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Short report

Individual and hospital-specific factors influencing medical graduates' time to medical specialization

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ABSTRACT

Previous studies of gender differences in relation to medical specialization have focused more on social variables than hospital-specific factors. In a multivariate analysis with extended Cox regression, we used register data for socio-demographic variables (gender, family and having a child born during the study period) together with hospital-specific variables (the amount of supervision available, efficiency pressure and the type of teaching hospital) to study the concurrent effect of these variables on specialty qualification among all 2474 Norwegian residents who began specialization in 1999–2001. We followed the residents until 2010. A lower proportion of women qualified for a specialty in the study period (67.9% compared with 78.7% of men, $p < 0.001$), and they took on average six months longer than men did to complete the specialization qualification ($p < 0.01$). Fewer women than men entered specialties providing emergency services and those with longer working hours, and women worked shorter hours than men in all specialties. Hospital factors were significant predictors for the timely attainment of specialization: working at university hospitals (regional) or central hospitals was associated with a reduction in the time taken to complete the specialization, whereas an increased patient load and less supervision had the opposite effect. Multivariate analysis showed that the smaller proportion of women who qualified for a specialty was explained principally by childbirth and by the number of children aged under 18 years.

Introduction

Most health care systems face the challenge of managing the increasing proportion of female physicians, combined with women's preferences for shorter working hours, the longer time they take to complete a specialty qualification and their different specialty preferences to men. This development may alter the distribution of physicians and may have consequences for recruitment to many specialties that are crucial for modern hospital services. In general, there seems to be an increasing preference among medical students for specialties that offer control over lifestyle, defined in previous studies by characteristics such as time for leisure and family, and personal control over the total time spent on professional responsibilities (Dorsey, Jarjoura, & Rutecki, 2003; Lind & Cendan, 2003). To enable better understanding of this challenge, research from different national systems should be encouraged and compared.

The gender differences in work preferences have been related to domestic factors, including marital status, parenthood, family relations and other personal and social factors related to life satisfaction (Bovier & Perneger, 2003; Gjerberg, 2001; Heiliger & Hingstman, 2000; Lambert, Davidson, Evans, & Goldacre, 2003). However, medical career development is complex, with medical residents combining the multiple tasks of patient care, learning, training and teaching in an environment of increasing demands for efficiency (Linna, Hakkinen, & Magnussen, 2006). We therefore extend the focus of previous studies (Boex & Leahy, 2003; Buddeberg-Fischer, Klaghofer, Zivanovic, Vetsch, & Buddeberg, 2006) to include three hospital-specific variables, namely the amount of supervision available, efficiency pressure and the type of teaching hospital, in the analyses of the time taken to complete a specialty. Our research question was: How do hospital-specific variables and individual characteristics influence the time medical residents take to complete a specialty qualification?

Many previous studies were based on questionnaires completed by residents in selected medical specialties (surgery, internal medicine or others). This study adds to the literature by using register data to combine social variables with hospital-specific

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factors and by including more explanatory variables. All residents in Norway recruited between 1999 and 2001 were included and followed up until 2010 with respect to the time taken to obtain a specialist qualification.

Background

Gender equity

From the perspective of social framework and lifestyle factors, Norwegian resident education may be of specific interest because, for several decades, gender equity has been a focus of Norwegian work-force policies, and working conditions have evolved that other systems may wish to emulate. Over the past 40 years, generous maternity leave provisions have been implemented, and today all children are guaranteed a place in kindergarten from the age of one year. There has been a 25% reduction in total working hours, to 38 h per week and from 48 to 47 weeks per year. This may contribute to better conditions for women's career development in medicine. Several authors have discussed the increased focus on lifestyle and work–life balance (Colletti, Mulholland, & Sonnad, 2000; Ellsbury, Baldwin, Johnson, Runyan, & Hart, 2002; Ettner, 1995; Heiliger & Hingstman, 2000; Lambert et al., 2003). A previous study (Gjerberg, 2001) comparing two cohorts of Norwegian residents who qualified as doctors in the 1970s and 1980s, respectively, found that changes had taken place. In the second cohort, as many women as men chose to specialize, and they chose a wider range of specializations than their predecessors did, although more women in the 1980s cohort chose obstetrics, gynaecology and paediatrics.

Organization of Norwegian specialty education

The structure of the specialization programme varies among specialties, but in the major specialties such as surgery, internal medicine, orthopaedics, gynaecology and obstetrics, it is mandatory to spend six years in the main field, although one year may be replaced by an equivalent period in complementary fields in certain cases. Hospital departments certified for resident education are classified into groups, with Group 1 departments offering a higher level of specialization than Group 2. Residents must spend a defined part of the mandatory education period at Group 1 departments, which are all located at regional (the largest and most specialized hospitals) or central hospitals (Norwegian Medical Association, 2010). Candidates may complete their residency at one or more hospitals. In addition, theoretical courses totalling 200–300 h are mandatory. Regional, and to a certain degree central, hospitals use a substantial portion of their resources for research and specialized health care, while local hospitals provide less specialized patient care. Theoretically, these factors, together with the amount of supervision by senior colleagues, may affect residents' practice and training and thus the time needed to complete the specialty qualification. In addition, residents' activities during their scheduled time on duty are determined partly by their need to participate in the direct patient care responsibilities necessary to achieve specialty-specific learning objectives, and partly by their hospital's need for doctors to deliver routine (non-specialist) health services. Hospitals' patient loads (per physician) may therefore also be of importance.

Methods

Study group

The study population was collected from the personnel databases of all Norwegian hospitals and included all 2474 physicians (1232 males) who commenced a residency in the years 1999–2001 and for whom records continued until the end of 2010 with respect to their specialty qualifications. The first specialist qualification was recorded, but later sub-specialties were not included. Specialties were grouped into 15 categories (Table 1).

Independent variables

Socio-economic data were obtained from Statistics Norway (www.ssb.no) and linked with data from the personnel registers by personal identification numbers. In addition to gender (male = 0, female = 1) and age at the start of specialization, multiple socio-economic variables were registered yearly; marital status (0 = married or cohabitating, 1 = single), having a child born (childbirth = 0 if no, childbirth = 1 if yes) and number of children aged under 18 years.

We used three hospital-specific variables. As an indicator of the availability of supervision, we used the ratio of residents to the total number of physicians in each hospital for each year (resident fraction, RF). As an indicator of the patient load per physician, termed the "patient work-load" (PWL), we used the total number of diagnosis-related group (DRG) equivalents (the sum of DRG weights) per year from hospitalized patients, day treatment and outpatient visits, and divided this by the total number of physician full-time equivalents to obtain the total DRG activity per physician for each year. The activity data were acquired from the Norwegian Patient Register.

DRG equivalents are not an exact measurement of the actual patient loads in terms of physician productivity, because they also contain an allowance for non-personnel routine costs, medical and technical tools, nursing services and so on. Pooling of outpatient and inpatient DRG metrics requires care, because inpatient and outpatient activities demand different amounts of physician labour (Vitikainen, Linna & Street, 2010). Furthermore, specialties such as pathology and laboratory medicine are involved with patients in quite different ways to the specialties with direct patient contact, and this implies limitations when global DRG activity is used. To test for the stability of the variable, we isolated DRG activity in surgery, internal medicine and gynaecology and performed sub-analyses for the specialty candidates in these fields. Because there are no DRG measures in psychiatry, we excluded these residents ($n = 274$) when analysing hospital factors.

Table 1
Descriptive statistics for those who qualified for a specialty during the study period.

Specialty	*N*	Percent of total choosing the specialty	Percent of men choosing the specialty	Percent of women choosing the specialty	Percent of female within specialty
Anesthesiology	185	10.2%	12.7%	7.2%	33%
Dermatology	23	1.3%	0.8%	1.8%	65%
Gynaecology	116	6.4%	3.7%	9.5%	69%
Internal medicine	355	19.5%	21.8%	16.9%	40%
Laboratory medicine	47	2.6%	1.7%	3.6%	64%
Neurology	86	4.7%	3.6%	6.1%	59%
Oncology	40	2.2%	1.9%	2.5%	53%
Ophthalmology	62	3.4%	3.5%	3.3%	45%
Orthopaedic surgery	107	5.9%	8.9%	2.4%	19%
Otolaryngology	60	3.3%	3.4%	3.2%	45%
Pathology	33	1.8%	1.4%	2.3%	58%
Pediatrics	96	5.3%	3.6%	7.2%	64%
Psychiatry	226	12.4%	8.9%	16.5%	62%
Radiology	142	7.8%	7.3%	8.4%	50%
Surgery	241	13.2%	16.8%	9.1%	32%
Total	1819	100%	100%	100%	