students with proper motivation. Understanding how students perceive PM practice differently from practicing doctors is necessary to guide students, especially for those for whom PM is only a substitute for medicine as their first study preference, properly during their study and, later, the practice of PM.

3.1.2. Methods

1,386 PM students in four Vietnamese medical schools and 101 PM doctors filled out a questionnaire about the relevance of 44 characteristics of working in PM. ANOVAs were conducted to define the relationship between students' interest, year of study, willingness to work in PM, and the degree to which students had realistic perceptions of PM practice, compared to doctors' perceptions.

3.1.3. Results

Overall, compared to doctors' perceptions, students overestimated the importance of most of the investigated PM practice's characteristics. Moreover, students' perception related to their preference and willingness to pursue a career in PM after graduation. In particular, students for whom PM was their first choice had more realistic perceptions of community practice than those who chose PM as their second choice. And, second-choice students had more realistic perceptions than first-choice students in their final years of study, but expected higher work stress in PM practice. Students who were willing to pursue a career in PM rated the importance of community practice higher than those who were not. We also found that students' perception changed during training as senior students had more realistic perceptions of clinical aspects and working stress than junior students, even though they overemphasized the importance of the community aspects of PM practice.

3.1.4. Conclusions

To increase the number of students actually entering the PM field after graduation, the flawed perceptions of students about the real working environment of PM doctors should be addressed through vocation-oriented activities in the curriculum targeted on groups of students who are most likely to have unrealistic perceptions. Our findings also have implications for other less attractive primary health care specialties that experience problems with recruiting and retaining students.

Key words: student perception, characteristics of specialty, preventive medicine, first-choice students, student motivation, career choice

3.2. BACKGROUND

Preventive medicine (PM) should be a priority in developing countries where preventable diseases cause death of millions of people every year, especially of children under five years old [1]. However, it is an international problem that primary health care (PHC) specialties, such as PM, are not attractive to medical students [2,3]. Previous studies have shown that students' knowledge and experiences of specialties influence their career decision-making processes [4]; they increase or decrease students' preferences for PHC careers [5,6] and working in rural settings [7]. Insufficient understanding or knowledge of the role of PHC specialties is a major factor discouraging students from pursuing a career in those specialties [8,9]. However, little is known about the development of students' perceptions of PHC specialties over time. Particularly it is underexplored, how the perceptions of students with different specialization interests develop in different phases of the curriculum, and whether students' perceptions of the specialty relate to their willingness to work as a PHC doctor.

Medical students gradually collect more knowledge and experiences during different phases of their studies, mostly during their training in clinical clerkship [10,11] and community practice [7]. Based on those experiences, senior students make more definite and consistent decisions on their career choice in PHC than junior students do [9]. Nonetheless, some studies show that the career preferences of students are not always related to their actual knowledge of the specialty [8,12] but primarily to their values and goals [13]. Some scholars recommend that students should be more guided to gain a more accurate view of PHC specialties, [12] and that educators should consider the risk of fostering a negative attitude toward PHC specialties among students during their training [13,14].

In medical education, motivation for or interest level in pursuing a career in a particular specialty has been found to influence medical students' persistence in their study [15] and their specialty choice [16]. Moreover, motivation is a predictor of students' satisfaction during study, including levels of distress or burnout [17,18]. Another study [19] showed that "second-choice

students”, who chose to study the specialty because they were not accepted into their preferred program (i.e., general medicine), regretted their choice and wanted to change to another specialty or even another profession, more than “first-choice students”, who were admitted to their preferred program, did. A primary reason for these feelings of regret was that students were not properly informed about the specialty they chose to pursue, meaning they were not fully aware of the mission, working conditions, and job prospects. This observation is consistent with other studies noting that the major impediment to students’ career decisions is a poor understanding of the specialties [9]. However, we have not found pre-existing studies on how perceptions of a specialty vary among students who have different levels of interest in that specialty. Also it is as yet unclear how students’ perceptions change over the course of their studies, as a result of the accumulation of experience and knowledge, and whether this impacts first-choice students and second-choice students differently. This kind of information is crucial for teachers and vocational educators who have to aid all students in forming adequate understanding about a specialty.

Studies reveal that although medical students choose to study medicine because of their desire to help people and they are well aware of the importance of PHC in the health care system, these motivations do not translate into a willingness to work in the community and in rural areas [8,9,12]. However, few studies have focused on the perceptions of students who have already expressed a willingness to work in the PHC field. It would be valuable to get insight into the perceptions of those studying PHC at the undergraduate level in relation to their levels of interest in PHC and their willingness to work as a PHC doctor in the future.

The fact that PHC specialties are not attractive to medical students is an international problem and can also be observed in Vietnam, where medical schools are not highly successful in recruiting appropriate PM students. Students often choose to study PM for various reasons, such as curiosity about the profession, likely high-income jobs, low entry requirements and study burden compared to general medicine, and chance to uphold family traditions [19]. The fact that none of these reasons relates to a personal passion for prevention indicates that the students may not fully understand PM, public health (PH), and the role of PM doctors in community health protection. As a consequence, it is not surprising that only 60% of PM students anticipate choosing a job within the specialty after graduation, because the rest look for a “higher prestige” job, e.g a clinical doctor in a hospital in big cities [19]. These views seem very removed from reality where one of the main motivating factors that keep PH workers, including PM doctors, in their jobs is that they realize that their contribution to health protection is appreciated by colleagues and the community [20]. Therefore, the differences between students’ perceptions and those of doctors regarding the characteristics of PM practice should be examined in more depth.

In this study we investigated PM students’ sense of the reality of the PM specialty by comparing their perceptions with the perceptions of practicing PM doctors, focusing on key characteristics as: necessary knowledge and skills for PM doctors, day-to-day PM doctor work life, types of

practice, and the pressure and benefits of work as a PM doctor. We were guided by the following research questions:

How realistically do students perceive the characteristics of the practice of a PM doctor?

How do students' realistic perceptions change over the course of the curriculum as they acquire more experience in PM? Does degree of interest in PM affect students' realistic perceptions at different levels in the curriculum?

How does the willingness to work in PM after graduation affect the realistic perceptions of students? Does willingness to work in PM after graduation affect students' realistic perceptions, and is this impacted by degree of interest in PM?

3.3. METHODS

3.3.1. Setting and Participants

PM training programs in Vietnam are conducted at the undergraduate level. At the moment this study was conducted, 6 out of 13 medical Vietnamese universities offered PM training. They recruit students who are either high school graduates for a 6-year track or those already holding a bachelor of science (nurses, public health, medical technique, etc.) for a 4-year track. The regular curriculum lasts for six years, with the first two years focusing on basic sciences and basic medical knowledge and skills, the next two years on clinical clerkship, and the last two years on knowledge and skills related to the PM specialty, while the 4-year track only contains the last four years [21]. Graduates obtain the Degree of Doctor of PM and can officially work as PM doctors in the community or PM centers at different levels of the healthcare system (national, provincial, district, commune), in hospitals (if they take post-graduate training course in clinical specialties), research institutes, non-government organizations or in medical universities/schools [22]. In Vietnam, the preventive medical system includes public health, family medicine and PM. While bachelors of public health work only in prevention, family medical doctors take care of health of people in a family [23]. PM doctors in Vietnam have to cover both preventive and curative duties; they treat common diseases and have to detect and prevent epidemics in the community as well [22]. This requires them to work mainly in the community or in PM centers and to serve a broad range of people.

The current study is focused on the 6-year track PM training and involved 1386 PM students from four medical universities in the North of Vietnam and 101 practicing PM doctors working in Hanoi, the capital. All participants were invited to voluntarily participate immediately after attending lectures (students) or meetings (doctors). Signed consent was acquired after the researchers explained that voluntary and anonymity of the participants was guaranteed. After participants filled out the questionnaire (taking approximately 10 minutes), they received a small financial compensation for their devoted time, which is ordinary in Vietnamese context. Ethical

approval for the study was given by the Institutional Review Board of the Hanoi Medical University (Decision No 174/HMU-IRB) and of the other three universities' Scientific and Technical Committees.

3.3.2. Materials

A written questionnaire was developed based on earlier studies on students' perceptions of the medical profession [12,24]. The original questionnaire, which included 47 characteristics of the medical profession, was used in a study by Soethout [12]. In our study, in light of suggestions from practicing PM doctors in the pilot phase, three items were added: "Skill with using computers," "Capacity to use a foreign language," and "Work that requires a lot of travelling." Participants were asked to indicate to which degree these characteristics applied to a PM doctor's daily practice with the phrase: "To what extent does this characteristic apply to the profession of PM?" using a 3-point Likert scale (1 = not applicable, 2 = moderately applicable, 3 = highly applicable). Exploratory factor analysis was used to identify factors within the 50 items. This procedure resulted in seven factors that were interpreted as seven subscales, and Cronbach's alpha was calculated for each subscale. Cronbach's alpha of every subscale was improved by deleting items that worsened the internal consistency of that subscale. Table 1 presents the content and internal consistency reliability of the seven subscales, with Cronbach's alphas of each subscale, separately for practicing doctors and of students. The Cronbach's alpha values for the two subscales "Clinical practicing" (.58) and "PM working stress" (.59), were quite low, ($< .60$), we decided to keep these subscales because they are important characteristics of working in PM and Cronbach's alpha of 0.6 was considered acceptable for new subscales [25]. We will interpret these results with caution. The subscale of "PM working benefits" was taken out because of too low alpha, to avoid negative effect on study's accuracy. This procedure produced a final questionnaire containing six subscales with 41 items.

Mean scores of the six subscales were computed. As data were normally distributed, parametric tests were used. The differences between the original and the modified questionnaire are presented in Table 3.1 as well.

Table 3.1. Modification of the study instrument and internal consistency reliability of the subscales

Original instrument 4 subscales – 47 items	Modified instrument 7 subscales – 44 items	Cronbach's α (Doctors)	Cronbach's α (Students)
1. Knowledge and skills (13 items)	1. PM knowledge and skills (11 items) (e.g. Epidemiology, Health promotion)	.75	.85
	2. Basic sciences (4 items) (e.g. Anatomy, Chemistry, Pharmacotherapy)	.67	.66
2. Nature of medical- professional practice (7 items)	3. Clinical practice (7 items) (e.g. Referral, Diagnostic skills, Treatment of patients)	.58	.59
3. Types of patients, contacts, and complaints (10 items)	4. Community practice (9 items) (e.g. Simple complaints, Long relationships with patients)	.84	.75
4. Characteristics of the daily work (17 items)	5. Daily work characteristics (5 items) (e.g. Move from place to place, Diversity of work)	.66	.74
	6. PM working stress (5 items) (e.g. Stressful work, Long working days, Routine work)	.56	.64
	7. PM working benefits* (3 items) (e.g. High income, High prestige)	.13	.40

* This subscale was taken out due to low Cronbach's alpha for both doctors and students

3.3.3. Data analysis

To answer the first research question, differences between students' perceptions and the corresponding doctors' answers were tested for each subscale by using independent sample *t*-tests. The value of the difference score between students' perceptions and doctors' perceptions will be called students' *realistic perceptions* (i.e., a positive score indicates that students perceive the importance of a characteristic to be greater than doctors do, while a negative score indicates students' underestimation of the importance of a characteristic as compared with doctors). Effect sizes in terms of Cohen's *d* were calculated in all analyses, in which *d* values of .2 to .3 are considered small effects, those around .5 medium effects, and larger than .8 significant effects [26]. Regarding the second and third research questions, ANOVAs were conducted to test for the impact of levels in the curriculum, willingness to work in PM, and levels of interest in PM on students' realistic perceptions. Students were divided into the following categories: first-choice students and second-choice students; junior students from first to fourth year, and senior students in fifth and sixth year; and students willing and unwilling to work in PM. Results were presented in tables for significant effects; graphs were plotted to illustrate the interaction effects. Results for research question 2 and 3 were considered statistically significant if the one-tailed *p* was $\leq .05$. For research question 1, two-tailed tests were conducted. Data were analyzed using IBM SPSS Statistics (Version 20.0).

3.4. RESULTS

3.4.1. General information of participants

Among PM students, there were 937 (67.60%) first-choice students, 432 (31.16%) second-choice students, and 17 students (1.22%) who did not remember their initial priority choice and therefore were excluded from the analysis. There were 513 (37.02%) senior students, and 821 (59.23%) students who stated that they are willing to work in PM after graduation. The mean age of the students was 21.57 years ($SD = 2.24$), with 61% being women. PM doctors had a mean age of 40.38 years ($SD = 8.62$; 25 to 60 years old), with 52.47% being women, and the mean length of time working in the PM field was 11.72 years ($SD = 8.13$; 1 to 32 years).

3.4.2. Students' perceptions of the characteristics of PM practice

Table 3.2 displays the differences in perceptions of PM practice's characteristics between students and practicing doctors. Students significantly overestimated the characteristics of PM practice on all scales, except for clinical practice. The effect size was medium (Cohen's $d > .5$) in most of the subscales where the differences were found significant ($p < .05$). This indicates that the differences were large enough to have practical impact, although the mean difference between students and doctors was quite low (ranging from .13 to .29).

Table 3.2. Relevance of characteristics of PM in daily work as perceived by students, compared with perceptions of practicing doctors.

Subscales	PM Students			PM Doctors			Dstudents-doctors		t	Cohen's d
	n	M	SD	n	M	SD	M	SD		
PM knowledge and skills	1386	2.91	.19	100	2.78	.23	.13	.19	7.05*	.62
Basic sciences	1379	2.41	.38	98	2.13	.38	.26	.38	7.23*	.74
Daily work characteristics	1377	2.92	.21	100	2.68	.33	.22	.23	10.30*	.87
Community practice	1381	2.40	.37	100	2.15	.43	.23	.38	6.35*	.62
Clinical practice	1380	2.37	.35	100	2.38	.41	-.01	.35	-.24	.03
Working stress	1368	2.22	.42	100	2.10	.39	.11	.42	2.82*	.30

* Two-tailed p -value $\leq .01$

3.4.3. Effects of level in the curriculum and degree of interest in PM on students' realistic perceptions

We found a significant effect of levels in the curriculum on students' realistic perceptions on the subscales of basic sciences ($F(1,1360) = 4.61, p < .05$), community practice ($F(1,1358) = 11.36, p < .01$), clinical practice ($F(1,1359) = 3.55, p < .05$), and PM working stress ($F(1,1348) = 3.93, p < .05$) (see Table 3.3). Senior students had more realistic perceptions than junior students did of basic sciences, clinical practice, and of PM working stress; however, they seemed to overestimate the importance of community practice compared to junior students (for full descriptive statistics, see Appendix 3.1).

Table 3.3. Effect of level in the curriculum and interest in PM on student's realistic perception of PM

Subscales	First-choice students (N=937)				Second-choice students (N=432)				Effect		
	Junior (N=667)		Senior (N=270)		Junior (N=194)		Senior (N=238)		Interest in PM F	Level in the curriculum F	Interaction effect F
	M	SD	M	SD	M	SD	M	SD			
PM knowledge and skills	.13	.20	.15	.17	.16	.10	.13	.19	.33	.09	6.07**
Basic sciences	.30	.36	.22	.37	.31	.37	.29	.42	2.67*	4.61*	1.96
Daily work characteristics	.24	.21	.25	.18	.25	.17	.22	.25	.18	1.02	3.02*
Community practice	.22	.40	.28	.33	.23	.35	.32	.34	1.07	11.36**	.15
Clinical practice	-.02	.35	-.01	.32	-.02	.39	.05	.33	2.67*	3.55*	2.01
Working stress	.16	.44	.03	.36	.10	.41	.13	.41	.85	3.93*	11.77**

*One-tailed p -value $\leq .05$, ** One-tailed p -value $\leq .01, df = 3$

Regarding the impact of degree of interest in PM on students' realistic perceptions, we found a significant effect in the subscales of basic sciences ($F(1,1360) = 2.67, p = .05$) and clinical practice ($F(1,1358) = 2.67, p = .05$). First-choice students had more realistic perceptions than second-choice students did of basic sciences and of clinical practice.

Furthermore, an interaction effect was found between the level in the curriculum and degree of interest in PM on students' realistic perceptions of PM knowledge and skills ($F(1,1365) = 6.07, p < .01$), daily work characteristics ($F(1,1356) = 3.02, p < .05$), and working stress ($F(1,1348) = 11.77, p < .01$) (Figure 3.1). As shown in Figures A and B, first-choice students had more realistic perceptions of PM knowledge and skills and daily work characteristics at the beginning, however, they increasingly overestimated these characteristics at higher levels of study. Second-choice students gradually had more accurate perceptions of these characteristics over the time. Figure C shows that the more first-choice students learnt the more accurate perception of working stress they had, whereas second-choice students increasingly overestimated this when they got to their final years.

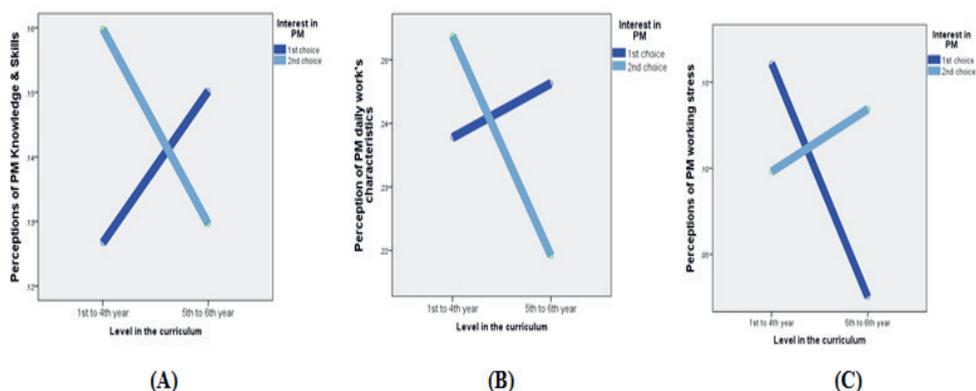


Figure 3.1. Interaction effects of level in the curriculum and interest in PM on students’ realistic perceptions of PM practice.

3.4.4. Effect of willingness to work in PM and degree of interest in PM on students’ realistic perceptions

Regarding the effect of students’ willingness to work in PM on their perception, we found a significant effect on the subscales of PM knowledge and skills ($F(1,1365) = 6.51, p < .01$), daily work characteristics ($F(1,1356) = 4.77, p < .05$), and community practice ($F(1,1360) = 6.73, p < .01$) (see Table 3.4). Students who were willing to work in PM after graduation overestimated the importance of PM knowledge and skills, daily work characteristics and community practice more than their peers who were unwilling to work in PM did (see Appendix 3.1).

Table 3.4. Effect of willingness to work in PM and interest in PM on student’s perception of PM

Subscales	First-choice students (N=937)				Second-choice students (N=432)				Effect		
	Willing (N=570)		Not willing (N=367)		Willing (N=242)		Not willing (N=190)		Interest in PM	Willing to work in PM	Interaction effect
	M	SD	M	SD	M	SD	M	SD	F	F	F
PM knowledge and skills	.15	.16	.11	.23	.15	.15	.13	.16	1.21	6.51**	.14
Basic sciences	.29	.34	.27	.39	.28	.38	.32	.42	1.28	.01	2.39
Daily work characteristics	.24	.19	.23	.22	.25	.18	.21	.26	.27	4.77*	1.42
Community practice	.26	.36	.20	.41	.30	.33	.25	.37	4.28*	6.73**	.05
Clinical practice	-.02	.33	-.02	.36	.03	.35	.01	.37	3.58*	.03	.21
Working stress	.11	.42	.14	.43	.10	.39	.14	.43	.02	1.69	.07

*One-tailed p -value $\leq .05$, ** One-tailed p -value $\leq .01, df = 3$

Concerning the impact of interest in PM on the realistic perceptions of students who differed in their willingness to work in PM, we found a significant effect on the subscales of community practice ($F(1,1360) = 4.28, p < .05$) and clinical practice ($F(1,1359) = 3.58, p < .05$). First-choice students, whether they were willing to work in PM or not, had more realistic perceptions than their second-choice counterparts regarding community practice and clinical practice (see Table 4). No interaction effects of willingness to work in PM and degree of interest in PM were found.

3.5. DISCUSSION

Our study provides new insight into the impact of levels in the curriculum and career preferences on students' perceptions of a specific primary health care specialty, PM. The results show that students have different views than practicing doctors. More specifically, students considered most of the PM characteristics to be more important than they are in practice, even for the typical ones such as the community aspect that defines the meaning of PM, or the working stress that describe the daily job features of PM. Clinical aspect was the only one characteristic that students perceived similarly to the reality; this point was a warning signal about PM students' tendency to pursue clinical careers. In particular, by ranking of importance of characteristics of PM based on mean subscale scores of students and doctors, we see a similar picture in the top-3 ranking. Doctors ranked as most important: (1) PM knowledge and skills, (2) daily work characteristics, and (3) clinical practice. Students chose (1) daily work characteristics, (2) PM knowledge and skills, and (3) basic sciences as their first three priorities. Although students realized the importance of daily job and the application of PM knowledge and skills in the specialty, they seemed to underestimate the application of clinical practice while overemphasizing the basic sciences in their future work. Our findings confirmed the conclusion of previous studies [8,12,13] that students' career preferences are not always related to their actual knowledge of the specialty, and our results provide specific evidence about perceptions of PM from the point of view of undergraduate students. Considering the state of PM training in Vietnam, a heavily theoretical and less practical curriculum, in which the first four years focus on basic sciences and basic medical knowledge, could be responsible for students' flawed perceptions of the importance of most PM aspects.

Regarding the question on how students' realistic perceptions change over the course of the curriculum, our results show that after getting some PM experience in the fifth and sixth years, senior students developed more accurate perceptions of basic sciences, clinical aspects, and working stress, but overemphasized the importance of community in PM practice compared to the reality. Previous studies have shown that the knowledge and experience that medical students gain during practice in the field helps them to develop more realistic perceptions of a particular specialty [7,10,11]. Our findings confirm these observations in the case of PM, and they also indicate a notable point that training in the community should be more practical to help students to have realistic perceptions of this aspect of PM practice.

Concerning the impact of degree of interest in PM on students' realistic perceptions, our study reveals that first-choice students always had more realistic perceptions of basic sciences and clinical practice than second-choice students, and they had more realistic perceptions of working stress than second-choice students in later years. However, second-choice students had more realistic perceptions of PM knowledge and skills and daily work characteristics than their first-choice counterparts. One explanation for this observation could be that lower interest in PM could increase the stressful feelings that second-choice students reported during their studies. Previous studies have indicated that motivation and career choice play a role in the prevalence of burnout [17,18]. Applying this to our case, we may speculate that second-choice students, who showed a lower interest in PM and higher expectation of work stress in PM practice, could be at risk of burnout, and therefore should be given more attention in efforts at prevention. Moreover, in light of previous findings about the impact of early education programs on improving attractiveness of PHC to medical students [5-7], the fact that second-choice students had more accurate perceptions of some PM characteristics in their final years is a promising sign for developing an intervention strategy. This program should early introduce the practical information such as important knowledge and skills that are useful for PM doctors, a typical work day of a PM doctor, how working in PM helps to protect the community, and so on to PM students, specifically to second-choice students who are willing to work in PM, though it was not their initial preference.

Our results revealed that students who had high willingness to work in PM overemphasized the importance of PM knowledge and skills, PM daily work characteristics, and the community aspects compared to the reality. A potential reason for this phenomenon could be that students who expressed a willingness to work in PM also had more motivation to learn and to look for information about the specialty; however, the information they found was theoretical and removed from reality. Therefore, our findings could be a foundation for developing a more appropriate information provision program, which would help students, specifically those who are not willing to work in PM, to have accurate perceptions of their future work, focusing on the role of PM knowledge and skills, PM daily work characteristics, and the community aspects of PM practice.

Remarkably, we found that first-choice students, whether they were willing to work in PM after graduation or not, had a more accurate perception of the community and clinical aspects of PM practice than second-choice students. This finding reinforces the idea of introducing community-oriented values and the concept of community interest to students during the course of training, especially to those for whom PM was not their first choice, to produce a greater number of PM doctors.

Examining the extent to which students' perceptions of PM practice are realistic as compared to doctors' perceptions helps us to better understand students' specialty preferences and willingness to work in PM. Hopefully, these insights can contribute to methods of attracting more appropriate students to work in PM, by providing students with additional information during

their medical studies. Our findings indicate the kinds of misconceptions students have about the real working situation of practicing PM doctors, such as their daily work characteristics or the specific knowledge and skills applied in PM practice, which could be corrected before and during studying as part of the curriculum's vocational component. Another implication of our study is that second-choice students have a greater tendency toward stress and might be at risk of burnout. Appropriate vocational interventions focusing on community-oriented values and interests should be directed to second-choice students, especially those who are not willing to work in PM, in order to increase the number of students entering the PM field after graduation. These findings may also have implications for other less attractive PHC specialties that are struggling to recruit and retain students.

3.6. LIMITATIONS

There are some limitations of our study. Although the original questionnaire developed by Soethout [12] used a 5-point Likert scale, we decided to use a 3-point Likert scale when asking how much a particular characteristic applied to a PM doctor's daily practice, which could have reduced the accuracy of the scale. This option was chosen because it is general practice in Vietnam to express opinions by using one of three options: either agree, disagree, or neutral. Additionally, despite relatively low Cronbach's alphas for the two subscales "Clinical practice" and "PM working stress", we decided to report on these subscales because of their importance and representativeness in understanding the characteristics of PM practice. These results on these scales were interpreted with more caution. Furthermore, we recruited only PM practicing doctors who are working in a big city and may not represent PM practice across the north of Vietnam, where we recruited part of our participating students. The different practice settings might have an effect on perception of PM doctors and this issue deserves to be explored in more detail in further studies. Lastly, this was a cross-sectional study focusing on the perception of PM students at a particular time, and we could not provide information about the relationship between students' perceptions of PM and their study achievements. A long-term follow-up study would be necessary to answer the question of whether the inaccurate perceptions of students affect their final career decisions and working destinations, i.e. in the community or in hospitals.

3.7. CONCLUSIONS

PM students have a perspective on their specialty that is different from that of PM doctors. In general, they overestimate the importance of most of PM practice's characteristics. During their studies, second-choice students report more stressful feelings about their future work than first-choice students. Although students realize the importance of PM knowledge and skills, daily work

characteristics, and community practice, their perceptions are theoretical and far from reality. Identifying specific flawed points in students' perceptions, as well as trying to encourage target subjects, such as junior students, second-choice students, and students who are not willing to work in PM, to develop a positive attitude could be helpful for vocational interventions in the curriculum. Consequently, these measures might help to recruit and retain qualified people in the PM field.

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Appendix 3.1. Descriptive statistics on realistic perceptions of PM students

Subscales	Level in the curriculum						Interest in PM						Willing to work in PM					
	Junior N = 873			Senior N = 513			First-choice N = 937			Second-choice N = 432			Willing N = 821			Not willing N = 565		
	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD
PM knowledge and skills	873	.13	.18	513	.14	.19	937	.13	.19	432	.14	.16	821	.15	.16	565	.11	.22
Basic sciences	868	.30	.36	511	.25	.40	933	.28	.36	429	.30	.40	817	.29	.35	562	.27	.40
Daily work characteristics	864	.24	.20	513	.23	.22	929	.24	.20	431	.23	.22	817	.25	.19	560	.22	.24
Community practice	868	.22	.39	513	.30	.34	934	.23	.38	430	.28	.35	817	.27	.35	564	.22	.40
Clinical practice	867	-.02	.36	513	.01	.33	932	-.02	.34	431	.02	.36	819	-.01	.34	561	-.01	.37
Working stress	855	.15	.43	513	.08	.39	922	.12	.42	430	.12	.41	814	.11	.41	554	.14	.43
Working benefits	826	.87	.47	498	.84	.41	894	.87	.45	414	.82	.44	793	.85	.43	531	.87	.47

Why do graduates choose to work
in a less attractive specialty?
A cross-sectional study on the role
of personal values and expectations

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4.1. ABSTRACT

4.1.1. Background

Primary health care (PHC), of which preventive medicine (PM) is a subspecialty, will have to cope with a deficiency of staff in the future, which makes the retention of graduates urgent. This study was conducted in Vietnam, where PM is an undergraduate degree in parallel to medical training. It aims to identify facilitating and hindering factors that impact recruitment and retention of PM graduates in the specialty.

4.1.2. Methods

A cross-sectional study enrolled 167 graduates who qualified as PM doctors from a Vietnamese medical school, between 2012 and 2018. Data were collected via an online questionnaire that asked participants about their motivation and continuation in PM, the major life roles that they were playing, and their satisfaction with their job. Multiple regression analyses were used to identify which life roles and motivational factors were related to the decision to take a PM position and to stay in the specialty, as well as how these factors held for subgroups of graduates (men, women, graduates who studied PM as their first or second study choice).

4.1.3. Results

Half of the PM graduates actually worked in PM, and only one-fourth of them expressed the intention to stay in the field. Three years after qualification, many graduates had not yet decided whether to pursue a career in PM. Satisfaction with opportunities for continuous education was rated as highly motivating for graduates to choose and to stay in PM. Responsibility for taking care of parents motivated male graduates to choose PM, while good citizenship and serving the community was associated with the retention of graduates for whom PM was their first choice.

4.1.4. Conclusions

The findings demonstrate the importance of social context and personal factors in developing primary care workforce policy. Providing opportunities for continued education and enhancing the attractiveness of PM as an appropriate specialty to doctors who are more attached to family and the community could be solutions to maintaining the workforce in PM. The implications could be useful for other less popular specialties that also struggle with recruiting and retaining staff.

Keywords: Primary health care, preventive medicine, role in life, satisfaction with job, recruitment, retention, career decision.

4.2. BACKGROUND

Despite many efforts to increase the number of physicians serving in primary health care (PHC) specialties, there is still disparity in the distribution of health care staff between hospital and community settings [1,2]. The need for physicians serving in PHC areas is, however, expected to grow, especially in middle- and low-income countries (MLICs) [2-4]. In general, medical students' and graduates' career preference for primary care specialties has decreased over time [5-7]. For example, in the UK, more than 70% of recently qualified doctors expressed preference for a hospital specialty, while 25% specified general practice, and only 1% chose public or community health [8]. There are reasons to expect that the problem will be the same or even larger in MLICs, where fewer medical students choose a PHC career [9,10]; if they do choose PHC, it is often as a "second choice" specialty [11]. Furthermore, PHC doctors tend to leave their jobs in the community and seek a hospital position after completing postgraduate specialty training [2,12-14]. This suggests that scarce resources of students, medical schools, and society may be wasted and result in the diminishing number of physicians in the PHC field.

Although there are several reports on career choices of health care workers who graduated as medical doctors in rural and remote areas [15-17], little is known about the factors related to motivation of those who studied and graduated from the less popular specialties, such as PHC. In Vietnam, preventive medicine (PM) is a subspecialty of PHC; it constitutes an undergraduate curriculum program that trains specialized staff to work in PM centers and in the community and leads to a Doctor of Preventive Medicine degree. However, our recent study [10] showed that one-third of the students who began their study in PM had little knowledge about the specialty and that it was a "second-choice" when they failed to qualify for medical school. As a consequence, these "second-choice" students expressed regret and wanted to pursue a "higher prestige" clinical position in the hospital. The tendency of moving away from the community of PHC workers has been reported both in Vietnam [12,14] and in other countries [13,15,17]. The main aim of the current study was to understand the time period at which PHC graduates, specifically graduates in PM, decide on their choice of job and the facilitating and hindering factors that affect their retention in the specialty.

Literature on clinical career paths suggests that it could take at least three years after graduation for most medical doctors to make their final decision on career choice [18,19]. We do not know yet if this period of three years would be applicable to PM doctors and if so, what happens during that time. Addressing these questions would help provide better counseling for PM students and young doctors, especially to those for whom PM was not the first preference career, so that there is greater continuity in their medical career planning.

Several demotivating factors that might impact the decision to maintain or change specialty among PHC doctors have been mentioned in the context of MLICs [15-17]: low salaries; fewer opportunities for career development; inadequate management, supervision, and training; poor infrastructure and resources; and difficult working conditions. Incentives other than finances play

a critical role in increasing PHC staff motivation, including recognition or appreciation by employer, colleagues, and the community; having a stable job and income; and access to training [15,17]. Intrinsic factors, such as love for the work or “being useful to society and taking care of people,” have also been noted [16]. In contrast, factors in high-income countries seem to be more often related to individual and family issues [19,20]. For instance, domestic circumstances, perceived lack of collegial support, social isolation from family and friends, and lack of post-graduate training were listed as demotivating factors for staff working in remote areas in Canada and Australia [20]. In European countries, female graduates had greater preference for a community specialty, and domestic circumstances were more relevant for female than for male doctors; they were also more important for general practice physicians than for hospital doctors [19]. These findings might be related to a community specialty’s greater compatibility with family life compared to a hospital specialty.

Theoretically, motives for important decisions in life can be understood using Maslow’s motivation theory [21]. According to Maslow, an individual cannot be fulfilled in life unless all five fundamental elements (i.e., physiological needs and needs for safety, love and belonging, esteem, and self-actualization) are met, starting from basic physiological needs and working toward the highest level, self-actualization. Since work plays an important role in the quality of life, Maslow’s theory can be applied to explain work-related needs in an individual’s career. Furthermore, the needs of a person could change during their lifetime in tandem with their age and personal and professional experiences and responsibilities. According to Super’s theory of life’s role in career development [22], at a certain stage of life, people can simultaneously play multiple roles, as a child, student, citizen, worker, and homemaker; increasing the number of roles in one’s life may mean less commitment to other roles. This theory has been applied to human resource development in a diverse range of contexts [23]. Applying these theories to define PM graduates’ working needs in relation to their roles at the time they make their career decision may give clues to understanding their motivation and expectations for their career pathway. For example, female doctors are expected to fulfill the simultaneous roles of family caretaker and physician; therefore, the need to be settled and able to take care of family might impact their consideration of working in the community. Another example would be if graduates have to support their wider family, which might lead to a choice to work near their parents in their hometown or encourage them to find a position in a hospital based on better income and access to health care for family members. The application of Maslow’s and Super’s theories to understand graduates’ decision to choose and continue with PM is presented in Figure 4.1.

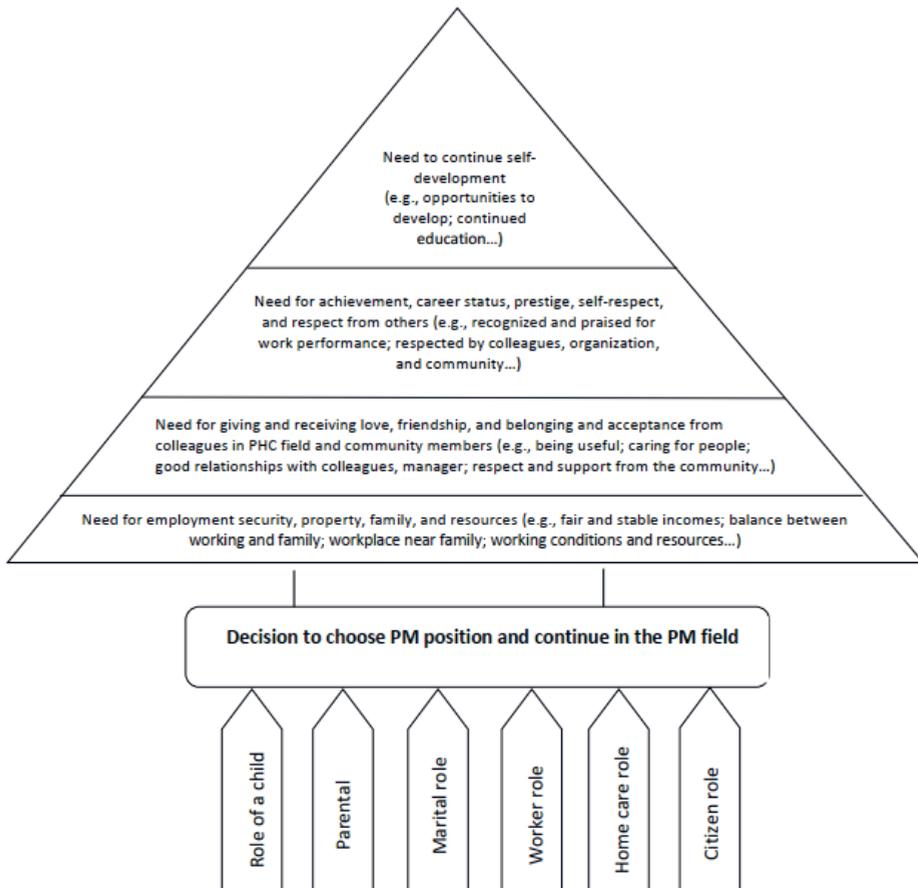


Figure 4. I: Needs of preventive medicine graduates.

There are gaps in our knowledge of the possible impacts of need fulfillment at particular life stages on graduates' motivation to choose a job in PM (a subspecialty of PHC) and continue in the specialty. The objective of this study was to identify the reasons related to life roles and motivational factors that lead to PM graduates choosing a PM position and staying in the field.

4.3. METHODS

4.3.1. Settings and participants

Hanoi Medical University (HMU) has graduated eight cohorts of PM students since the program started in 2006. Students are recruited as high school graduates for a six-year track: the first two years in the curriculum focus on basic medical knowledge and skills, the next two on clinical clerkships, and the last two on knowledge and skills related to the PM specialty. In 2013, a four-year program started recruiting students already holding a Bachelor of Science degree in nursing, public health, and medical technology; it covers only the last four years of the six-year curriculum. This study was conducted among 288 PM graduates from the six-year track between 2012 and 2018. We did not include the four-year track graduates because of limited resources and because they may differ significantly in background, prior experience in health care, and motivations to study PM.

4.3.2. Procedure

PM graduates' contact information was collected through administrators and alumni networks, using a snowball technique. Graduates were invited to participate by an email containing a brief introduction of the study and a link to the online survey (Google form). Two reminder emails were sent to those who did not respond after two and four weeks, and finally, a telephone interview was conducted to get the highest rate of response and to clarify unclear answers. The recruitment process is summarized in Figure 4.2. Ethical approval for the study was given by the Institutional Review Board of HMU (Decision No 174/HMU-IRB).

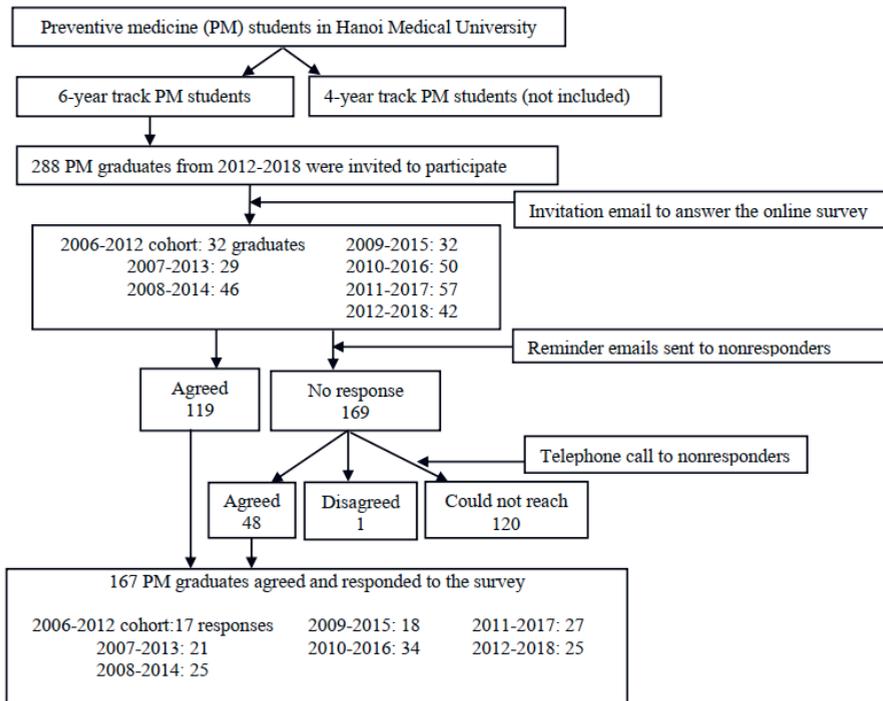


Figure 4.2: Flowchart of participant recruitment process.

4.3.3. Materials

A four-part questionnaire with 89 items (Appendix 3) was developed based on previous relevant scales [24-26]. Part A (eight items) investigated demographic information of participants, their current work site, and level of the health organization in the state health system where they were working. Part B (13 items) measured graduate's personal decision of choosing a PM position, the strength of their attachment to the PM specialty, and their desire to work in PM or intention to leave the field if provided the opportunity. Part C (35 items) was developed based on Maslow's motivation theory [21] to measure PM graduates' job satisfaction (in seven dimensions: job and working conditions, management, coworkers, promotion, pay, contingent rewards, and continued education). Relevant items were selected from existing job satisfaction scales [24-25], and new items were formulated specific to the PM specialty. Part D (33 items) was developed based on Super's theory of life role [22] to assess six major roles in a PM graduate's life (role of a child, parent, marital partner, worker, homemaker, and citizen). Relevant items were selected from existing life role scale [26], and two new subscales were formulated: one corresponding to the role of a child (to measure the commitment to staying close to and taking care of parents, an

important task of a child in Vietnamese culture), and one for the role of a citizen (to measure the commitment to serving the community, reflecting a presumed characteristic of a PM doctor).

For all items in parts B, C, and D, participants were asked to indicate to what extent they agreed or disagreed with the statement on a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). A pilot survey was conducted with five PM graduates to obtain feedback on the form, which was then revised to improve clarity.

Exploratory factor analysis was used to identify factors within the subscales related to personal decision-making on job choice and continuing with PM. The Cronbach's alpha was calculated for each subscale and was improved by removing items that reduced the internal consistency of that subscale. Table 4.1 presents the content and internal consistency reliabilities of the 15 subscales.

Table 4.1: Study instrument and internal consistency of the subscales after conducting exploratory factor analysis and deleting item

Scales	Subscales	Example item	Cronbach's α
Demographic information (Part A, 9 items)	Personal information	Gender, marital status, number of children...	NA
	Current working place	Place of work, level of organization	
	Time of making decision	Time of making decision of specialty choice	
Job choice and staying in preventive medicine (PM) (Part B, 4 items)	Choosing PM job	I accepted this job because it relates the most to PM	.67
Motivational factors (Part C, 35 items)	Continuing in PM	I wish to work in the PM field if I have the opportunity.	NA
	Happy with job and working conditions	I am satisfied with my job in terms of working conditions.	.85
	Happy with manager	My manager always stands behind the workers.	.94
	Happy with colleagues	I am satisfied with the people I speak and work with.	.93
	Happy with promotion	I am satisfied with the opportunity of being promoted at this job.	.87
	Happy with pay	My salary is good when it is compared with the wage of other physicians who work at similar positions in other specialties.	.91
	Happy with reward	I feel respected and supported while working with people in the community.	.72
Happy with continued education	My opportunities for continued education are appropriate when compared to physicians who work in other specialties.	.90	

Scales	Subscales	Example item	Cronbach's α
Multiple roles in life (Part D, 28 items)	Child role	I tried to find a job with which I can afford to support my parents and family in my hometown.	.62
	Parental role	I tried to find a job which allowed me to have time to take care of my children.	.60
Multiple roles in life (Part D, 28 items)	Marital role	I tried to find a job which allowed me to have time for my spouse.	.76
	Worker role	I tried to find a job that was interesting and exciting to me.	.74
	Homecare role	I tried to find a job which allowed me to have time to manage and care for my home.	.72
	Citizen role	I tried to find a job in which I can contribute to the community where I originate from.	.58

Note: On the parental and marital role subscales, participants who were not married or had no children indicated "Not applicable" for all items, which caused missing values when calculating the mean score of the subscales. To prevent violations of the reliability of a regression model caused by a small sample size, we did not use these two subscales in further analyses but two equivalent variables: number of children (1=no child, 2= have one child, 3=have two children, 4=have more than two children) and marriage status (1=Single, 2=Married/Have a partner)

4.3.4. Data analysis

We conducted descriptive analysis on demographic data to investigate the characteristics of participants, including their career choice and the places where they currently work. Variability according to gender and preference for PM (first-choice/second-choice) was analyzed with a χ^2 test. Results were considered statistically significant if the two-tailed p -value was less than .05.

Multiple linear regression analysis was used to describe how multiple life roles and motivational factors were related to the decision to take a PM position and to continue in the PM field. An average score per subscale was calculated; these mean scores per subscale were entered into the regression analysis as variables. Stepwise regression (backward method) was used to test which predictors (i.e., different life roles and motivational factors) predicted the outcome variables (i.e., choosing a PM position or continuing in a PM position). Collinearity diagnostics results showed no multicollinearity between our predictors. The largest variance inflation factor was smaller than 3, and all tolerance values were above .40. All analyses were performed for the whole sample, then separately for men and women and for first-choice and second-choice graduates. R^2 was reported to indicate how much of the variability in the outcome was accounted for by the predictors. Data were analyzed using IBM SPSS Statistics (Version 20.0).

4.4. RESULTS

4.4.1. General information of participants

Ultimately 167 PM graduates completed the online form (response rate 58%). The mean age of the graduates was 27 years ($SD = 2.2$; 24 to 38 years); 66.5% were women; and 59.9% chose PM as their first choice when starting medical school. The average number of years since graduation was 4.3 ($SD = 1.9$); 36.5% still had not decided on career choice. Of all study subjects, 52.7% were working in a PM position, and half of these wanted to stay in the PM field. Participants' characteristics, timing of career decision, and places of work are described in Table 4.2.

Table 4.2: Participants' characteristics, timing of career decision, and places of work

Characteristics of participants	n	%
Personal information:		
– Married	80	47.9
– Have children	61	36.5
– Born in the countryside	122	73.1
PM preference when starting medical school:		
– First choice	100	59.9
– Second choice	64	38.3
– No recall	3	1.8
Places of work:		
– Working in PM position	88	52.7
– Non-PM position in private or non-governmental organization	30	18.0
– Clinical doctor in hospital	11	6.6
– Post-graduate student or working in medical school	20	11.9
– Outside health sector	10	5.9
– Looking for employment	8	4.8
Level of public health care organization:		
– Central	78	46.6
– Province	57	34.1
– District	32	19.3
– Village	0	0
Timing of decision about career choice:		
– Before or at the time of graduation	69	41.3
– During first job	37	22.2
– Had not made a decision	61	36.5
Continuation in PM position:		
– Yes	90	53.9
– No	77	46.1

4.4.2. Association of life roles and motivational on graduates' decision to choose a PM position

Table 4.3 presents the results on how life's multiple roles and motivational factors impacted on graduates' decisions to choose a job in PM for all graduates and subgroups. The results indicated that the "child" role was significantly related to the decision to choose a PM position for all PM graduates ($p < .01$), as was access to continued education ($p < .001$).

Table 4.3: Association between playing multiple life roles and motivational factors on graduates' decision to choose PM position

	F	df	R ²	B	SE B	β	95% CIs
All graduates (N = 143)	15.5***	2	.2 [^]				
Child role				.3	.1	.2**	.1-.6
Continued education				.4	.1	.4***	.2-.6
Male (N = 50)	7.9***	3	.4 [^]				
Child role				.7	.2	.5***	.2-.9
Colleagues				.4	.2	.3**	.1-.8
Continued education				.4	.2	.4**	.1-.8
Female (N = 93)	11.6***	3	.3 [^]				
Marital status				.4	.2	.2*	0-.8
Job and working conditions				.4	.1	.3*	.1-.7
Continued education				.4	.1	.3**	.1-.6
First choice (N = 82)	12.1***	2	.2 [^]				
Child role				.4	.2	.3**	.1-.7
Continued education				.4	.1	.4***	.2-.6
Second choice (N = 58)	5.7*	1	.1 [^]				
Continued education				.4	.2	.3*	.1-.7

Note: * p-value $\leq .05$, ** p-value $\leq .01$, *** p-value $\leq .001$, [^] p-value $> .05$, F: explains the variance in the dependent variable (i.e., decision to choose PM position), R²: explains how well the model fits the data

Among the subgroups, however, findings were different. Male graduates who valued the child role, satisfaction with colleagues, and satisfaction with continued education were more inclined to choose a PM position. For female graduates, the more they settled down (i.e., married) and the more they were satisfied with their job and working conditions and continued education, the more they tended to choose a PM position. The general model fits well with the first-choice graduates, while the second-choice graduates were more likely to choose a PM job when they were more satisfied with possibilities for continued education.

4.4.3. Association of life roles and motivation on graduates’ decision to stay in PM

Table 4.4 presents the results of how playing multiple life roles and motivational factors impacted graduates’ decision to stay in PM for all graduates and subgroups. The role of “citizen” appeared to be related to continuing in PM among all PM graduates ($p < .05$), as were job and working conditions ($p < .01$) and continued education ($p < .001$).

Table 4.4: Association between playing multiple life roles and motivational factors on graduates’ decision to continue in PM

	F	df	R ²	B	SE B	β	95% CIs
All graduates (N=131)	8.9***	3	.2[^]				
Citizen role				.5	.2	.2*	.1–.8
Job&working conditions				-.4	.1	-.3**	-.7–-.1
Continued education				.5	.1	.4***	.3–.8
Male (N=47)	5.8**	2	.2[^]				
Job&working conditions				-.6	.2	-.5**	-.9–-.2
Continued education				.6	.2	.5**	.2–.9
Female (N=84)	9.7**	1	.1[^]				
Continued education				.4	.1	.3**	.1–.7
First-choice (N=73)	7.4***	3	.2[^]				
Citizen role				.7	.3	.5*	.2–1.2
Job&working conditions				-.5	.2	-.4**	-.9–-.2
Continued education				.6	.2	.5**	.2–.9
Second-choice (N=55)	5.9**	2	.2[^]				
Childe role				.4	.2	.3	0–.8
Continued education				.5	.2	.4**	.2–.8

Note: * p-value ≤ .05, ** p-value ≤ .01, *** p-value ≤ .001, [^] p-value >.05, F: explain the variance in the dependent variable (i.e. decision to retain in PM), R²: explain how well the model fit that data

Findings differed among subgroups. For male graduates, the less they felt satisfied with job and working conditions and the more satisfied with continued education, the more they were inclined to continue in PM. Satisfaction with continued education was the only factor predicting the tendency of staying in PM for female graduates. The general model fits well with the first-choice graduates, while the second-choice graduates would maintain their career in PM if they took the importance of the role of “child” seriously and were satisfied with possibilities for continued education.

4.5. DISCUSSION

Recruitment and retention of PM staff remains a challenge in many countries. Our study provides new information about PM graduates' post-educational job choices and interest in continuing to work in this PHC subspecialty, which can inform policy to encourage more PM staff to join and stay in the field. Different factors influenced decisions on job choice and continuing in PM among men and women and between graduates who had or had not chosen PM at the start of their university study.

The results showed that only half of PM graduates were actually working in PM, the majority at the central and provincial levels, while about 10% of half of the graduates worked in hospitals or outside the health sector, and none of them worked in the community. This is consistent with existing evidence that PHC staff in Vietnam move away from the community and from preventive care [12,14]. In the current study, nearly 40% of the graduates had chosen to study PM without a strong preference, that is, as a second choice. As we have previously reported [11], PM students had misconceptions about what PM doctors really do in practice, which might partly explain graduates' job choices, although we did not find a significant difference in current jobs between graduates who chose PM as a first- or second-choice.

In this study, we found that one-third of graduates had not decided which specialty to pursue as a career, even though half of them had graduated more than three years earlier, and one-third were already working in PM. This career decision-making time period is longer than that from previous findings among medical graduates [18,19] or among more mature graduates of clinical specialties such as nephrology [27] or oncology [28], which reported the time was one to three years after qualification. This indecision about career choice among graduates in a PHC specialty has been confirmed in both developed [18,19] and developing countries [10,13]. The possibility of losing more than half of graduates who did not choose PM even three years after qualification questions the effectiveness of training programs that recruit freshmen straight to the PHC subspecialty training, suggesting that the specialty should be offered as a post-graduate training specialty. However, to be more optimistic, this three-year period of instability could be seen as an opportunity to engage more graduates who are still undecided, by working to meet their needs and nurturing their preference for work in PHC.

Concerning the influence of life roles on graduates' career decisions, we found a significant association between the "role of a child" (i.e., staying close to, respecting, and taking care of parents) and the decision to choose a PM job. Additionally, the "role of a citizen" (i.e., serving the community) was related to the decision to stay in the PM field, although not in all subgroups. Responsibility to parents only influenced the choice for PM among male and first-choice graduates. This confirms an observation in our previous study [11], which showed that first-choice PM students were drawn to study PM by the desire to uphold their family traditions and fulfill their parents' wishes. The fact that the role of a child strongly affected male graduates but not their female peers could be explained by the social norm in Vietnam that expects men

to take care of their parents, while women should assist their husbands in that task. Interestingly, a child's responsibility for their parents encourages particularly second-choice graduates to stay in PM, even though it might not be their preferred specialty. The idea of working in PM, with its offer of stability and sufficient time to care for parents, might help to explain this motivation. This interpretation is supported by another report [14] that Vietnamese doctors expressing interest in stable work and salary were more satisfied with their current job in rural areas. For female graduates, marriage was a significant factor influencing the choice of a PM job, consistent with previous findings in European countries [17,19]. These advantages of PM work could be emphasized to increase the attractiveness of the specialty to new students and undecided young doctors, especially to women and second-choice graduates.

Interestingly, we found a link between commitment to serve the community (the citizen role) and the tendency to stay in PM, particularly among those for whom PM was their first choice. This confirms the importance of intrinsic factors, such as "being responsible" and "relation with the community" that have been noted as significant motivators from the perspective of health professionals in developing countries [16,17]. Although our data do not allow us to conclude that the inherent preference for PM of first-choice graduates was the main motivator for them to stay in the field, it might be useful to guide recruitment of "the right students" and "the right staff" in a less popular specialty like PHC. Additionally, our findings enrich the existing application of Super's role salience theory in human resources development [22] by providing information from the perspective of both health care-related human resources and that of a developing Asian country whose values and cultural context are different from the Western settings the theory and its related literature have mostly focused on. However, we did not investigate the interaction among the roles important to healthcare workers during their career development, including the influence of changing life roles on an individual's career development strategies. Future longitudinal studies can help in the understanding of the inter-role relationships and the effect of role fluctuation in different life stages on retention of PHC health workers.

Along with the impact of personal life roles, we found that satisfaction with opportunities for continued education was prominent in graduates' motivation, regardless of gender or PM preference. This motivating factor can be linked to the highest level of Maslow's pyramid, that is self-actualization, as access to continued education would provide graduates opportunities for professional achievement and advancement. This result is in line with a previous study on motivation of medical staff in a Cyprus public general hospital [29]; however, our results did not reveal a connection of certain factors including remuneration or good relationships with coworkers to lower levels of the pyramid, as reported in that study. Critics of Maslow's hierarchy of needs also assert that this theory may not be universally applicable and may vary across cultural, organizational, and individual perspectives in different countries [30]. Another possible explanation for this difference is that our participants are PHC workers, a specialty that is

considered to have less prestige and be less attractive than hospital-based specialties. Therefore, their desire might be for the opportunity for achievement and to gain respect from colleagues and the community, which can be linked to the achievement needs in Maslow's pyramid. Our findings also confirm the observation of Witter et al. [14], who listed the lack of opportunity for further training or continued education as an impediment to working in PHC. Interestingly, these authors suggested that a possible underlying reason for health workers' demands for further training was that better training might be a "passport" for them to leave their lower-level facilities. An implication of our findings on retaining PM doctors therefore includes both providing more trainings (short courses, graduate, and post-graduate) and controlling the final destination of PM staff after achieving higher qualifications. Unexpectedly, we found a negative relationship between satisfaction with job and working conditions and the decision to stay in PM, especially among men and first-choice graduates who decided to stay because of their responsibility to their parents. Our data do not explain this unusual connection; we hypothesize that these graduates felt unhappy because they did not see any other option than continuing in PM. Further study is necessary to explore this issue in more detail.

4.6. LIMITATIONS

The present study has several limitations. Firstly, the study design was cross-sectional, which allowed us to examine predictors' association with PM recruitment and retention at only a single time point. In the future, longitudinal studies should be conducted to follow participants and describe the entire process of their career choices, from the beginning to the final decision. Secondly, participants were PM graduates drawn from one medical school; when this study was conducted, six out of 13 Vietnamese state medical universities offered PM training, including HMU. To increase the generalizability of our results, future studies should recruit graduates from other medical schools that also provide PM training, as differences in training programs, sociodemographic characteristics, facilities, and available positions might impact job choices. Finally, the limited sample size was partly a result of the university's not yet well-established alumni information system, which caused random missing values. The relatively low response rate from graduates whom we did reach might not be fully representative of our sample; for example, alumni who are dissatisfied with their current situation could have been more inclined to answer than those who are satisfied. Future study could also include the four-year program graduates, whose motivations may be different because they already have practical health care experience before starting their study. Their perspectives would be relevant and might provide good information to policy makers to focus efforts on people with more experience.

4.7. Conclusions

This study, which asked graduates from a PHC subspecialty training program what motivated them to choose a PHC job and to keep working in the field, is the first of its kind. The research provided information about timing of career choices, personal needs, and expectations of graduates that will support the design of interventions aimed at maintaining an adequate PHC workforce. The findings highlight the importance of continuing education and the role of graduates in relation to family and the community in recruiting and retaining healthcare workers in PHC in Vietnam. These findings can inform and inspire policy development to manage human resources for PHC in Vietnam and perhaps globally and might also be useful for other less popular specialties struggling with recruiting and retaining staff.

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Appendix 4.1: Survey questionnaire of PM Graduates

No	Question	Answer
A	Personal information	Tick the corresponding box
A1	How old are you? old
A2	What is your gender?	Male Female 1 <input type="checkbox"/> 2 <input type="checkbox"/>
A3	What is your marital status?	Single or divorced Married Others (in detail): 1 <input type="checkbox"/> 2 <input type="checkbox"/> 97 <input type="checkbox"/>
A4	How many children do you have?
A5	Which was the level of priority of your choice at medical school to study PM?	PM was my first preference 1 <input type="checkbox"/> PM was my second preference 2 <input type="checkbox"/> PM was my third preference 3 <input type="checkbox"/> I do not remember 98 <input type="checkbox"/>
A6	Where are you working?	State health establishment Private health center 1 <input type="checkbox"/> Foreign organization 2 <input type="checkbox"/> Medical school/institute/college 3 <input type="checkbox"/> Post graduate studying 4 <input type="checkbox"/> Clinical department in hospital 5 <input type="checkbox"/> Para-clinical department 6 <input type="checkbox"/> Not working in medicine 7 <input type="checkbox"/> Unemployment 8 <input type="checkbox"/> Others (in detail): 97 <input type="checkbox"/>
A7	If you are working in a state health establishment, which level are you working at?	Central 1 <input type="checkbox"/> Provincial 2 <input type="checkbox"/> District 3 <input type="checkbox"/> Commune 4 <input type="checkbox"/> Lecturer/researcher 5 <input type="checkbox"/> Others (in detail): 97 <input type="checkbox"/>
A8	When did you make a final decision on the speciality? in which you want to pursue your career	When I chose to study PM 1 <input type="checkbox"/> When I was studying at medical school 2 <input type="checkbox"/> When I finished studying and graduated 3 <input type="checkbox"/> When I found my first job 4 <input type="checkbox"/> When I found my current job 5 <input type="checkbox"/> I haven't made the decision yet 6 <input type="checkbox"/>

B Job Choice and Retention in PM field

Please mark on the scale to which you agree or disagree about your current job (1-Strongly disagree; 2-Partly disagree; 3-Neither agree nor disagree; 4-Partly agree; 5-Strongly agree; 6-Not applicable)

<i>Decision on taking a job offer</i>		(1)	(2)	(3)	(4)	(5)	(6)
B1	I accepted this job because it was the only available job offer I had at that time	<input type="checkbox"/>					
B2	I accepted this job because it helps me to have stable incomes	<input type="checkbox"/>					
B3	I had tried several jobs and was not happy until this one	<input type="checkbox"/>					
B4	I accepted this job because it seemed to be the best offer among several job options I had	<input type="checkbox"/>					
B5	I accepted this job because it fits best with my expectations and desires about a job	<input type="checkbox"/>					
B6	I accepted this job because it relates the most to PM field	<input type="checkbox"/>					
B7	I gathered as much information as possible about the job before I accepted it	<input type="checkbox"/>					
B8	My current job is well fit with what I had been trained for Retention in PM field	<input type="checkbox"/>					
B9	I will probably look for a new job in the upcoming year	<input type="checkbox"/>					
B10	I often think about quitting this job	<input type="checkbox"/>					
B11	I wish to work in PM field if I have the opportunity	<input type="checkbox"/>					
B12	I wish to leave PM field if I can find another job	<input type="checkbox"/>					
B13	I think I will keep this job as long as possible	<input type="checkbox"/>					

C Job satisfaction

Please mark on the scale to which you agree or disagree about your current job (1-Strongly disagree; 2-Partly disagree; 3-Neither agree nor disagree; 4-Partly agree; 5-Strongly agree; 6-Not applicable)

<i>Satisfaction on "Job and working condition"</i>		(1)	(2)	(3)	(4)	(5)	(6)
C1	I like doing the things I do at work	<input type="checkbox"/>					
C2	I sometimes feel my job is meaningless	<input type="checkbox"/>					
C3	My job is enjoyable	<input type="checkbox"/>					
C4	I am satisfied with my job in terms of working conditions	<input type="checkbox"/>					
C5	I feel a sense of pride in doing my job	<input type="checkbox"/>					
<i>Satisfaction on "Management skills"</i>							
C6	My manager provides me assistance at difficult cases	<input type="checkbox"/>					
C7	My manager is quite competent in doing his/her job	<input type="checkbox"/>					
C8	My manager manages his subordinates well	<input type="checkbox"/>					
C9	My manager always stands behind the workers	<input type="checkbox"/>					
C10	My manager considers the complaints of employees	<input type="checkbox"/>					
<i>Satisfaction on "Co-workers"</i>							
C11	I am satisfied with my colleagues on being agreeable with each other	<input type="checkbox"/>					

C12	I am satisfied with the people I speak and work with	<input type="checkbox"/>				
C13	My colleagues are hardworking	<input type="checkbox"/>				
C14	I am satisfied with the friendship of my colleagues	<input type="checkbox"/>				
C15	My colleagues take responsibility for their duties	<input type="checkbox"/>				
<i>Satisfaction on "Promotion"</i>						
C16	I am satisfied with the opportunity of being promoted at this job	<input type="checkbox"/>				
C17	Promotion at my work is based on individual skills	<input type="checkbox"/>				
C18	The person who performs well in his job can get the chance to be promoted	<input type="checkbox"/>				
C19	There are regular promotion practices at my work	<input type="checkbox"/>				
<i>Satisfaction on "Pay"</i>						
C20	My wage is enough for my regular expenses	<input type="checkbox"/>				
C21	I feel satisfied with my salary increases	<input type="checkbox"/>				
C22	My wage is appropriate when it is compared with workers in other occupations	<input type="checkbox"/>				
C23	I think I get a fair wage for the work I do	<input type="checkbox"/>				
C24	My salary is good when it is compared with the wage of other physicians who work at similar positions in other specialties	<input type="checkbox"/>				
<i>Satisfaction on "Contingent rewards"</i>						
C25	I do not feel that the work I do is appreciated	<input type="checkbox"/>				
C26	I don't feel my efforts are rewarded the way they should be	<input type="checkbox"/>				
C27	When I do a good job, I receive the recognition for it that I should receive	<input type="checkbox"/>				
C28	I feel respected and supported while working with people in the community	<input type="checkbox"/>				
C29	I feel respected and supported by medical colleagues in other specialties	<input type="checkbox"/>				
C30	There are few rewards for those who work in my organization	<input type="checkbox"/>				
<i>Satisfaction on "Continued education"</i>						
C31	I feel satisfied with my possibilities for continued education	<input type="checkbox"/>				
C32	I have gained a lot of PM practical knowledge and skills from doing this job	<input type="checkbox"/>				
C33	My opportunities for continued education are appropriate when compared to physicians who work in other specialties	<input type="checkbox"/>				
C34	I am supported by managers and colleagues while I have to study for my continued education	<input type="checkbox"/>				
C35	Chances for continued education at my work are based on individual competence and needs	<input type="checkbox"/>				

D21	I am willing to devote whatever time and energy it takes to move up in my job/career field	<input type="checkbox"/>				
D22	I value being involved in a career and want to devote the time and effort needed to develop it	<input type="checkbox"/>				
D23	I am willing to devote a significant amount of my time to building my career and developing the skills necessary to advance in my career	<input type="checkbox"/>				
<i>Homecare role</i>						
D24	I want to have the responsibility for seeing that my home is well kept and well run	<input type="checkbox"/>				
D25	I tried to find a job which allowed me to have time to manage and care for my home	<input type="checkbox"/>				
D26	I tried to find a job which was near my house	<input type="checkbox"/>				
D27	I am not willing to devote a significant amount of my time to managing and caring for a home	<input type="checkbox"/>				
D28	I want to leave most of the day-to-day details of running a home to someone else	<input type="checkbox"/>				
D29	I want to be very much involved in caring for a home and making it attractive	<input type="checkbox"/>				
<i>Citizen role</i>						
D30	I tried to find a job in which I can contribute to the community where I originate from	<input type="checkbox"/>				
D31	I tried to find a job that could help me to stay in big cities	<input type="checkbox"/>				
D32	I am willing to devote the time and effort needed to develop my original community	<input type="checkbox"/>				
D33	At this moment having a successful career and family life is more important than caring for my own community	<input type="checkbox"/>				

Thank you very much for your time!

Attracting and retaining physicians in less attractive specialties – The role of continuing medical education

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5.1. ABSTRACT

5.1.1. Background

Less attractive specialties in medicine are struggling to recruit and retain physicians. When properly organized and delivered, continuing medical education (CME) activities that include short courses, coaching in the workplace, and communities of practice might offer a solution to this problem. This position paper discusses how educationalists can create CME activities based on the Self-Determination Theory that increase physicians' intrinsic motivation to work in these specialties.

5.1.2. Main content

The authors propose a set of guidelines for the design of CME activities that offer physicians meaningful training experiences within the limits of the available resources and support. First, in order to increase physicians' sense of professional relatedness, educationalists must conduct a learner needs assessment, evaluate CME's long-term outcomes in work-based settings, create social learning networks, and involve stakeholders in every step of the CME design and implementation process. Moreover, providing accessible, practical training formats and giving informative performance feedback that authentically connects to learners' working life situation increases physicians' competence and autonomy so that they can confidently and independently manage the situations in their practice contexts. For each guideline, application methods and instruments are proposed, making use of relevant literature and connecting to the Self-Determination Theory.

5.1.3. Conclusions

By reducing feelings of professional isolation and reinforcing feelings of competence and autonomy in physicians, CME activities show promise as a strategy to recruit and retain physicians in less attractive specialties.

Keywords: Guidelines, continuing medical education, CME, attraction, retention, physicians, less attractive specialties.

5.2. INTRODUCTION

Imbalance in the health workforce is no novelty; It is reported in most of the health care professions in both developed and developing countries [1]. Previous studies have reported imbalances between specialties (generalists vs. specialists), services (preventive vs. curative care), gender, and geographical location (urban vs. rural areas) [1,2]. In fact, shortages of physicians have been reported mainly in primary care specialties and in specialties that provide preventive care services in the community [3-5]. In the United States, 88% of doctors are specialists, while only 12% of doctors are generalists (i.e., general practitioners, family doctors, and other non-specialist medical practitioners). Similar percentages of 72% to 28% have been reported in the United Kingdom [4]. This maldistribution is even more pronounced in developing countries, where the demand for professionals in many important primary health care occupations far exceeds their supply [5-7]. For instance, to meet the mental health care needs of the African and South-East Asian populations, at least 20 additional mental health professionals are required per 100,000 inhabitants, and most of the psychiatrists work for mental hospitals [5]. Or in case of family medicine, despite its important role in low- and middle-income countries (LMICs)' health system to achieve health equity and attain Sustainable Development Goals [8], it is still relatively new and has not been a residency-based medical specialty in many African and Asian countries [9]. In other areas, such as general practitioner, geriatrics, pediatrics, and preventive medicine, similar maldistributions of physicians are recorded [10-13]. Several reasons are listed to explain for the preponderance of specialist over generalist or "preventist" doctors, such as: less medical students choose non-specialist specialties [11,14], low job satisfaction of generalist doctors due to low incomes [6,7,15], high workload [7,12,16], as well as perceiving low prestige compared to specialist doctors [16,17].

As a consequence of this imbalance, physicians who do work in less attractive specialties (LASs) face a higher workload, feelings of professional isolation, limited career development opportunities, and economic instability [18]. These unfavorable conditions, in turn, make physicians less satisfied and willing to remain in LASs [19], creating a vicious cycle of health care workforce imbalance and poor health outcomes of the population, especially in the primary care domains [16,20,21]. Indeed, physicians working in LASs are extremely disappointed with their salary which is significantly lower than that of their colleagues in other specialties [2,22,23]. Even in the LMICs where all doctors are paid a flat rate regardless of specialty, such as Nigeria [24] or Vietnam [7], physicians working in LASs (like primary care, mental health or preventive medicine) are not satisfied with their incomes. They do not have opportunities to get paid from other allowances (i.e. private practice, per diem for attending workshop, etc) as much as their clinical colleagues do [7,16,24]. Although financial incentives have had a positive impact on the recruitment of doctors [25,26], as extrinsic motivators they did not have a long-lasting effect [27,28]. LASs physicians typically work in challenging environments [12] with limited resources or infrastructures [29] and a lack of supervision and connection to their professional community

[30]. Although efforts to improve health care infrastructure and physicians' working and living conditions have been found to enhance job satisfaction and retention [30], their effectiveness is limited as they require considerable skills in managing and monitoring the allocation and use of resources, especially in developing countries [31]. Other interventions to provide personal and professional support in the form of close mentoring and supervision have had positive results in increasing primary care physicians' performance and job satisfaction [31-33]. Yet, we need more follow-up studies to evaluate the impact on physicians' intention to continue working in the field [33].

Another demotivating factor is that physicians in LASs have fewer opportunities to participate in continuing medical education (CME) activities, such as classes, seminars, and training, to update their knowledge and extend skills in their field. Indeed, CME is considered an important factor motivating doctors to work in LASs [7,10,34], as it significantly improves satisfaction, learning, performance, and specialist recertification in LASs physicians [30-33]. For example, physicians working in rural Kenya and Benin feel more comfortable and confident with their work taking short training courses, with about 20% of them mentioning an increase of interest and work commitment [31]. This effectiveness of CME on satisfaction and retention of physicians working in LASs is also reported in other countries [34-39]. Considering that training programs for physicians in LASs, including in-service training or continuing education, are often not available [40-43], there is a need for information on how CME can be designed and implemented to increase physicians' motivation to work in LASs.

Recently, most research on the effectiveness of CME for motivating healthcare workers took the form of experimental studies [30,37,39], evaluating the impacts on participants' knowledge and practice as well as patients' outcomes. CME also was mentioned in several systematic reviews of strategies to cope with the problem of healthcare worker shortages [35,43]. These studies and reviews provided evidence for the necessity and the effectiveness of CME. However, to highlight the characteristics of CME as a potential solution for recruiting and retaining healthcare workers in LASs, we seek to offer a practical set of guidelines for the design and organization of CME activities in the format of a position paper. Based on Self-Determination Theory (SDT) [44], we purposefully searched the literature for research findings that support our claims and proposed guidelines. First, we will describe how SDT, and, more specifically, its three components of Autonomy, Competence, and Relatedness representing physicians' psychological needs that must be addressed, can be applied to the design and implementation of CME activities for LASs. We will then present the guidelines for the said CME activities, providing specific directions for each of the following three stages of development: (1) goal setting and evaluation, (2) design and development, and (3) implementation of the learning activities involving all relevant stakeholders. Finally, in the Discussion section we will present specific practical tips and set out the implications of these guidelines.

5.3. SELF-DETERMINATION THEORY

Presented by Deci and Ryan in 1985, SDT has been widely used as a theory of work motivation in various contexts, such as business, education, and health care, and has recently been introduced into the medical education discourse as well [45,46]. It differs from other theories of motivation in that it distinguishes a spectrum of motivation ranging from amotivation (total disengagement), through extrinsic motivation or controlled motivation (people undertake an activity under pressure, often expecting extrinsic rewards to stay motivated), to intrinsic motivation or autonomous motivation (people engage in an activity because they find it interesting). According to SDT, to foster motivation the following three psychological needs of an individual must be addressed: *autonomy* (the feeling of being free to choose whatever one desires); *competence* (the feeling of being effective in whatever action one performs), and *relatedness* (the feeling of being connected with or belonging to and accepted by one's community) [44]. As such, SDT presents a comprehensive framework for analyzing how effective CME activities can help cultivate the autonomous motivation in LASs physicians to enter and stay active in the fields by increasing these feelings of relatedness, competence, and autonomy (see Figure 5.1).

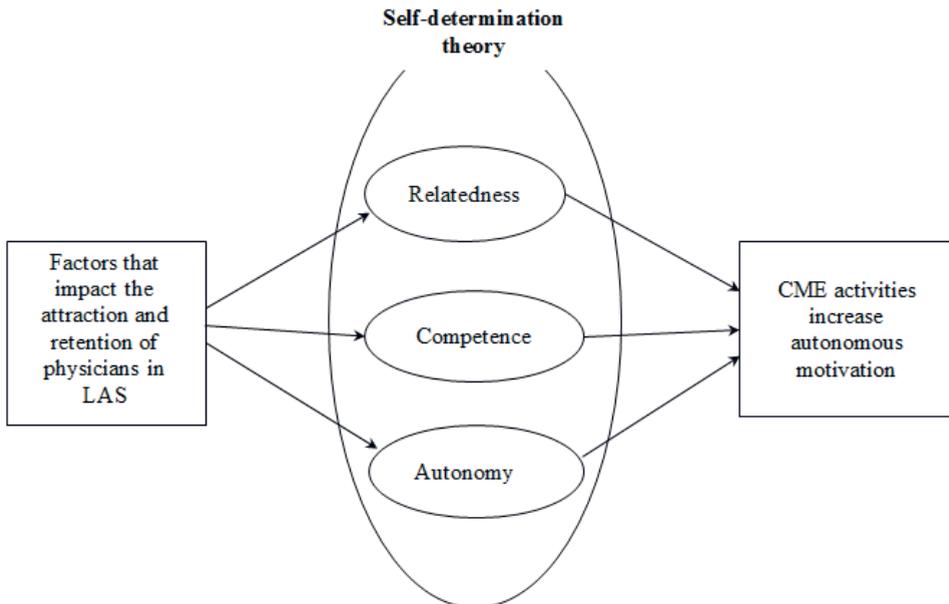


Figure 5.1: Framework for developing CME activities based on the self-determination theory that effectively motivate physicians to work and remain in LASs.

Physicians in LASs usually have to work independently, isolated from their professional community [47-49]. Such professional communities are generally sustained by means of informal gatherings of physicians in their workplace or professional organizations; They are also formally formed via hierarchical work relations or by taking part in conference meetings or CME activities. A study with Canadian family doctors revealed that feeling related was the largest contributor to physicians' job satisfaction and work-related engagement [49]. The working conditions in LASs are such, however, that physicians have less professional connections, thereby reducing their opportunities to talk with colleagues about their work, their patients, and to seek their support, empathy, or simply the passion and motivation to work [48]. Moreover, working conditions in LASs usually require a high sense of self-confidence and independence in physicians' performance, which underscores their autonomy and competence needs. Indeed, an international study involving primary care physicians in the USA, UK, and Germany found that a lack of administrative and clinical autonomy was associated with high levels of work stress in physicians in all three health care systems [50].

It has been suggested that, in order to increase physicians' feelings of relatedness, it is important to first carefully analyze their learning needs [51] and to connect them with their community [49,52]. To strengthen their feelings of competence, moreover, physicians should be continuously updated with new knowledge and practice [53] and receive close supervision via on-site follow-up and evaluation [54]. Finally, to enhance feelings of autonomy, physicians must be free to study in their own setting, undertake learning activities that are learner-centered and practical [35], and have the opportunity to independently apply new knowledge and skills to their own struggles in daily practice [37,55]. In sum, these three basic psychological needs of physicians – relatedness, competence, and autonomy – should be considered and embedded in every step of the CME design and implementation process to increase autonomous motivation in LASs physicians and induce them to consistently pursue their careers in LASs.

5.4. CME GUIDELINES

In the following section, we propose a set of SDT-inspired guidelines for the design of CME activities that help attract physicians to LASs and retain them. The relevant literature used to support these guidelines was searched for in PubMed, Web of Sciences, and Google Scholar. Table 5.1 gives an overview of these specific guidelines, which are organized into three parts. While the first part focuses on how to define and evaluate the objectives of CME, the second part targets the design and development of learning activities that address these goals. Finally, the third part explains how to involve all relevant stakeholders in the implementation process.

Table 5.1: CME guidelines that may help to recruit and retain health professionals in LASs

Scope	Guidelines	Alignment with self-determination theory
Goal setting and evaluation	<ul style="list-style-type: none"> • Keep physicians up-to-date with current and best practices in their specialty by addressing their specific needs. • Conduct a needs assessment and evaluation both online and offline, via alumni networks or professional associations. • Use evaluation methods that authentically connect to learners' working life situation to stimulate learners to appreciate the effectiveness of their new learning and to build their capacities so that they can confidently and independently manage the situations in their practice context. 	<p>Increase relatedness</p> <p>Increase competence and autonomy</p>
Design and development of learning activities	<ul style="list-style-type: none"> • Use formats that are learner-centered which will increase participants' independence, provided they can practice and apply new knowledge and skills in their own situation and also learn from their own struggles in daily practice. • Train LASs physicians in practical, flexible, and user-friendly platforms, so that they can adapt learning to their busy, isolated, and resource-limited settings. • Give doctors equal and fair opportunities to participate in CME, regardless of their position and experience; Let participants share the knowledge acquired with colleagues in their organization. • Create a social learning network and community of practice among participants during and after the educational activities 	<p>Increase autonomy and competence</p> <p>Increase relatedness</p>
Involvement of stakeholders in the implementation process	<ul style="list-style-type: none"> • Develop alumni networks and professional associations and engage these in every step of the CME development process by making use of their contributions and following their interests. • Involve facilitators from health profession education institutions and organizations and technologists in the development of CME. • Develop a policy of licensing and continuing professional development requirements, including a quality assurance procedure for designing CME courses. 	<p>Increase relatedness</p> <p>Increase competence</p>

5.4.1. Goal setting and evaluation

As can be seen in Table I, to be able to develop CME activities that enhance feelings of relatedness in LASs physicians, it is important that participants' training needs be carefully analyzed via their specialty's professional community and alumni networks, both online and offline. Similarly, feelings of competence and autonomy can be reinforced in LASs physicians, by making sure the design of CME activities includes an evaluation of their impact on physicians' practice, attitudes, and behaviors in their daily practice as well as on their connection and commitment to stay in the specialty. We will now elaborate on each of these aspects.

5.4.1.1. Analyze doctors' needs

In conducting a needs assessment, it is important to differentiate between doctors' "felt," "perceived," and "expressed" learning needs. Felt needs are what doctors feel they need, based on their own experiences in direct patient care. Perceived needs refer to what they take in after having interacted with colleagues and the professional community in clinical and academic activities. Finally, expressed needs are what they report in a formal needs analysis conducted by their organization for quality management and risk assessment purposes [56]. Indeed, the literature has shown that doctors working in LASs have various learning needs, which range from the need to learn basic medical topics to learning more personal and professional competencies for high-quality practice. Primary care doctors in developing countries, for instance, need to learn basic knowledge of how to diagnose and manage common diseases in the community [57]. Their colleagues in developed countries, on the other hand, need to learn about disease pattern changes or other additional knowledge to manage patients in new emerging fields in their area, as in the case of Canadian family doctors wanting to learn genetic counseling [53] or listeriosis care during pregnancy [58]. Furthermore, LASs physicians in developed countries also want to learn about teaching and teamwork [59] or how to provide palliative care for patients in rural and remote locations where many people prefer care at home during their end-of-life phase [37]. When based on instructional approaches that address these specific needs, CME can help to close any existing gaps between doctors' current and best practices [51].

Depending on LASs physicians' working conditions, such needs analysis should be conducted either online (e.g., when physicians work in remote areas or are difficult to reach through other channels) or offline (e.g., when physicians cannot access the Internet or can only be reached via professional activities in their specialty). To obtain doctors' valid contact information, one might refer to the alumni mailing list, a result of previous educational activities, or the professional associations. Using these same alumni networks or professional associations for evaluation purposes, moreover, might reinforce the connections between the organizations and their members, thereby reducing feelings of professional isolation in LASs physicians [37].

5.4.1.2. Evaluate the quality of CME activities

It is essential to evaluate whether the CME program has been successful in teaching particular competencies to LASs physicians and in increasing their independent performance at work. By using evaluation formats that “authentically connect to learners’ life circumstances, frame of preference and values”, learners can receive informative feedback on their new competencies so that they can independently manage situations in their practice context [60]. Case scenarios offer an authentic way to evaluate how learners apply the relevant knowledge learned in the CME courses to similar situations in their work settings [61]. Another evaluation method that is precise and authentic is “Audit and Feedback.” Often used for quality improvement purposes in the workplace, this intervention first measures physicians’ performance and consequently provides them with feedback from instructors, supervisors, or colleagues on specific points needing improvement, accompanied by an appropriate action plan [62]. Over the long term, these workplace-based evaluation methods have the potential to strengthen feelings of relatedness [61], competence, and independence in physicians, which can be considered a true benefit [54,63]. These long-term effects on physicians’ professional development and careers are often missed by current CME evaluation practices as they mainly focus on outcomes that are easy to measure, such as participants’ self-reported knowledge, confidence, skills, and attitudes [54].

To measure other long-term outcomes of CME such as learners’ performance, outcomes on patients’ health or community health, Moore et al. [63] proposed a framework for outcomes assessment in CME. This seven-level framework, which was expanded on the base of integrating his original framework and other models of assessment and evaluation such as Kirkpatrick’s model of training evaluation [64] and Miller’s pyramid [65], can be used to design an assessment plan at each stage of the CME development process. Evaluations of CME programs for LASs physicians should therefore be long enough to allow these less tangible outcomes to materialize, especially those that are harder to measure such as professional growth, networking, or the commitment to stay in the field [54]. Furthermore, the content and formats of CME normally have to be modified to meet the demands of the local situation and specific learners’ needs. For example, a CME course in Advanced Trauma Life Support in developed countries has been changed to the Primary Trauma Care training in LMICs, which have limited resources and different patterns of injury and trauma care workforce [66]. The evaluation of CME activities, therefore, should not only focus on the learning and teaching process and its usefulness outcomes, but also on determining the extent to which objectives of the program are attained while considering the variety of learner’s needs, capacity of educational institutions and available resources to capture a wide variety of effects [67].

5.4.2. Designing and developing learner-centered activities

In order to increase participants’ autonomy and competence, CME activities should be offered in learner-centered, practical, and flexible modalities which allow participants to practice and apply new knowledge and skills in their own situation and adapt learning to their busy and isolated

working conditions. To increase feelings of relatedness, moreover, CME should create a learning community where opportunities to study are open and fair to all LASs doctors, independent of their location and position.

5.4.2.1. Use formats that are learner-centered and practical

To ensure that CME activities enhance doctors' competence which translates to improved clinical performance, it is imperative that CME contents be tailored to their individual needs. Additionally, the learning activities must be interactive and allow doctors to apply the newly acquired knowledge in their daily practice [43]. This high relevance of the CME study contents and evaluation methods, including their practicality and accessibility, might induce participants to develop a "positive attitude toward learning", meaning that they become interested or motivated [60]. When focused on the learner, CME formats might also help to foster participants' self-regulation or autonomy, provided they have the opportunity to practice and apply the knowledge and skills learned in their own situation and to their own struggles in daily practice.

The recent use of advanced teaching methods in medical education, accelerated by the rapid development of information and communication technology, has greatly helped to reduce the geographical and professional isolation of LASs physicians. E-learning and Internet-delivered CME activities (e.g., Massive Online Open Courses and Webinars) have brought along several advantages that suit LASs physicians' working life. For instance, they are convenient, give access to remote areas, are adaptable to doctors' busy schedules [68,69], and provide diverse and abundant digital resources [70-72]. As such, these innovative educational technologies have been proved acceptable and effective in delivering physicians knowledge electronically [70,72]. Likewise, software applications on mobile phones and portable electronic devices (mHealth-mobile Health, mCME-mobile CME, and gaming) have been used as a tool to disseminate information, offer clinical decision support [73,74], master skills [75] and, combined with feedback in coaching groups, to increase reflection in clinical practice [76]. It should be borne in mind, however, that several factors might impact the application of e-learning or mHealth in CME for LASs physicians, such as a limited scope of training, rapid changes to the applications [77], and lagging human and infrastructural resources which are quite common in remote areas and in developing countries [70,78].

5.4.2.2. Create and maintain a learning community

Providing professional support in the form of relevant educational activities is an effective strategy to reduce isolation and increase retention among LASs doctors [79]. CME is more likely to be valued if it allows for the creation of a social learning network among participants during and after the courses. Using small-group learning in CME, moreover, will afford LASs physicians the opportunity to meet with colleagues from their field and to integrate personal, social, and professional experiences into the learning process [70,80]. More than 90% of

Australian general practitioners reported a preference for learning in a group over self-educating online as it enhanced their feelings of professional relatedness [81]. Also the application of teleconferencing allows physicians, especially those in rural areas, to consult with their colleagues and supervisors online from a distance. By saving time and costs of travel, such approaches effectively address the challenges LASs doctors face, such as personal isolation and a lack of supervision [43].

By staying connected to other alumni of their professional associations or of previous CME activities, physicians in LASs can create their own learning communities. In such communities, physicians who work in big cities could, for instance, teach their peers who cannot easily access the training or they can simply share their past CME experiences with them. Due to ineffective resource allocation and top-down management, junior or practicing LASs doctors, especially those in developing countries, have fewer opportunities to participate in CME, as these activities are often the preserve of managers or senior doctors [82]. Therefore, the idea of creating a community of practice via CME activities where participants can share the knowledge acquired and train their colleagues could also be applied as a faculty development method [83]. Similarly, such communities of practice could help generate “best” practices to solve common clinical problems [84] and facilitate the implementation of new practices in individual working conditions [85].

5.4.3. Involving stakeholders in the implementation

As presented in Table 1, it is imperative to involve multiple stakeholders in the whole cycle of CME creation and sustainment to ensure its effectiveness and to autonomously motivate LASs physicians to participate in the activities. Stakeholders should include not only alumni networks, professional associations, educational institutions, and information technology supporters, but also national governments and international organizations.

5.4.3.1. Motivate LASs physicians to participate in CME activities

It is crucial to establish alumni networks or professional associations of LASs physicians and to engage and involve them as key informants in all activities related to the design and implementation of CME courses. Preferably, alumni themselves should drive these initiatives and share their learning needs [86]. Physicians’ needs for CME and professional development could be determined by conducting surveys and tracking alumni or physicians’ career paths [87]. Their reflection and feedback will be vital for CME quality assurance and development [88].

In addition, keeping the alumni or professional association members up-to-date and connected to their fields and community will promote their self-determination and motivation to pursue the same professional development goals as their colleagues have [60]. CME could foster feelings of confidence and autonomy in LASs physicians by allowing them to apply new

knowledge and skills to their own problems in the workplace [84] or by offering distance supervision and support from more experienced colleagues [43]. Finally, making CME attendance a requirement of the licensing procedure could be a strong extrinsic motivator for LASs physicians [88,89]. However, to promote learners' participation in CME activities and boost their personal and professional development, there must be an adequate balance between pressure and support in the work setting [90].

5.4.3.2. Involve other stakeholders to keep CME effective

The CME designers should involve and listen to the voice of medical students, doctors yet to enter training and those in training as they are the main beneficiaries as well as important stakeholders of the programs. On the one hand, involving learners in every stage of the teaching and learning process will stimulate their feelings of relatedness [60], ownership and empowerment [91]. On the other hand, the feedback of learners can support formulation of plans for change and improve the quality of education and professional development of teachers [92,93]. The CME program developers and teachers should support and motivate learners' involvement in co-creation of education which will bring benefits to all relevant stakeholders [94].

In addition, involving other stakeholders, such as governments, academia, and technologists, as partners in every step of the CME design and development process is indispensable [73,94]. The government plays a key role in ensuring educational grants and making sure that financial incentives are well allocated and effectively used [82]. It is also instrumental in developing policies to coordinate doctor replacements, freeing study time for physicians [43], and in incorporating CME requirements into licensing/relicensing procedures and continuing professional development of LASs physicians [36,89]. Medical schools or educational institutions, in their turn, must ensure that CME contents and activities are customized to the needs of the physicians in their regions, and that CME is encouraged and facilitated among LASs physicians via the continuum of subsequent education and training [95]. Not only must these educational institutions equip CME trainers with appropriate teaching skills, they should also teach them community facilitation skills to establish and reinforce professional relatedness among groups of LASs physicians [85]. Although online distance CME has the potential to reduce professional isolation among physicians in LASs and remote areas, its effectiveness depends on the computer skills of facilitators and learners, its accessibility and their acceptance, and on the technological maintenance and user support system [72,77]. Moreover, when running online CME activities, many other technical issues must be considered, such as security, confidentiality and copyright protection concerns [96]. This is why the involvement of educational technologists in the development, delivery, and implementation of online learning is essential: They can help optimize the uptake of this advanced learning approach in a specific local context [71,73].

5.5. DISCUSSION

Access to CME is a key factor in attracting physicians to LASs and retaining them. In this article, we proposed guidelines for organizing and implementing CME activities in such a way that they can help to increase physicians' autonomous motivation to enter and stay active in LASs. By carefully analyzing physicians' learning needs, and establishing and maintaining a learning community among participants, CME activities could help foster professional relatedness. Whether activities are designed online or in small groups or meetings in the workplace, CME modalities must be flexible, user-friendly, practical, and applicable in LASs physicians' setting and environment to enhance their competence and autonomy. The involvement of all relevant stakeholders in the design and implementation of CME is vital to engage LASs physicians in CME and to ensure effectiveness of the respective activities in "anchoring" their career commitment.

Although CME has been proved effective as an approach to improve LASs physicians' satisfaction, learning, and performance [35-37], we recommend that future studies focus on evaluating the long-term impact of CME interventions on LASs physicians' personal, professional, and career development [54]. Since the problem of recruiting and retaining LASs physicians has been reported globally, in both developed [4,10] and developing countries [5,6], the validity and feasibility of the proposed guidelines in either resource-limited or well-established contexts should be tested. In developing countries, for instance, human and infrastructural hurdles could limit the potential of online education [70,78], whereas a culture of top-down management might inhibit physicians' freedom to participate in CME activities [82]. Another obstacle is that, although non-specialist physicians recognize the need to update their knowledge and improve their practice through CME, they disagree with the idea of making these CME programs a compulsory part of license renewal procedures in developed countries [90].

In the present paper, we used SDT as a theoretical framework for developing CME guidelines to support LASs physicians' autonomous motivation. However, SDT cannot account for all aspects contained in the guidelines. Besides offering LASs physicians opportunities to study and practice in their own settings [35,37,60], there might be other things we could do to enhance feelings of autonomy in CME participants. More specifically, how can CME continuously nurture and foster LASs physicians' autonomous motivation? Similar to SDT, we found that Wlodkowski's "Motivational Framework for Culturally Responsive Teaching" [60] and Keller's ARCS model of Instructional Design [96] both mention conditions for developing intrinsic motivation. Compared to SDT, however, their approaches are more specific in that they describe how to improve the motivational appeal of instructions (Keller's ARCS model) or the learning environment per se (Wlodkowski's framework). These practical strategies and materials could be embedded in the current guidelines with a view to helping CME instructors or designers enhance and maintain the motivation of given target learners, that is, LASs physicians. For example, Wlodkowski's suggestion to establish *inclusion* in CME activities could be applied by letting instructors and learners, who are often both LASs physicians, collaborate and share own experiences in solving

specific problems, thereby creating mutual respect and two-way connections. Keller's ARCS model, on the other hand, presents several strategies to improve learner *satisfaction* which could make LASs physicians feel good about their accomplishments in CME activities, such as giving appropriate extrinsic rewards without over controlling. Such strategies could prevent resentment and reduced enjoyment of the learning activities by physicians who only participate in CME activities to meet the administrative requirements [97].

Informed by SDT, the current guidelines provide a practical basis for developing CME activities that address LASs physicians' psychological needs of feeling related to the professional community, feeling competent to properly do their work, and feeling autonomous in shaping this work. Other alternative motivational or adult learning theories might be helpful to further refine these guidelines and make them better applicable as a solution to attract more physicians and retain them as active workers in less attractive medical fields.

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CHAPTER 6

General discussion

Specialty preferences and career choices of medical students and graduates are influenced by many factors. It is important to understand and define these factors so that educators and policy makers can develop better strategies to increase work motivation of healthcare workers in different stages of their lives, especially for the less attractive specialties (LASs). In this Thesis, the focus of investigation is on what motivates students, graduates and physicians to study and work in LASs. The findings can be used to develop educational strategies to recruit and retain healthcare workers in these specialties. To achieve the project goal, four studies were designed to answer four research questions. Table 6.1 presents these research questions and the main study outcomes.

Table 6.1: Four research questions and their outcomes

Chapter	Research questions	Main outcomes
2	What are the demographic characteristics and career preferences of preventive medical students with preventive medicine (PM) as first or second choice, and which factors are likely to influence their choices?	First-choice and second-choice students are two populations with distinctive characteristics and preferences, such as: relative's medical professions, reason to choose to study PM, or projected career path after graduation.
3	How realistically are students' perceptions of the characteristics of the practice of a PM doctor, and are these perceptions related to interest in PM or their willingness to work in PM after graduation?	PM students have inaccurate perceptions of PM regardless of their willingness to work in PM after graduation, but this inaccuracy is corrected over time.
4	What are the reasons related to life roles and motivational factors that lead PM graduates to choose a PM position and to stay in the field?	Only half of the PM graduates actually work in PM. The choice of both groups (i.e., first- and second-choice) of graduates to work in PM is influenced by the expectation of continuing medical education (CME), but differently by the role of a child and the role of citizens.
5	How can CME be designed and implemented to increase physician's motivation to work in LASs?	A set of guidelines for designing and organizing CME was developed to increase the feelings of relatedness, competence and autonomy of physicians working in LASs. These guidelines highlight the importance of addressing learner's needs, maintaining professional connection, and involving stakeholders in CME implementation.

In this General Discussion, I will first describe the main findings of the four studies. These will be followed by a discussion of the main theoretical implications, suggestions for future research, limitations, and practical implications of the work presented in this Thesis. Finally, the chapter will close with a general conclusion.

6.1. MAIN FINDINGS

6.1.1. Students' characteristics, preferences and values

Study 1 (Chapter 2) was conducted to describe the characteristics of students who choose PM, one of LASs, and it showed the differences between students who chose PM as their first choice to study and those who did not. First-choice students more often had siblings working as preventive doctors; they made more efforts to obtain information from many sources about PM before deciding to choose the specialty; and they are motivated to study PM by extrinsic factors such as: the benefits the future profession would bring, high-income prospects, low entry requirements, low study burden, to fulfill their family's wish and uphold their family tradition. Meanwhile, second-choice students are urged by more intrinsic motivation, that is the desire to follow their own dream of becoming a doctor. They more often regret their choice to study PM and wish to change to another profession. However, by the final years of the training program, they change their attitude toward a better appreciation of PM as they were encouraged by PM teachers, as well as by realizing that PM suited their own personality better than initially expected. Second-choice students anticipate landing jobs as clinical doctors in hospitals more often than first-choice students, and they are more interested in jobs that offer the opportunity to continue their studies and that are located at provincial health care centers.

6.1.2. Perceptions of PM

Since first-choice and second-choice students have different motivations, in Study 2 (Chapter 3), I explored how this difference in motivations is related to their perceptions of PM over time. In general, PM students have misperceptions of PM practice compared to what practicing PM doctors described, regardless of their interest in PM or their willingness to work in PM. At first, first-choice students have more realistic perceptions than second-choice students. However, over time, both groups of students gained more accurate perceptions by being exposed to the specialty although second-choice students increase misperceptions about the working stress of PM compared to PM doctors when they get to their final years.

The findings from Studies 1 and 2 point to the importance of receiving sufficient information about PM for students to build correct perceptions of PM. First, the fact that students have misperceptions of PM, which we observed in Study 2, is in line with the result of Study 1, which showed that only half of PM students had made efforts to obtain information about PM before deciding to choose the specialty. They most frequently turned to the media and the national guideline book for information and resources, which only provide general, and, in case of the former, superficial and unsystematic information about the public understanding of the specialty. Second, in Study 2, first-choice students had more realistic perceptions than second-choice students upon entering the PM study, which seems to align with the finding of Study 1 that they are also more likely to seek out information about the specialty before making the decision to study PM. Third, second-choice students, when given more information, presumably through increased exposure to the specialty over the course of study, also gained more realistic perceptions about the specialty. Therefore, correct and detailed information provided before the selection of study direction is made and also throughout the study period can play important roles in both forming students' decisions on future career and correcting their misperceptions of PM.

6.1.3. Future career needs

Study 3 (Chapter 4) focused on defining the reason why PM graduates pursue a position in PM, regarding their roles in life and motivation factors at work. Only half of the surveyed graduates are working in a PM position, and surprisingly, among graduates who chose to stay in the PM field after graduation, there was no significant difference between first-choice or second-choice students. Most of the PM graduates are working at central and provincial levels, none in villages. In general, the "child role" with the responsibility to take care of parents together with opportunities to access continued education are related to the decision of graduates to choose a PM position. Having opportunities to access continued education is also a great motivational factor for graduates to stay in the PM field. Additionally, commitment to serve the community is linked with first-choice students' tendency to stay in PM, while the second-choice graduates would maintain their career in PM if they take the importance of the "child role" seriously.

In summary, the three studies show that even though the destination of first-choice and second-choice students' careers are the same, they are in fact two distinct populations (Table 6.2). They enter the PM study with different motivations, perceptions and expectations. Over the course of study, this difference between the two groups seems to decrease, at least in the aspect of perceptions, such that there is no difference in their rate of retention, although their motivations and reasons to stay in the field still vary.

Table 6.2. Portraits of first- and second-choice students regarding four components of Bland's model (1995) about career choices.

Components	Comparing issues	First-choice students	Second-choice students
Students' characteristics, preferences and values	Gender, geographic and socioeconomic backgrounds	No difference	No difference
	Relatives' professions	More likely to have siblings working in PM	More likely to have family members as medical students/ clinical doctors
	Look for information about PM before study	More efforts to look for information	
	Motivations to study PM	Extrinsic motivation	Intrinsic motivation
Perceptions of PM	Projected career path after graduation	More likely to think they will stay in PM	More likely to choose career as clinical doctors in hospitals More interested in jobs that offer the opportunity for continuing education and that are located at provincial healthcare centers
	At the beginning of program	Misperceptions of PM but more accurate perceptions than second-choice students	Misperceptions of PM
Career needs	Working in a PM position	No difference	No difference
	Influence of life roles and motivation factors in choosing a PM position	Role of a child Continued education	Continued education
	Influence of life roles and motivation factors in continuing to stay in PM	Role of a citizen Continued education	Role of a child Continued education
Educational program's characteristics		No difference	No difference

6.1.4. Continuing medical education (CME) as a motivation for physicians in LASs

Following the idea of CME potentially playing an important motivating role for students and graduates to work in the PM field, as shown in Studies 1 and 3, the fourth study was conducted to develop a set of guidelines to use CME to increase intrinsic motivation of healthcare workers working in LASs. To increase the feeling of professional relatedness in physicians in LASs, CME programs should pay attention to learners' needs assessment, conduct evaluations of long-term outcomes in work-based settings, create learning networks, and involve stakeholders in every phase of design and implementation. To increase the feelings of competence and autonomy of LAS physicians, CME should be delivered in accessible, practical training formats and provide informative performance feedback that authentically connect with learners' working situations.

6.2. THEORETICAL IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

As motivation is an important element that relates to work performance [1], this issue has been discussed in many studies that tried to address the shortage of health workers, especially in primary care specialties [2,3]. This Thesis applies Bland's model of career choice and existing needs-based theories of motivation (Maslow's hierarchy of needs [4], Super's Model of Life Span/ Life Space [5], and Self-Determination Theory [6]) to explain the choices of students and graduates of PM, a less attractive medical specialty, in the context of Vietnam, a developing country. The main findings of this project provide additional information to give new insights into these models and theories when applied to the situation of specialties that are not attractive. Suggestions for future research will also be proposed to clarify the remaining uncertain points and to answer new research questions that came up.

In terms of theoretical implications, this Thesis extends the applicability of Bland's model [2], and Querido et al.'s additions to this model [7], which so far have been used to predict choices of medical specialties in general for students who are in their final or postgraduate years. The studies in this Thesis investigated the four components of specialty choice in a group of students who have various motivations to study a specific specialty at the undergraduate level. The main findings of this project showed that initially, preference for PM is only one element in career choice, which could be modified by other factors appearing during and after education, such as information gained during study and different life roles and expectations of their future career after graduation.

However, the results of this Thesis also point out several points within this framework that need to be further investigated. Specifically, in her model, Bland mentioned the association between specialty choice and socioeconomic background, including parents' medical-related profession [2], and this observation was confirmed by findings of Soethout et al. [8] about the

influence of having parents working in general practice on students' career preference for the same specialty. The results described in this Thesis showed that not just parents, but also other relatives working in medicine could influence students' choices of LASs (Chapter 2). However, this influence is not straightforward because of conflicting results with other studies, which witnessed a tendency that students who have clinical physicians as relatives are less likely to practice in underserved communities or enter into a primary care specialty [9,10]. We speculated that family influences may not be restricted to creating initial preferences, but also, for example, on perceptions, job opportunities, or future personal needs of the students. This complex interaction should be investigated in future studies in other LASs to find how to help students from non-medical or non-LASs families. For example, if having relatives in the less attractive medical fields means early exposure to the specialty for students, then the intervention should include early educational activities on professional orientation at primary, secondary, or high schools. It would be better if these educational activities could reach out to students who are from non-medical/non-LASs families in order to help them have a better outlook on LAS's functions and job opportunities.

Additionally, the results of this project reveal that students who are interested in LASs set out to look for information on the specialties before making career decisions, and they frequently turn to the media as their main source of information. These findings provide support to the observation by Querido et al. [7] about the influence of "students-initiated information collection" on their career choice, which was not included in the Bland model. In the era of Internet, social media such as Facebook or YouTube have massive influence on those at the age of choosing a study; therefore, future studies should pay attention to the potential impact of information channels such as social media or television and films on students' perception of different medical specialties, especially in the situation of LASs, which are often described as low prestige.

Furthermore, both Bland et al. [2] and Querido et al. [7] stated the importance of the perceptions of specialties on predicting students' career choice. Although the results of this Thesis also showed that students' perceptions of PM specialty are not static but malleable through the course of study, this change of students' perceptions seems to be not significant enough to influence their career choice after graduation. This result is similar to studies on career choice of other LASs, such as psychiatry [11], geriatrics [12], and family medicine [13], but it is different from observations in studies of attractive clinical specialties such as surgery [14,15], urology [16], and radiology [17]. The perceived status of LASs as 'low prestige' [12,18], 'boring' [13] or 'not innovative' [19] in the medical community could be one possible explanation for this difference. However, this weak influence of perception of specialty on students' career preference also could be the result of the training programs, which is, in the case of the PM training program in Vietnam, a more theoretical and less practical PM training program without extra-curricular activities that could increase realistic perceptions of students. Future studies should pay attention to investigate how perceptions of LASs influence students' specialty

choice, whether students who receive sufficient information and have realistic perceptions of the LASs choose those specialties by the end, or still choose to work in other 'more prestigious' medical fields.

This Thesis was developed from the combination of three existing needs-based theories of motivation that have been used in medical education [20] and human resource development [21] in order to understand the motivation factors that could increase the number of healthcare workers in LASs. Although these theories provided practical tools to identify the factors that influence the choices and commitment of graduates to work in LASs, it is necessary to explore further theories to explain several unclear points in the results. Specifically, previous studies only mentioned the influence of being parents or of preference for a lifestyle-friendly specialty [22,23] on the decision of choosing a LASs. However, the results of this Thesis (Chapter 4) revealed the influence of relatively new factors, for example, the role of being a child and the role of being a citizen in graduates' making the decision to choose and stay to work in PM. On the one hand, these findings can be explained by applying the Basic Psychological Need Theory [24], an extension of the Self-Determination Theory (SDT), in which the authors argue for more new basic psychological needs that should be satisfied, including *morality* (the moral satisfaction) and *benefician* (the feeling of having a positive impact on others). On the other hand, these results are in line with the observation of other researchers who stated that medical students who value the wish to help people [25] or for social commitment [26,27] are more likely to enter into LASs. This hypothesis should be tested in different LASs and in different cultures.

Furthermore, in the discussion of SDT's applicability to different cultures, Vansteenkiste et al. [24] stated that the concept of autonomy should be expanded to a more universal notion, that is, acting independently and making independent choices, rather than autonomy as volition and authenticity in the original SDT, and that the benefits of autonomy depend on one's culture, age and social class [28]. In this Thesis, the studies were conducted in an Asian country where people are perhaps more easily dominated by external factors in career choice, such as the view of the society (e.g. doctors must work in hospitals, psychiatrists only work with crazy people, their family's wish to have a doctor) and young students lack experiences to decide what they really want to do in the future; their decisions are impacted by their parents and relatives or by extrinsic benefits. This is different from Western countries, where people have more autonomy and intrinsic motivation in career choice [29]. Therefore, the influence of the extrinsic and intrinsic motivation of career choice of first- and second-choice students is not explicitly shown in their afterward destination (Chapters 1 and 3). With these ideas in mind, future researchers could test the influence of cultural factors in career choice in LASs of healthcare workers and in guiding vocational education across diverse cultural backgrounds.

6.3. LIMITATIONS

The research reported in this Thesis has several limitations. The first limitation is that the findings may not reflect the perceptions and situation of all students, graduates and practicing doctors of other LASs and in other countries, as the participants of the studies were recruited from one specific developing country. Due to resource limitations, the studies were conducted in only four out of six medical schools that provide PM training throughout the country at that time, and recruited only PM doctors and graduates from Hanoi, the capital of Vietnam. These sample selections, though convenient, could impact the results because of differences in demographic characteristics of the students as well as the working condition and practice of PM doctors in other parts of the country, which could influence the career choice of PM. Moreover, although the participants in the first three studies were students, graduates and doctors of preventive medicine, a typical less attractive primary care specialty, the training program is at the undergraduate level, which is unique to the Vietnamese health profession education system and may not be directly comparable to undergraduate study in other countries.

Secondly, another weak point is that all of the three experimental studies used a cross-sectional design and did not provide information about the influence of educational factors such as study content, PM teachers and role models, and methods of teaching and assessment on the change of students' motivation during the training time. In addition, the studies did not include the measurement of personal characteristics which is listed as one of the impact factors in career choice [30,31] and specialty choice [32,33]. It will be interesting to explore the influence of these factors in career decisions to choose and work in LASs of medical students and graduates to provide grounded information for vocational education at pre-medical schools.

Lastly, in Chapter 5, a set of guidelines for designing and implementing CME activities was developed within the theoretical framework of SDT, but the applicability and feasibility of these guidelines should be tested in different contexts, especially in the context of limited resources. We are also aware of other existing instructional design models, such as the Wlodkowski's Motivational Framework for Culturally Responsive Teaching [34] and the ARCS model of Instructional Design [35], which can be used to design CME courses. Experiments comparing the viability of different theories in developing and designing CME activities to enhance and maintain the motivation of LASs healthcare workers could be a potential direction for future studies.

6.4. PRACTICAL IMPLICATIONS

The results of this project have several practical implications for stakeholders who are involved in educating and managing human resources in medical specialties that are less attractive, such as policy makers, educational managers, program developers and educators in health/medical education institutions.

6.4.1. Implications for policy makers

Policy makers in education and in healthcare systems could use the results from this Thesis as an evidence-informed basis to develop appropriate strategies to increase the number of healthcare workers in medical specialties that are struggling with recruitment and retention of students, graduates, and physicians. Although the approach to train PM doctors at the undergraduate level is expected to solve the problem of shortage of PM healthcare workers in Vietnam, policy makers should consider the use of this training format as only one of the solutions to the problem. This project has identified factors that influence the attitude and choices of PM students, including the lack of sufficient information and misperceptions of the specialty, which lead to the instability in their motivation to study and to pursue a career in PM. Therefore, it is necessary to increase the knowledge and experiences of students by stimulating educational activities on vocation [36] before and during the training program, including broadcasting in mass media the important role and function of LASs in the healthcare system [7].

Moreover, although there are many other factors influencing the graduates' decision, the fact that half of the PM graduates choose not to work in PM and seek jobs in other specialties and fields afterward raises a question about the effectiveness of the current training program in providing PM physicians to the country. Given the lessons from the situation of PM training, therefore, besides the existing undergraduate training program, Vietnamese policy makers should consider implementing other approaches to increase healthcare workers in LASs. That could be in the form of selecting students from more remote areas who may be more likely to return to their hometown to work [37], having satellite training centers in those areas to address the local shortage [38], or offering more online CME or blended educational activities via Internet which require only short visits to the big cities [39,40]. Moreover, a policy to establish a better licensing system that requires all graduates of medical school to specialize, including PM and other LASs [41], or to enrol medical graduates to train in LASs as a postgraduate degree could be considered as alternatives to the current system. As a matter of fact, these approaches will then lead to the necessity of developing policies to retain healthcare workers who are working in LASs, such as to increase and equalize the opportunities to access CME activities for LASs healthcare workers to promote their personal and professional development [42,43]; coordinate doctor replacements, freeing up study time for physicians especially in rural and remote areas [44]; or make CME attendance a requirement of the licensing, and promote procedure to engage LAS physicians in continuing educational activities [41,45]. Moreover, in order to increase their commitment to the specialties, educational and technical transfer activities should be enhanced among different levels of the healthcare system in order to increase the supervision and connection among physicians in one LAS [38].

6.4.2. Implications for educational managers and program developers

The results of this project showed that students who have different interests in PM at the beginning (i.e., first-choice and second-choice students) have various characteristics, needs, and expectations. Educational managers or training program developers should keep this diversity in mind when designing new training programs for other LASs in order to have appropriate interventions for each group of students. For example, at the stage of recruiting new students, instead of relying only on results of the entrance exams, program managers should consider implementing more activities that give candidates the opportunities to express their needs, perceptions and expectations, including individual interviewing [46] or doing personality trait tests [47].

Simultaneously, marketing strategies to advertise the attractiveness of LASs to potential students who prefer family lifestyle and care for the community should be conducted either at Educational Fairs or on Open Days to increase the accurate perceptions and attitudes toward LASs of novice students [18]. In addition, in order to effectively retain both first- and second-choice students, the training curriculum should be designed or revised to help the second-choice students to catch up with the first-choice students by offering them a variety of activities to fill the gaps in their perceptions and motivations. These interventions could be in the form of early exposure to LASs to learn more about the specialties via practice [48,49], giving more time for extracurricular activities in workshops about LASs, or consultations of career choice in LASs [36].

6.4.3. Implications for educators

As teachers play an important role as information source and career guidance to their students [48,50], it is necessary for teachers in any stage of the educational continuum to be involved in vocational education. In the situation of LASs career guidance, students should be provided with plenty of opportunities to acquire accurate knowledge and experiences with the medical profession (at every stage of general education) or the LASs (in higher education). For example, small children should be educated about compassion or sharing at the very first years of primary or secondary schools. Continuously, they should be taught to take care of themselves, their family, and other people by doing volunteer work in hospitals or nursing homes, which can help to cultivate interest in the health professions among high-school [51] and junior medical students [52]. Later, at the level of higher education, teachers in medical schools should facilitate the learning process of students to improve perceptions of the functions of LASs such as primary care or PM in the healthcare system. Through a broad array of teaching activities as well as being role models or sharing their personal experiences, teachers can inspire their students to study and pursue a career in the LASs [36], particularly students who have less motivation (in our case, the second-choice students).

In addition, when involved in delivering continuing medical education, educators should customize the contents of CME to the needs of LAS physicians, including implementing multiple instructional and assessment activities relating to learners' work places [53]. They also have a major role in establishing and maintaining the professional connection among learners during and after educational activities [54], which are essential to reduce the feeling of isolation of healthcare workers in LASs.

6.5. CONCLUSIONS

This Thesis provides information about the factors that influence the career choice of students and graduates in less attractive medical specialties, and proposes strategies to overcome the human resource shortages in these fields. Even though the effectiveness of an undergraduate training program is not convincing enough, the initial shortcomings in the interests and perceptions of less attractive specialties could be gradually addressed, and motivations to work in these specialties could be nurtured both by vocational and educational interventions.

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Summary

This Thesis describes four studies conducted to explore the factors that influence the recruitment and retention of healthcare workers in preventive medicine (PM) - one of the less attractive specialties (LASs). In the General Introduction (Chapter 1), we describe the problems in the recruitment and retention of healthcare workers in LASs, the motivating and demotivating factors that influence the decision to study and to work for students and doctors in LAS as well as possible strategies to overcome this health worker shortage. Subsequently, we describe the situation of PM education in Vietnam and the problems in recruiting new students and retaining PM graduates. Then we rationalize the potential suitability of several needs-based theories of motivation (Maslow's Hierarchy of Needs, Super's Theory of Life Role in Career Development and Self-Determination Theory) to understand the factors that influence the decision of PM graduates to choose to work in PM, and the effectiveness of continuing medical education (CME) in motivating LAS health workers.

In order to provide information of career motivation of students, graduates and practicing doctors in PM to lay the basis for proper educational interventions and to address the problem of healthcare worker shortage in similar LASs, four studies were conducted to address the following four research questions:

1. What are the demographic characteristics and career preferences of PM students with PM as first choice and second choice and which factors are likely to influence their choices? (Study 1 – Chapter 2)
2. How realistic are students' perceptions of the characteristics of the practice of a PM doctor and are these perceptions related to their interest in PM or their willingness to work in PM after graduation? (Study 2 – Chapter 3)
3. What are the reasons related to life roles and motivational factors that lead to PM graduates choosing a PM position and staying in the field? (Study 3 – Chapter 4)
4. How can CME be designed and implemented to increase physician's motivation to work in LAS? (Study 4 – Chapter 5)

To answer the first research question, we conducted the study presented in Chapter 2, which was a cross-sectional study involving 1386 PM students from four medical schools in the North of Vietnam. The study participants were referred to as first-choice and second-choice students depending on their preference for PM at the entrance into medical schools. The study instrument was a structured, written questionnaire with 33 items investigating basic personal socio-demographic data of the PM students, their reasons for choosing to study PM, their preference in PM during the academic course, and their expected career path following graduation. The results showed that first-choice students more often had siblings working as preventive doctors; they made more efforts to obtain information from many sources about PM before deciding to choose the specialty; and they are motivated to study PM by extrinsic factors such as: the benefits the future profession would bring, high-income prospects, low entry requirements, low study burden, fulfillment of their family's wish and uphold their family tradition. Meanwhile, second-choice students are urged by more intrinsic motivation, which is the desire to follow their own

dream of becoming a doctor. They more often regret their choice to study PM and wish to change to another profession. However, by the final years of the training program, they often change their attitude toward a better appreciation of PM as they are encouraged by PM teachers, as well as by realizing that PM suits their own personality better than initially expected. Second-choice students anticipate landing jobs as clinical doctors in hospitals more often than first-choice students, and they are more interested in jobs that offer the opportunity to continue their studies and that are located at provincial health care centers.

Since first-choice and second-choice students have different motivations, we conducted the second study, described in Chapter 3, to investigate how this difference in motivations is related to their perceptions of PM over time by comparing their perceptions with those of PM practicing doctors. Together with the students who were already involved in the first study, 101 practicing PM doctors working in Hanoi were invited to participate in the study. They answered a 41-item questionnaire about six groups of characteristics of the medical professions and indicated to which degree they think the listed characteristics apply to a PM doctor's daily practice. The surveys' results showed that in general, PM students have misperceptions of PM practice compared to PM doctors' opinion, regardless of their interest in PM or their willingness to work in PM. At first, first-choice students have more realistic perceptions than second-choice students. Over time, both groups of students gain more accurate perceptions by being exposed to the specialty although second-choice students still overestimate the working stress of PM compared to PM doctors when they get to their final years. The findings from Studies 1 and 2 point to the importance of receiving sufficient information about PM for students to form their decisions on future careers and correcting their misperceptions of PM.

Since there are differences in motivations and perceptions of PM between the groups of first-choice and second-choice students, we conducted the third study, described in Chapter 4, to explore if there is any difference between the first-choice and second-choice graduates in their decision to choose a PM job and stay in the field. We investigated the reasons related to life roles and motivational factors that lead to PM graduates' career decision by conducting a cross-sectional study involving 167 graduates who are qualified as PM doctors from a Vietnamese medical school. Based on the theoretical framework developed by combining Maslow's Hierarchy of Needs and Super's Theory of Life Role in Career Development, an 89-item questionnaire was sent to participants under an online survey format. The questionnaire's content focused on investigating the motivation and continuation in PM of the graduates, the major life roles that they were playing, and their satisfaction with their job. Multiple regression analyses were used to identify which life roles and motivational factors were related to the decision to take a PM position and to stay in the specialty of the graduates, and whether these factors were associated with gender or preferences in PM. The results showed that only half of the surveyed graduates are working in a PM position, and surprisingly, among them, there is no significant difference whether they were first-choice or second-choice students. Most of the PM graduates are working at central and provincial levels, and none at villages. In general, the "child role", with the

responsibility to take care of parents, and opportunities to access continued education are related to the decision to choose a PM position of graduates. Opportunities to access continuing medical education (CME) is also a great motivation factor for graduates to stay in the PM field. Additionally, commitment to serve the community is linked with first-choice students' tendency to stay in PM, while the second-choice graduates would maintain their career in PM if they take the importance of the "child role" seriously.

Following the idea of CME potentially playing an important motivating role for students and graduates to work in the PM field, as shown in Studies 1 and 3, we conducted the fourth study, a position paper (Chapter 5), to study the effectiveness of using CME to increase intrinsic motivation of healthcare workers working in LASs. By reviewing the literature related to the use of CME in motivating LAS physicians, under the light of the Self-Determination Theory, we developed a set of guidelines for designing and organizing CME in such a way that it could help to attract and retain physicians in LASs. In general, to increase the professional relatedness feeling of physicians in LASs, CME programs should pay attention to learners' needs assessment, conduct evaluations of long-term outcomes in work-based settings, create learning networks, and involve stakeholders in every phase of design and implementation. To increase the feelings of competence and autonomy of LAS physicians, CME should be delivered in accessible, practical training formats, and provide informative performance feedback that authentically connects with learners' working life situation. For each of these suggestions, specific practical tips and instruments were proposed based on reviewing available literature for the implication of the guideline in different situations.

The General Discussion, Chapter 6, provides an overarching discussion of the work conducted, as well as theoretical and practical implications of the results. The limitations of the whole project have been discussed as well, followed by suggestions for future research in the field. Overall, this project provides information about the relation between an individual's initial interest, personal needs, perceptions and expectations with the motivation to choose one of the LASs in a developing country. The knowledge presented in this Thesis can serve as a basis for the design and implementation of appropriate educational strategies at high school, university, and further career development to increase the motivation of healthcare workers in the specialties that struggle with recruitment and retention of workforce.

Theoretically, this Thesis extends the applicability of existing theories on career choice and needs-based theories of motivation in order to explain the choice of individuals across the whole continuum of expertise, including students, graduates, and practicing doctors in PM. The main findings showed that initial preference of PM is only one element in career choice, which could be modified by other factors appearing during and after education, such as information gained during study and different life roles and expectations of their future career after graduation. This showed the importance of early exposure to the specialties via educational activities. These activities stimulate students who are not interested in LASs at the beginning as well as who are from non-medical/non-LASs families in order to help them have a better outlook on functions, lifestyle-

friendly characteristics or job opportunities of LASs. The educational activities via CME are also essential in motivating and increasing the human resources in LASs, therefore, the proposed set of guidelines for developing CME provides additional support for designing and organizing the training activities. However, future study should pay attention to the influence of cultural factors in career choice in LASs of health workers and in guiding vocational education across diverse cultural backgrounds.

The results of this project have several practical implications for stakeholders who are involved in educating and managing human resources in medical specialties that are less attractive. Specifically, together with training students at undergraduate level, policy makers in education and in healthcare systems should consider to develop proper strategies to increase knowledge and experiences of students of LASs before and during the training program. Moreover, establishing a better licensing system that requires all graduates of medical school to specialise, including PM and other LASs, or enrolling medical graduates to train in LASs as a postgraduate degree could be considered as alternatives for the current system. It is also essential to develop policies to retain health workers who are working in LASs, such as increase and equalise the opportunities to access CME activities for LASs health workers to promote their personal and professional development. For educational managers or training program developers, they should keep in mind the various characteristics, needs and expectations of students who have different interests in the specialties when designing new training programs for LASs. Simultaneously, marketing strategies to advertise the attractiveness of LASs to potential students who prefer family lifestyle and care for the community should be conducted to increase the accurate perceptions and attitudes toward LASs of novice students. And finally, for educators, they should inspire their students to study and pursuit a career in the LASs, particularly students who have less motivation. In addition, educators should customize the contents of CME to the needs of LASs physicians and maintaining the professional connection among learners during and after educational activities, which are essential to reduce the feeling of isolation of health workers in LASs.

Even though the effectiveness of an undergraduate training program is not convincing enough, the initial shortcomings in the interests and perceptions of LASs could be gradually addressed, and motivations to work in these specialties could be nurtured by educational interventions. Although the applicability of the information and proposed strategies in this Thesis should be further assessed for other LASs in different contexts, these findings from Vietnam could help related stakeholders in health professions education to overcome the human resource shortages in these fields.

Nederlandse samenvatting

(Dutch Summary)

In dit proefschrift worden vier onderzoeken beschreven die ten doel hadden de factoren in kaart te brengen die van invloed zijn op de werving en het behoud van zorgverleners in de Preventieve Geneeskunde (Preventive Medicine - PM), een van de minder beminde specialismen. In de Algemene Inleiding (Hoofdstuk 1) beschrijven we met welke problemen deze minder beminde specialismen te kampen hebben als het gaat om de werving en het behoud van zorgverleners, welke factoren studenten en artsen motiveren dan wel demotiveren om in deze minder beminde specialismen te gaan studeren en werken, evenals potentiële strategieën om dit tekort aan zorgverleners te verhelpen. Vervolgens beschrijven we hoe het PM-onderwijs in Vietnam ervoor staat, inclusief de problemen bij het werven van nieuwe studenten en het behouden van PM-afgestudeerden. Daarna gaan we na in hoeverre diverse op behoeften gerichte motivatietheorieën (de hiërarchie der behoeften van Maslow, Supers theorie van levensrollen bij loopbaanontwikkeling en zelfbeschikkingstheorie) inzicht kunnen bieden in de factoren die de keuze van PM-afgestudeerden om in PM te gaan werken beïnvloeden en in hoe effectief medische bij- en nascholing zorgverleners in minder beminde specialismen kan helpen motiveren.

Om meer inzicht te verschaffen in de manier waarop studenten, afgestudeerden en praktiserend artsen in PM tot hun beroepskeuze komen zodat de basis kan worden gelegd voor passende onderwijsinterventies en het tekort aan zorgverleners in vergelijkbare minder beminde specialismen kan worden aangepakt, werden er vier studies verricht waarin de volgende vier onderzoeksvragen centraal stonden:

Welke demografische kenmerken en loopbaanvoorkeuren hebben PM-studenten met PM als eerste en als tweede keus en door welke factoren worden hun keuzes waarschijnlijk beïnvloed? (Studie 1 – Hoofdstuk 2)

Hoe realistisch zijn de opvattingen die studenten hebben over hoe de praktijk van een PM-arts eruitziet en houden deze opvattingen verband met hun interesse voor PM of hun bereidheid om na hun afstuderen in PM te werken? (Studie 2 – Hoofdstuk 3)

Om welke met levensrollen samenhangende redenen en door welke motiverende factoren kiezen PM-afgestudeerden ervoor om een PM-functie te vervullen en om in het vakgebied te blijven? (Studie 3 – Hoofdstuk 4)

Hoe kan medische bij- en nascholing zo worden ontworpen en ingevoerd dat artsen meer gemotiveerd worden om in minder beminde specialismen te werken? (Studie 4 – Hoofdstuk 5)

Voor het beantwoorden van de eerste onderzoeksvraag verrichtten we de in Hoofdstuk 2 gepresenteerde studie: een transversaal onderzoek waarbij 1386 PM-studenten van vier medische faculteiten in Noord-Vietnam betrokken waren. De participanten van het onderzoek werden aangeduid als “eerste-keuze” en “tweede-keuze” studenten, al naargelang hun voorkeur voor PM bij de toelating tot de medische opleiding. Het onderzoeksinstrument was een gestructureerde, schriftelijke vragenlijst met 33 items die de voornaamste persoonlijke socio-demografische gegevens van de PM-studenten onderzocht, alsmede hun redenen om PM te gaan studeren, hun voorkeur voor PM gedurende de academische opleiding en hun verwachte

loopbaantraject na het afstuderen. De resultaten lieten zien dat eerste-keuze studenten vaker broers of zussen hadden die als preventiearts werkzaam waren; meer moeite deden om uit vele bronnen informatie over PM in te winnen voordat ze besloten het specialisme te kiezen; en extrinsiek gemotiveerd waren om PM te studeren door factoren als: de voordelen die het toekomstige beroep zou opleveren, het vooruitzicht op een hoog inkomen, lage toelatingseisen, lage studiebelasting, het laten uitkomen van hun families wens en het in ere houden van hun familietraditie. Ondertussen bleken tweede-keuze studenten meer gedreven te worden door intrinsieke motivatie, namelijk de wens om hun eigen droom om arts te worden na te jagen. Zij hadden vaker spijt van hun keuze om PM te gaan studeren en wilden vaker overstappen naar een ander beroep. Tegen de laatste jaren van de opleiding veranderden zij echter vaak hun opstelling richting meer waardering voor PM, dankzij de aanmoediging van PM-docenten maar ook doordat zij inzagen dat PM beter bij hun eigen persoonlijkheid paste dan aanvankelijk verwacht. Tweede-keuze studenten hadden vaker dan eerste-keuze studenten de verwachting dat zij een baan als klinisch arts in een ziekenhuis in de wacht zouden slepen en waren meer geïnteresseerd in banen in provinciale zorgcentra die hun de mogelijkheid boden om hun studie voort te zetten.

Aangezien eerste-keuze en tweede-keuze studenten verschillen in hun motivatie, verrichtten we de tweede, in Hoofdstuk 3 beschreven studie waarmee we wilden onderzoeken hoe dit verschil in motivatie door de tijd heen samenhangt met hun opvattingen over PM. Dit deden we door hun opvattingen te vergelijken met die van praktiserend PM-artsen. Behalve de studenten die reeds bij de eerste studie betrokken waren geweest, werden er 101 praktiserend PM-artsen die in Hanoi werkzaam waren, uitgenodigd om aan de studie deel te nemen. Zij beantwoordden een vragenlijst met 41 items over zes groepen kenmerken van de medische beroepen en gaven aan in hoeverre zij vonden dat de vermelde kenmerken van toepassing waren op de dagelijkse praktijk van een PM-arts. De resultaten van dit vragenlijstonderzoek toonden aan dat PM-studenten, ongeacht hun interesse voor PM of hun bereidheid om later in PM te gaan werken, over het algemeen verkeerde opvattingen hadden over de PM-praktijk wanneer vergeleken met de mening van PM-artsen. Eerste-keuze studenten hadden aanvankelijk meer realistische opvattingen dan tweede-keuze studenten. Door blootstelling aan het specialisme kregen beide groepen studenten na verloop van tijd een juister beeld, hoewel tweede-keuze studenten tegen de tijd dat zij hun laatste jaren bereikten de werkstress van PM nog steeds overschatten vergeleken met PM-artsen. De bevindingen van Studies 1 en 2 wijzen op het belang van het ontvangen van voldoende informatie over PM zodat studenten weloverwogen besluiten kunnen nemen over hun toekomstige loopbaan en zij hun verkeerde opvattingen over PM kunnen bijstellen.

Gezien de verschillen in motivatie en opvattingen over PM tussen de groepen eerste-keuze en tweede-keuze studenten verrichtten we de derde, in Hoofdstuk 4 beschreven studie waarmee we trachtten te onderzoeken of er verschillen bestonden tussen eerste-keuze en tweede-keuze afgestudeerden met betrekking tot hun besluit om voor een PM-baan te kiezen en in het vakgebied te blijven. We onderzochten de met levensrollen samenhangende redenen en

motiverende factoren die PM-afgestudeerden tot hun loopbaan deden besluiten door middel van een transversale studie onder 167 als PM-arts bevoegde alumni van een medische opleiding in Vietnam. Gebaseerd op het theoretisch kader dat we verkregen door de hiërarchie der behoeften van Maslow en Supers theorie van levensrollen bij loopbaanontwikkeling samen te voegen, werd een enquête met 89 items naar de deelnemers verzonden in de vorm van een online vragenlijst. De inhoud van deze vragenlijst ging nader in op de motivatie van afgestudeerden en op hun voortzetting van het PM-beroep, de belangrijkste levensrollen die zij vervulden en in welke mate zij tevreden waren met hun baan. Met behulp van meervoudige regressieanalyses probeerden we vast te stellen welke levensrollen en motiverende factoren verband hielden met het besluit van de afgestudeerden om een PM-functie te aanvaarden en in het specialisme te blijven en of deze factoren samenhangen met hun geslacht of voorkeur voor PM. De resultaten toonden aan dat slechts de helft van de ondervraagde alumni een PM-functie vervulden. Verrassend genoeg werd er onder deze groep geen significant verschil gevonden ten aanzien van hun aanvankelijke keuze voor PM (eerste-keuze of tweede-keuze studenten). De meeste PM-afgestudeerden werkten op centraal of provinciaal niveau, en geen van hen in de dorpen. Over het algemeen hielden de “rol van kind”, met de verantwoordelijkheid om voor de ouders te zorgen, en de mogelijkheid om toegang te krijgen tot nascholing verband met het besluit van alumni om voor een PM-functie te kiezen. De mogelijkheid om toegang te krijgen tot medische bij- en nascholing was dus een belangrijke motiverende factor waardoor alumni in het vakgebied bleven. Voorts hing het voornemen van eerste-keuze studenten om de gemeenschap te dienen samen met hun neiging om in het specialisme te blijven, terwijl tweede-keuze alumni hun loopbaan in PM voortzetten wanneer zij het belang van de “rol van kind” serieus namen.

Nadat uit Studies 1 en 3 was gebleken dat medische bij- en nascholing mogelijk een belangrijke motiverende rol speelt waardoor studenten en alumni in het PM-specialisme gaan, respectievelijk blijven werken, verrichtten we de vierde studie, een standpuntartikel (*position paper*; Hoofdstuk 5), waarmee we wilden onderzoeken hoe effectief medische bij- en nascholing kan worden ingezet om de intrinsieke motivatie van zorgverleners werkzaam in minder beminde specialismen te vergroten. Aan de hand van een literatuuronderzoek naar de inzet van medische bij- en nascholing om artsen in minder beminde specialismen te motiveren, ontwikkelden we vanuit een zelfbeschikkingstheorie-invalshoek een aantal richtlijnen waarmee medische bij- en nascholing zo kan worden opgezet en georganiseerd dat deze artsen in minder beminde specialismen kan helpen aantrekken en behouden. Om het gevoel van professionele verbondenheid onder artsen in minder beminde specialismen te versterken, moeten programma's voor medische bij- en nascholing in het algemeen aandacht besteden aan een behoefteanalyse onder studenten, resultaten op de lange termijn evalueren in werksettings, leernetwerken creëren en belanghebbenden betrekken bij elke fase van ontwerp en implementatie. Om gevoelens van bekwaamheid en zelfstandigheid onder artsen in minder beminde specialismen te versterken, moet medische bij- en nascholing in een toegankelijke, praktische trainingsvorm worden aangeboden en informatieve feedback op het functioneren verstrekken die op authentieke wijze

aansluit bij de werksituatie van de student. Op basis van de beschikbare literatuur werden er voor elk van deze suggesties concrete praktische tips en instrumenten voorgesteld zodat de desbetreffende richtlijn in verschillende situaties kon worden toegepast.

In de Algemene Discussie (Hoofdstuk 6) wordt een overkoepelende beschouwing gegeven van het verrichte onderzoek en worden de implicaties ervan voor theorie en praktijk besproken. Ook worden de beperkingen van het gehele onderzoek besproken, gevolgd door aanbevelingen voor toekomstig onderzoek in het vakgebied. Al met al biedt dit onderzoek uitgangsinformatie over het verband tussen de aanvankelijke interesse, persoonlijke behoeften, opvattingen en verwachtingen van een individu enerzijds en zijn/haar motivatie om een van de minder beminde specialismen in een ontwikkelingsland te kiezen anderzijds. De kennis die in dit proefschrift gepresenteerd wordt, kan als uitgangspunt dienen voor het ontwerp en de implementatie van passende onderwijsstrategieën voor beroeps- en loopbaanontwikkeling teneinde de motivatie onder zorgverleners in specialismen die worstelen met de werving en het behoud van personeel te vergroten.

Theoretisch gezien, breidt dit proefschrift de toepasbaarheid van bestaande theorieën over beroepskeuze en op behoeften gerichte motivatietheorieën uit om zo de keuze te verklaren van het gehele expertisecontinuüm, waaronder studenten, afgestudeerden en praktiserend artsen in PM. De belangrijkste bevindingen toonden aan dat een aanvankelijke voorkeur voor PM slechts één aspect is bij de beroepskeuze. Dit aspect kon bovendien worden veranderd door overige factoren die zich gedurende en na de opleiding voordeden, zoals informatie die tijdens de opleiding werd opgedaan en andere levensrollen en verwachtingen van hun toekomstige loopbaan na het afstuderen. Hieruit bleek dat vroegtijdige blootstelling aan specialismen via onderwijsactiviteiten een belangrijke rol speelt in het stimuleren van studenten die in het begin niet in minder beminde specialismen geïnteresseerd zijn en van studenten uit niet-medische gezinnen (of niet uit de minder beminde specialismen) door hen te helpen een betere kijk te krijgen op de werkzaamheden, levensstijlvriendelijke kenmerken en carrièremogelijkheden van minder beminde specialismen. Medische bij- en nascholingsactiviteiten zijn eveneens van essentieel belang bij het motiveren en vergroten van menskracht in minder beminde specialismen. De voorgestelde set richtlijnen voor het ontwikkelen van medische bij- en nascholing biedt daarom extra ondersteuning bij het ontwerpen en organiseren van dergelijke trainingsactiviteiten. Toekomstig onderzoek zou echter aandacht moeten besteden aan de invloed van culturele factoren op de keuze van zorgverleners om in een minder beminde specialisme te gaan werken en aan het begeleiden van het beroepsonderwijs over de verschillende culturele achtergronden heen.

De resultaten van dit onderzoek hebben diverse implicaties voor de praktijk, in het bijzonder voor degenen die betrokken zijn bij het opleiden en beheren van menskracht in de medische specialismen die minder in trek zijn. Concreet houdt dit in dat beleidsmedewerkers in het onderwijs en in de zorg, behalve studenten in de bacheloropleiding opleiden, zouden moeten overwegen om passende strategieën te ontwikkelen waarmee studenten zowel voor als tijdens

de opleiding hun kennis van en ervaring met minder beminde specialismen kunnen vergroten. Voorts kan als alternatief voor het huidige systeem worden overwogen om een beter registratiesysteem in te voeren waarbij alle alumni van een medische opleiding zich moeten specialiseren, ook in PM en de overige minder beminde specialismen, of om Geneeskunde-alumni in te schrijven voor een vervolgopleiding in de minder beminde specialismen. Daarnaast is het van essentieel belang dat er beleid wordt ontwikkeld ter behoud van zorgverleners die werkzaam zijn in de minder beminde specialismen, zoals het vergroten en gelijktrekken van hun kansen op toegang tot medische bij- en nascholingsactiviteiten teneinde hun persoonlijke en professionele ontwikkeling te bevorderen. Onderwijsmanagers of -ontwikkelaars zouden bij het maken van nieuwe onderwijsprogramma's voor de minder beminde specialismen rekening moeten houden met de diverse kenmerken, behoeften en verwachtingen van studenten die verschillen in hun mate van interesse voor de specialismen. Tegelijkertijd zouden er marketingstrategieën moeten worden uitgevoerd die de aantrekkelijkheid van minder beminde specialismen onder de aandacht brengen bij potentiële studenten die een gezinslevensstijl en zorg voor de gemeenschap verkiezen, zodat aankomend studenten juistere opvattingen hebben van deze specialismen, en daarmee een verbeterde opstelling. Ten slotte zouden opleiders betrokken moeten worden bij beroepsspecifieke onderwijsactiviteiten, aangezien zij als rolmodel kunnen dienen en hun studenten, met name de minder gemotiveerden, kunnen inspireren om in de minder beminde specialismen te gaan studeren en er een loopbaan na te streven. Bovendien zouden opleiders de inhoud van medische bij- en nascholing moeten afstemmen op de behoeften van artsen in de minder beminde specialismen en ervoor zorg moeten dragen dat studenten zowel tijdens als na de onderwijsactiviteiten onderling hun professionele binding behouden. Dit laatste is essentieel om het gevoel van isolatie onder zorgverleners in de minder beminde specialismen te verminderen.

Hoewel de bacheloropleiding PM niet voldoende effectief is gebleken, zouden onderwijsinterventies die in eerste instantie gematigde interesse voor de minder beminde specialismen en de verkeerde opvattingen hiervan geleidelijk kunnen aanpakken en ook de motivatie om in deze specialismen te gaan werken, kunnen voeden. We zijn ons er terdege van bewust dat de toepasbaarheid van de informatie en de strategieën die in dit proefschrift worden voorgesteld, aan nadere toetsing in diverse contexten voor andere minder beminde specialismen onderhevig is; desondanks kan deze ervaring uit Vietnam andere belanghebbenden in het gezondheidszorgonderwijs helpen om het tekort aan menskracht in deze vakgebieden terug te dringen.

Impact Paragraph

This section aims to briefly explain the rationale and objective of this PhD project, followed by a presentation of the scientific and societal impacts of the research work to those who might benefit from this project.

7.1. PROJECT RATIONALE, OBJECTIVES AND FINDINGS

The shortage of qualified healthcare workers is an issue that needs urgent attention in many countries. Within the overall shortage situation, the current supply of healthcare workers in primary care specialties and in specialties that provide preventive care services in the community, despite their important role in healthcare systems, does not meet the needs while demands are particularly acute. Several reasons are pointed out for the preponderance of specialist over generalist or “preventivist” doctors, such as: fewer medical students choose non-specialist specialties, low job satisfaction of generalist doctors due to low incomes, high workload, difficult working conditions, limited career development opportunities, or perceived low prestige compared to specialist doctors. These unfavorable conditions lead to problems in recruiting new students and retaining practicing healthcare workers in these less attractive specialties (LASs), and these in turn lead to poor health outcomes of the population, especially in the primary care domains.

Many strategies to increase the health workforce in LAS have been implemented over the world, including financial incentives, improving healthcare infrastructure and physicians’ working and living conditions, encouraging young doctors to work in remote areas or providing close mentoring and supervision. Although these strategies have positive impacts on the retention of LAS doctors, as extrinsic motivators, they do not have long-lasting effects. These strategies also require many human and financial resource inputs, which are limited in developing countries. As general education and medical education, in particular, have important effects on specialty choice of undergraduate students and graduates, intervention in education could be a potential solution for the problem of healthcare worker shortage in LASs. Educational activities may help to increase students’ perceptions of LASs and practicing LASs doctors’ satisfaction, which, in turn, may help to create and nurture their intrinsic motivation and commitment to choose LAS as their medical career.

In order to provide essential information for the development of proper educational interventions to address the challenges in LASs healthcare worker shortage, this Thesis focuses on studying the career motivation, needs and expectations in all phases of the educational continuum, including students, graduates, and practicing doctors in a specific LAS program, Preventive Medicine (PM). Its main aims are to contribute to the theory development of motivating PM students and graduates to choose LAS as a career, and to develop guidelines of how education can help to decrease the shortage in LASs. To achieve this goal, we conducted four studies, including three empirical studies and one literature review under the format of a position paper.

Study 1 demonstrates the differences in motivating factors to study PM and future job expectations between students who chose PM as their first choice to study and those who did not, that is, second-choice students. Study 2 was conducted to investigate how these differences in motivations and expectations are related to students' perceptions of PM. The findings from Studies 1 and 2 point to the importance of receiving sufficient information about PM in forming students' decisions on future career and correcting their misperceptions of PM. In Study 3, we found that there is no difference in the rate of retention between first-choice or second-choice graduates, although their motivations and reasons to stay in the field still vary. Study 4 is a position paper in which we proposed a set of guidelines for designing and organizing CME in such a way that it could help to attract and retain physicians in LASs.

7.2. IMPACT ON SCIENCE AND SOCIETY

The four studies presented in this Thesis show the relation between an individual's initial interest, personal needs, perceptions and expectations, with the motivation to choose a medical specialty in the whole continuum of expertise, including students, graduates, and practicing doctors. This project extends the existing theoretical frameworks of predicting specialty choice of medical students when applied to the situation of specialties that are less attractive and in the context of a developing country. The proposed set of guidelines for developing CME provides additional support for designing and organizing the training activities. The knowledge presented in the Thesis can serve as a basis for the design and implementation of appropriate educational strategies on vocation and career development to increase the motivation of healthcare workers in the specialties that are struggling with recruitment and retention of workforce.

The results of this project have several practical implications for stakeholders who are involved in educating and managing human resources in medical specialties that are less attractive, such as policy makers, educational managers or program developers and educators in health professions education institutions. This section proposes practical suggestions for each party's considerations, which are presented in three strategies: (1) approaches and plans to train health workers in LASs; (2) vocational and marketing strategies to influence the public perceptions of LASs, and (3) making LASs more relevant and connected (Table 7.1).

Table 7.1: Summary of practical implications of the Thesis

Strategies	Policy makers	Educational managers, Program developers	Educators
Appropriate approaches and plans	Consider the effectiveness of training of LASs at the undergraduate level as well as create other strategies to increase human resources in LASs	Make plans for recruitment and selection of appropriate candidates for LASs training	Conduct multiple instructional and evaluation activities that relate to learners' workplaces
Vocational education and marketing strategies	Conduct early education activities of vocation, including social media in primary, secondary and thirddary schools	Conduct more marketing strategies to advertise the attractiveness of LASs to potential students	Increase student's perceptions of LASs via teaching activities, role models, personal experiences to publicize LASs characteristics
Relevance and connection	Develop policies to increase opportunities for LASs health workers to access CME activities and stay committed to the specialties.	Reform the curriculum, giving more time for extracurricular activities and early exposure to practice in LASs	Create and maintain a connection via the learning community to reduce professional isolation and increase competence of LASs students and graduates of CME.

7.3. IMPACT ON POLICY MAKERS

Developing appropriate strategies to cope with the problem of healthcare worker shortages has always remained a challenge for policy makers. The results from this project could serve as evidence to inform policy making in education and in healthcare systems to increase the number of health workers in less attractive medical specialties (as seen in the left part of Table 7.1). Together with the approach to train PM doctors at the undergraduate level as a solution to the problem of shortage of PM health workers, Vietnamese policy makers should consider the use of this specialty at postgraduate training. Besides applying a variety of motivating strategies towards practicing health workers, the essential purpose of medical education to attract more potential workforce for these specialties should be recognized and implemented. To support the formation of accurate perceptions of potential students and social understanding toward LASs, it is necessary to increase the knowledge and experiences of students by stimulating educational activities of vocation and career development before and during the training program, including broadcasting in mass media the important role and function of LASs in the healthcare system. Other management policies to increase and equalise the opportunities to access CME activities for LAS healthcare workers as a method of promoting their personal and professional development should be developed in order to enhance their commitment to the specialties.

7.4. IMPACT ON EDUCATIONAL MANAGERS AND PROGRAM DEVELOPERS

Students who choose a less attractive medical specialty might have various characteristics, needs, and expectations. Educational managers or training program developers should keep this diversity in mind when designing new training programs for LASs so that they have appropriate interventions for each group of students (as seen in the middle part of Table 7.1). Program managers should consider implementing more activities that give candidates the opportunities to express their needs, perceptions and expectations at the stage of recruiting new students, instead of relying only on results of the entrance exams. Marketing strategies to advertise the attractiveness of LASs to increase students' accurate perceptions and attitudes toward LASs should be conducted frequently. In order to effectively retain many students, the training curriculum should be designed or revised to help students have early exposure to LASs or have sufficient information to make their decision of career choice in a LAS.

7.5. IMPACT ON EDUCATORS

Teachers at every stage of the educational system should play the role as information source and career guidance to their students (as seen in the right part of Table 7.1). First, to be involved in CME activities, educators should customize the contents to the needs of LAS physicians, including implementing multiple instructional and assessment activities that relate to learners' work places. Second, teachers in medical schools should facilitate the learning process of students to increase perceptions of the functions of LASs in the healthcare system. Through a broad array of teaching activities as well as being role models and sharing their personal experiences, teachers can inspire their students to study and pursue a career in the LASs, particularly students who have lower motivation. And finally, they also have a major role in establishing and maintaining the professional connection among learners, which are essential to reduce the feeling of isolation of healthcare workers in LASs.

Making a decision in career choices is not an easy task for medical students and their family, especially in the specialties that they do not have sufficient information and experiences with. Since all people have their own dreams, values and expectations, their career choice would be made in combination with both personal preferences and social demands. All stakeholders that are directly or indirectly related to the healthcare and educational sectors should provide an open environment to support potential healthcare workers to make the right decision in career choice. While planning for the future labour market in the health care sector, policy makers, educational leaders and program developers could use the results from this Thesis as an evidence-informed basis to create proper strategies for student selection, curriculum development and renovation, and healthcare worker retention.

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Curruculum Vitae

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