Does having children in medical school influence tenure of postgraduate training: a nationwide 15-year follow-up study.

Andreas Saga Romsdal[a], Reidar Tyssen[a,*]

[a]*Department of Behavioural Sciences in Medicine Institute of Basic Medical Sciences Faculty of Medicine University of Oslo P.O.Box 1111 Blindern N-0317 OSLO, Norway*

Abstract

Purpose To find whether having children in medical school affect time to speciality, also when controlled for age, gender and life events. We also wanted to find out if having two or more children would impact on time to speciality. **Subjects** This study consists of two nationwide 15-year prospective cohorts with 466 respondents from all medical students graduating in 1993, 1994, 1999 and 2000 at all of the Norwegian medical faculties. We followed the subjects with comprehensive postal questionaries at five observations points. **Methods** Our outcome variable was length of postgraduate training. We used the following independent variables: age, gender, number of children during medical school, number of children during postgraduate training, life events, place of study and field of speciality. **Results** The following variables showed a significant effect on time to speciality; having children during medical school, having children during postgraduate training, gender and life events. Age and having several children during medical school did not have an impact on time to speciality. **Conclusion** We found that having children during medical school does prolong time to specialization when compared to not have any children at all. Having several children does not prolong time to specialization when compared to having none or one child. An unexpected findig where that women spent longer time on postgraduate training, even when controlled for having children.

*Supervisor

This finding needs further studies.

Contents

1. Introduction

Despite the importance of knowing which factors may contribute to the length of postgraduate training, in particular the effect of having children, we lack studies of this. The minimum length of postgraduate training varies from country to country, but the actual time spent from graduation and until obtaining the specialist title has not been of much concern in other studies.

1.1. Other studies

A 25-year longitudinal study from Denmark, reported that 50 % were specialists after ten years, 70 % after 14 years, and 75 % after 17 years.[1] The same study also reported that women used slightly more time to a speciality, 50 % of the females were specialists after 11 years versus 10 years for the total sample. A report from the Norwegian Medical Association showed that the mean time to specialization were nine years.[2] Another Norwegian study found that women

specialized less frequently, and this was not related to women using longer time to specialization.[3] A-level results were shown to predict time to membership qualifications, but not time to consultant.[4] Intelligence could not predict any of these.[4] Doing military service and parental leave has been shown to delay time to specialist.[2] Yet, we lack studies of the role of having children on time to specialization. In particular it is pertinent to study whether having children as at an undergraduate level will shorten postgraduate training time.

1.2. Indenpendent factors

Information about what affects the length of postgraduate training is, as shown above, lacking. There could be several reasons for spending longer time in postgraduate training and not all of these are necessarily extension of the training itself, as parental leave and military service.

Gender seems to be a factor, but we do not know wether it is gender itself or a confounding variable. This could be longer parental leave or women working less than men. Age could also be a factor, though it is not easy to deduce if this would increase or decrease the postgraduate time. In this study we would expect an age effect because we have two different cohorts, but this is merely due to the cohort effect.

Negative life events such as serious illness or accident, family problems, divorce or break-up, deaths in family and economical problems may to prolong time to specialist.

Having children or getting children while in the postgraduate period could also be a factor, since we know that postgraduates with children are concerned about the home/work balance.[5] We do not know whether having children actually prolongs the time to specialist, though we could expect that parental leave should extend the postgraduate period. One could also think that having infants and toddlers would be more demanding than having older children and therefore would prolong the graduation period.

Taking the specialist training part time or with reduced work hours, should be something that would extend time to specialty. Though we do no know the

reason for taking it part time, and this could be related to having children or sickness.

1.3. Why this knowledge is important

Knowledge about what affects time to specialty is useful from several different perspectives. For health politicians and economists, knowledge about this could lead to actions towards improving areas which may delay the postgraduate time. The same could be said about the administrators of both undergraduate and postgraduate training to improve the quality of medical training. It could even be interesting from the postgraduates point of view, especially female, since it is well established that infertility increases with age. Some women may experience involuntary childlessness if they postpone their pregnancy too long. Willett et al. reported in 2010 that in the Southern United States: "Women residents are intentionally postponing pregnancy because of perceived career threats..."[6] In New Zealand, Gander et al. reported that female postgraduates were less likely to live with children than male graduates.[5]

1.4. Medical training in Norway

Medical training in Norway may be started after finishing high school, usually around the age of 19. Medical school then lasts for 6 years at university level. For most of the specialities it takes atleast 6 1/2 years to finish postgraduate training. This training consists of 1 1/2 year of generalized training in internal medicine, surgery and general practice. After that there is 5 years of specialist training equivalent to working as a Specialty Registrar. In Norway, the minimum amount of time to become a specialist in General Practice, is 6 1/2 years, the same as the hospital specialties.

1.5. Equality and welfare in Norway

Norway may be considered as an equal society with regards to gender differences. The parental leave system should also be considered quite good. At the time of this study, parents had the right to 44 weeks of paid parental leave.

Even students at university level had this privilege and they even got additional grants.

1.6. Research questions

We have the following research questions:

1. Does having children in medical school impact on time to speciality, also when we control for age, gender and life events.
2. Is there an impact on 1) of having two or more children?

2. Subject and methods

2.1. Subjects

This study consists of two samples, both of them are nationwide 15-year longitudinal studies in Norway. We can thereby divide them in two cohorts. Both of these are cohorts from The Longitudinal Study of Norwegian Medical Students and Doctors(NORDOC) and is done according to the guidelines of the regional ethical commitees, with approval of the National Data Inspectorate and in collaboration with the Norwegian Medical Association.[7, 8, 9]

From cohort 1, we included those who answered on all occasions from T3, T4 and T5. From cohort 2, we included all who answered at all five observational points. The final sample consisted of 466 participants from these two cohorts with a response rate of 44,6 % (466/1044).

2.1.1. Cohort 1 - student cohort

The first cohort is the Student Cohort of the NORDOC and consists of all students entering medical schools in 1993 (n=421).[8] The participants where followed with postal questionaries at five different time points (T), T1, T2 and T3 during medical school, recpectively first, third and at the end of final (sixth) year of medical school.[8] T4 and T5 where collected during the fourth and ninth year respectively. 169 students were added to the Student Cohort at T2 and T3, making the total number of invited students to 580. We were unable to reach

43 of the subjects due to drop out from school and invalid mail adresses. The final sample consisted of 251 participants, 43,9 %(251/537), who responded at T3, T4 and T5.

Further details about data collection and validation of this cohort may be found in Finset et al.,2005;[7] Kjelstadli et al.,2006;[8] and Tyssen et al.,2007.[10]

2.1.2. Cohort 2 - doctor cohort

The second cohort is the Young Doctor Cohort of the NORDOC and consists of all medical students graduating in 1993 and 1994 at all medical schools in Norway (n=631). [11] The participants were followed with a postal questionary at five different time points (T), T1 at the end of the final (sixth) year in medical school, T2 at the end of the first postgraduate year, T3 during the fourth postgraduate year, T4 during the ninth postgraduate year and T5 during the fourteenth postgraduate year. 124 where unable to answer at one or more of the observational points because of problems with invalid adresses, invalid birth numbers or the subject had died or emigrated.The response rate was then 42,4 % (215/507). Further details about the data collection and validation of this cohort may be found in Tyssen et al., 2000[11] and Grotmol et al.,2010.[12]

2.2. Methods

The dependent variable we chose was the tenure of postgraduate training. This is defined as starting from the time of graduation at the university and ending at the completion of the postgraduate training, earning the specialist title which enables the opportunity to apply for a consultant position. We looked at the following independent variables: gender, age, children, graduating university, graduation semester, completed postgraduate training, what kind of speciality and life events.

2.2.1. Tenure and field of postgraduate training.

This data were collected at T4 and T5 for both cohorts. In the questionary we had the following question: "I have finished my postgraduate training in ... specify number of years ago ..." The participant could then choose a speciality

from a list of 52 specialities which each had a 3 digit number that could then be entered as answer. We then recoded these into 8 groups:

1 Internal Medicine

2 Family/General Practice

3 Pediatrics

4 Medical Specialities

5 Surgical Specialities

6 Psychiatry

7 Ob\Gyn

8 Others

To find an approximate date of when the postgraduate training was finished, we subtracted the number of years since postgraduate training ended from the year this variable was gathered. Since we also had an approximate graduation date, we could then derive the tenure of postgraduate training.

2.2.2. Age and gender

Age and gender was measured at T1, T2, T3, T4 and T5. Females were coded as 1 and males as 2. Three cases in cohort 1 were recoded to missing, all of these answered 1 at T1 and T2, and 2 at T3, T4 and T5.

2.2.3. Graduation semester

Cohort 1. This was gathered at T3 with a multiple choice question: "In which semester do you plan to finish medical school?

0 Quitted without finishing

1 Finished already

2 Spring 1999

3 Fall 1999

4 Spring 2000

5 Fall 2000

6 Later."

This data where then recoded into an approximate graduation date, where the spring semester ended 30th of June and autumn semester ended 30th of December. Those students that answered 0,1 and 6 were recoded to missing, since we could not derive an approximate finishing date on these.

Cohort 2. This was gathered at T1 and T2 with a multiple choice statement: "Graduation semester

1 Spring 1993

2 Fall 1993

3 Spring 1994

4 Fall 1994 ."

This data where then recoded into an approximate graduation date, where the spring semester ended 30th of June and autumn semester ended 30th of December. Those students that answered 0,1 and 6 were recoded to missing, since we could not derive an approximate finishing date on these.

2.2.4. Graduating university

For cohort 2 this data were only gathered at T1. For cohort 1, this data was gathered at T1, T2 and T3. When comparing the different place of study at T1, T2 and T3 we found 2 cases that had answered Bergen at T1, and Oslo at T2 and T3. These 2 cases were recoded to Oslo-students, as it was possible to change university during the first semesters.

2.2.5. Life events

Life events where recorded according to 13 dichotome items (see appendix 1) at T2, T3, T4 and T5. The object was to measure these variables from the end of medical school until the end of postgraduate training. Since T1 is at the start of medical school in cohort 1, and T1 is the end of medical school in cohort 2, we had to exclude the T2 and T3 variables for cohort 1, see table 5. We identified life events that were significally (or close to) associated with tenure of specialization, and computed a sumscore of these into a weighted life events variable.

2.2.6. Children

This was gathered at T1, T2 and T3 with the question: "How many children do you have?

0 None

1 One child

2 Two children

3 Three or more children."

From this we could derive if they had children while studying, for cohort 1 this would be if they had children at T1, T2 or T3. For cohort 2, if they had children at T1.

We could also from this derive if they had any children at approximately the time of ending the postgraduate specialist training. This was done by adding the number of life events "Have had children?" that occured after T3 to the variabel of children at T3. We could therefore in our analysis differentiate between those that had children while studying, those that had children while graduating, but not while studying and those that had none children at the time of finishing their speciality. We could even differentiate these groups by whether they had only one child or two or more children.

2.3. Statistics

The statistical analysis was done with IBM SPSS version 19, Release 19.0.0 for Mac. To answer research question 1 and 2, we used a general linear multiple regression.

To compare differences among the groups in field of specialization and undergraduate study place in regards with time to specialization, we used an one-way ANOVA. We used a Pearson Chi-Square test to see if there was a difference in prevalence of having children between gender. We also used an independent T-test to see if there was a difference in having children during postgraduate training wether you had none or one child during medical school, compared to having two or more children during medical school.

We chose the level of significance to be 5% and confidence intervals to 95%.

3. Results

The mean observational time from T1 to T5 were 14,7 years (SD=0,5). Descriptive statistics of the variables are shown in table 1. 54,7 % (255/466) of the total sample had finished their specialist training, while as much as 87,0 %(187/215) of the doctor cohort, and only 27,1 %(68/251) of the student cohort.

Variable	**Mean (SD)**	**Range**
Time to specialist (yrs).	9,5 (2,05)	5 - 15
Age at T5 (yrs.)	39,3 (3,9)	33 - 64
Gender	56,2 % female	
Cohort	53,9% cohort 1	
Children during post-graduate training only*	57,6%	
Children during medical school*	23,7%	
Have got married/started living with cohabitant*	41,4%**	0 - 3
Death of family member/close friend*	42,6%**	0 - 4
Other difficulties in nearest family*	39,2%**	0 - 5
Partner being unemployed/ Granted leave*	11,8**	0 - 2

Table 1: *Of those that have specialized. **This life-event has happened atleast once.

3.1. Research question 1

Having one or more children while in medical school did prolong time to specialization ($\beta = 0,762$, p=0,034) in our multiple linear regression model as seen in table 2.

3.2. Research question 2

We also did a multiple linear regression with the variables of having two or more children, table 3, and this actually achieved a higher adjusted R square (0,309) than the regression showed in table 2. This effect was even sustained when doing the multiple regression with only the doctor cohort alone. This showed that having 2 or more children while in medical school did not prolong

	Unadjusted				Ajdusted									
					Block 1		Block 2		Block 3		Block 4		Block 5	
				Adjusted R square	0,217		0,240		0,260		0,287		0,285	
Variabel	**U.B.**	**p**	**CI(95%)**		**U.B.**	**p**	**U.B.**	**p**	**U.B.**	**p**	**U.B.**	**p**	**U.B.**	**p**
Cohort	2,105	$< 0,001$	1,573-2,637		2,192	$< 0,001$	2,072	$< 0,001$	1,966	$< 0,001$	1,867	$< 0,001$	1,812	$< 0,001$
Gender	-0,964	$< 0,001$	-1,473- (-0,456)				-0,674	0,005	-0,764	0,001	-0,727	0,002	-0,732	0,002
Children during post-graduate training only*	1,110	0	0,478-1,742						0,892	0,005	0,905	0,003	0,914	0,003
Children during medical school*	0,637	0,09	-0,101-1,375						0,688	0,056	0,774	0,029	0,762	0,034
Weighted life events	0,311	$< 0,001$	0,149-0,473								0,23	0,002	0,230	0,002
Age	0,125	$< 0,001$	0,055-0,194										0,011	0,818

Table 2: U.B.=Unstandardized beta. *Having none children is the reference group

time to specialist (p=0,150), when compared to having none or one child during medical school. An independent T-test showed that if you had two or more children during medical school you would have fewer new children during post-graduate training when compared to having none or one child (p=0,009). See table 6 in the appendix additional information.

	Unadjusted				Ajdusted									
					Block 1		Block 2		Block 3		Block 4		Block 5	
				Adjusted R square	0,217		0,240		0,260		0,287		0,285	
Variabel	**U.B.**	**p**	**CI(95%)**		**U.B.**		**U.B.**		**U.B.**		**U.B.**		**U.B.**	
Cohort	2,105	$< 0,001$	1,573-2,637			$< 0,001$	2,072	$< 0,001$	1,905	$< 0,001$	1,794	$< 0,001$	1,715	$< 0,001$
Gender	-0,964	$< 0,001$	-1,473- (-0,456)				-0,674	0,005	-0,732	0,002	-0,696	0,002	-0,700	0,002
2 children or more during postgraduate training only*	1,263	0,955	0,724-1,801						1,062	$< 0,001$	1,122	$< 0,001$	1,128	$< 0,001$
2 children or more during medical school*									0,573	0,190	0,713	0,097	0,663	0,150
Weighted life events	0,311	$< 0,001$	0,149-0,473								0,250	0,001	0,249	0,001
Age	0,125	$< 0,001$	0,055-0,194										0,015	0,756

Table 3: U.B.=Unstandardized beta. *Having none children or one child is the reference group

3.3. Time to specialization

The mean time to specialization were 9,5 (SD=2,0) years for the total sample, 10,0 years (SD=2,1) for the doctor cohort, and 7,9 years (SD=0,9) for the student cohort. Only 4 %(8/243) spent 6,5 years in postgraduate training(the minimum amount of postgraduate time in Norway), and 5 of these spent less than 6,5 years. Afer 10 years, 35 % (163/455) were specialists, 47,0 % in the

doctor cohort.

3.4. Prevalence of having children

23,5 % (109/463) had children during medical school, while 62,4 % (289/463) got children between medical school and T5. 85,6 % (199/466) of the total sample had children at T5, 88,8 % and 82,9 %in the doctor and student cohort respectively. As seen in table 1, 57,6 % (136/236) had children during their postgraduate training. 75,9 % of women had children at time of specialization against 85,8 % of men, though this did not reach significancy (p=0,053). There was no difference in gender for having children during medical school (p=0,114).

		None children		**One child**		**Two children**		**Three or more**		**Total**	
Children during medical school	Women*	198	76,7%	43	16,7%	13	5,0%	4	1,6%	258	100,0%
	Men*	154	76,2%	28	13,9%	18	8,9%	2	1,0%	202	100,0%
	Total	354	76,5%	72	15,6%	31	6,7%	6	1,3%	463	100,0%
During post-graduation only		100	42,6%	37	15,7%	70	29,8%	28	11,9%	235	100,0%
Children at time of specialization all		44	18,7%	39	16,6%	94	40,0%	58	24,7%	235	100,0%

Table 4: *There were no signficant difference among gender neither for having children as student nor at the time of specialization.

3.5. Life events

Of the 13 items, three were significantly correlated to postgraduate tenure. These were "Have had children"(p$< 0,001$),"Death of family member/close friends"(p=0,036) and "Other difficulties in nearest family"(p=0,032). Two life events were close to significancy, "Partner being unemployed/granted leave"(p=0,068) and "Have got married/started living with cohabitant"(p=0,076). The weighted variabel of these life events, were significantly correlated with time to speciality, both unadjusted ($p < 0,001$) and adjusted ($p = 0,002$), see table 1. We did not include the life event "Have had children" since it would have a high correlation

with the variabel "Children during post-graduate training only" used in our multipe regression.

3.6. What affects time to speciality?

The results of our blockwise multiple regression are shown in table 2. We see that having children during medical school goes from not significant while unadjusted, but becomes significant when controlling for the other variables. Age looses its significance when controlling for the cohort effect. Age did not have an effect when analyzing the doctor cohort only. Gender, having children during postgraduate training, having children during medical school and life events were significantly correlated to postgraduate tenure, even while controlling for the other variables, see table 2.

3.7. Having children after medical school only

Having two or more children during the postgraduate period only, prolonged it (beta = 1,128, $p < 0,001$). As did having any children, see table 2.

3.8. What is the relative influence between the independent factors?

From table 2, we can see that the cohort effect explains most of the variation in years to specialization. Gender explains the second most, with having children in a close position on third.

3.9. Field of speciality and place of study

There was no difference among the different groups in regards of time to specialization for neither field of speciality nor which undergraduate study place.

4. Discussion

Our main finding were that having children in medical school did prolong time to specialization, when compared to not have any children at the time of speciality. Having two or more children in medical school did not prolong time when compared to having one or none children at the time of speciality.

We also had an unexpected finding, females spent longer time in training even when taking into account if they had children or not. As expected, we found that negative life events in the postgraduate period did prolong time to specalization. We also found an age effect, but this was absorbed by the cohort effect.

4.1. Research question 1

We found that having children during medical school does increase time to specialist compared to those that do not have any children at the time of specialization, even when controlled for gender, age and life events.We also see from table 6 that as much as 94 % of those having one child as a student gets new children during their postgraduate period. Thus this increased time in postgraduate training could as well be explained by having children in the postgraduate period, which we have shown have an impact on postgraduate tenure, but this needs further studies.

4.2. Research question 2

We found that having two or more children during medical school, did not prolong time to specialist when controlling for the same variables as mentioned in question 1. We also showed that this group had fewer new children during their postgraduate training, and this is a possible explanation. Their children would also be older, and maybe less demanding than younger children.

From table 3 we may conclude that if you have several children during medical school, you would spend less time in postgraduate training than if you had several children after medical school. Of those that specialize 41,7 % have several children during their postgraduate period only. We may then conclude that having several children in medical school would lessen the postgraduate training time compared to a large portion of those that that do specialize.

Even though having two children during medical school, does not prolong postgraduate training, we do not know if it prolongs undergraduate time. Since having children in the postgraduate period prolongs postgraduate time, one

could think that having children during medical school would prolong study time. Though this is not certain as there are multiple differences in postgraduate training and medical school. Though it could be that the total medical training time from start of medical school to finished specialist is the same whether you have children before or after medical school, but this needs further studies.

4.3. Having children in the postgraduate period only

As expected, we found that having children in the postgraduate period did prolong time to specialist, even when controlled for gender, age, life events and having children during medical school. Some of this could probably be explained by having parental leave. A large portion of this group would spend much of their postgraduate time when having children in infancy and toddler period. When you have small children as these, you face several challenges that may affect your working situation, for example you have to deliever and pick up children within the opening hours of daycare. This could lead to a reduction in working hours, and a comparable elongation of the postgraduate training.

Having two or more children did also prolong postgraduate time when compared to having none or one children. We interpret that as having two children or more, prolongs postgraduate time more than just having one child. Having two children would lead to another period of parental leave, thus prolonging postgraduate period even more.

We were not able to deduce if any of our participants got twins or even triplets, and this would in our questionary be recorded as just having one child. Though this is not a major concern as this would lead to some of those recorded as having one child actually had two or more and could lead to a Type II error, and thus is irrelevant since we have rejected the null hypothesis.

Spouse support were found to protect against the work-home interference caused by having many children.[13] There is a possibility of spouse support to reduce the increased length of postgraduate training.

McManus showed that personality influence stress and burnout in doctors.[14] Having many children both as a student and as a postgraduate may have a syn-

ergistic effect, and this should be studied further.

4.4. Gender

Gjerberg & Hofoss reported in a cross-sectional study in 1995 that females spent significantly, though slightly longer time (0,4 years) on postgraduate training.[3] They also reported that this difference was larger among older generations, while recently, the women were faster than their male counterparts. This claim was not significant in their own results, but mostly due to reports from the Norwegian Medical Association. In our study, females spent longer time in postgraduate training, even when taking into account if they had children or not. The difference between these two studies, suggests this subject needs further studies to be validated.

The reasons for women spending longer time on postgraduate training are unclear, thus this subject needs to be explored in further studies. One suggestion could be that females work less than males.[13] We do know that neuroticism is related related to stress and burnout, and McManus also showed that this is a causal relationship.[14, 15] We also know that Norwegian female medical students score higher on neuroticism than males.[10] This is also true in the general population across different cultures.[16] We may then suggest that this experience of stress and exhaustion may cause increased time to specialist.

Female junior house doctors were shown too be less likely to live with children in New Zealand.[5] Our study also found this trend, with a 10 % difference, but it did not reach significancy with a p-value of 0,053. This could be a type II error due to lack of statistical power. If this is not the case, another explanation could be difference in social rights and equality between Norway and New Zealand.

4.5. Time to specialization

The mean time in a cross-sectional study of Gjerberg & Aasland is 9,3 years, while the doctor cohort in our study has a mean of 10,0 years. Including the student cohort would lead to a too low mean since the postgraduate observational time in this cohort is lower than the mean time to specialist for the doctor

cohort. We may also expect the true mean time in our cohort to be slightly higher than this, since we have not observed the doctor cohort for more than 14,5 years of their postgraduate time. The reason for this discrepancy could be due to our study neither including Norwegian citizens who graduated in foreign countries nor any other students graduating from foreign universities. Though our study would not rule out any Norwegian students specializing in a foreign country, which Gjerberg's study did, and this could also make a difference.

The reason for some subjects spending less than the minimum time, could be due to the few specialities with less than 6,5 years of minimum specialization time, or doing the postgraduate training in a foreign country with shorter postgraduate time.

4.6. Life events

Life events have been found to have an impact on both mental health and life satisfaction.[9, 11, 17] Thus it is not surprising to find that this has an effect on time to speciality.

4.7. Strengths and limits

This is a nationwide study over a long period of time. Due to the need of having the subjects respond on all occasions from the final year of medical school and until T5 44,6 % response rate must be considered good. Though there could be problems with selection bias anyway, we do not know if the non-respondents differed in regards to time to speciality or number of children during postgraduation.

There are several factors that may affect time to speciality that we did not include in our study, thus there could be confounding variables that may have an impact on our findings. Our study explains about a quarter of the variation in time to specialization, leaving more factors to be explained in other studies. Among our suggestions could be work-home interference, experience of stress and burnout, spouse support, working hours or personality.

Our questionaries did not take into account of whether the postgraduate training was done in Norway or in a foreign country.

Our findings may probably be generalized to the nearby Nordic countries with similar speciality training and the same degree of equalization and social rights, but may be limited beyond that.

5. Conclusion

We found that having children during medical school does prolong time to specialization when compared to not have any children at all. Having several children does not prolong time to specialization when compared to having none or one child. An unexpected findig where that women spent longer time on postgraduate training, even when controlled for having children. This needs further studies.

6. References

[1] Siboni K; Winslwparken 21 2 DK-5000 Odense C. Department of Clinical Microbiology. Medical graduates (candidates) 1972-2001 from the University of Southern Denmark, Odense 2nd ed. Geographical supply and distribution, length of study, postgraduate education, specialties and main occupation. Dan Med Bull. 2003 3;50(1):85–9.

[2] Aasland OG, Gjerberg E. Do doctors use too much time for post-graduate education (specialisation)? Oslo; 1999.

[3] Gjerberg E, Hofoss D; Oslo. Seksjon for helsetjenesteforskning. [Is gender of significance for specialization of physicians? An analysis of specialization degree among female and male physicians]. Tidsskr Nor Laegeforen. 1995 4;115(10):1253–7.

[4] McManus IC, Smithers E, Partridge P, Keeling A, Fleming PR; London WC1E 6BT. Department of Psychology. A levels and intelligence as pre-

dictors of medical careers in UK doctors: 20 year prospective study. BMJ. 2003 7;327(7407):139–42.

[5] Gander P, Briar C, Garden A, Purnell H, Woodward A; Wellington New Zealand. Sleep/Wake Research Centre. A gender-based analysis of work patterns, fatigue, and work/life balance among physicians in post-graduate training. Acad Med. 2010 9;85(9):1526–36.

[6] Willett LL, Wellons MF, Hartig JR, Roenigk L, Panda M, Dearinger AT, et al.; University of Alabama at Birmingham Birmingham Alabama 35291-0012 USA. Internal Medicine Residency Program. Do women residents delay childbearing due to perceived career threats? Acad Med. 2010 4;85(4):640–6.

[7] Finset KB, Gude T, Hem E, Tyssen R, Ekeberg O, Vaglum P; Medicine University of Oslo Postbox 1111 Blindern NO-0317 Oslo Norway. Department of Behavioural Sciences in Medicine. Which young physicians are satisfied with their work? A prospective nationwide study in Norway. BMC Med Educ. 2005;5(1):19.

[8] Kjeldstadli K, Tyssen R, Finset A, Hem E, Gude T, Gronvold NT, et al.; Faculty of Medicine University of Oslo Norway. Department of Behavioural Sciences in Medicine. Life satisfaction and resilience in medical school–a six-year longitudinal, nationwide and comparative study. BMC Med Educ. 2006 9;6(1):48.

[9] Tyssen R, Hem E, Gude T, Grnvold NT, Ekeberg O, Vaglum P; Blindern 0317 Oslo Norway. Department of Behavioural Sciences in Medicine. Lower life satisfaction in physicians compared with a general population sample : a 10-year longitudinal, nationwide study of course and predictors. Soc Psychiatry Psychiatr Epidemiol. 2009 1;44(1):47–54.

[10] Tyssen R; Faculty of Medicine University of Oslo Oslo Norway. Department of Behavioural Sciences in Medicine. Health problems and the use of health

services among physicians: a review article with particular emphasis on Norwegian studies. Ind Health. 2007 10;45(5):599–610.

[11] Tyssen R, Vaglum P, Gronvold NT, Ekeberg O; University of Oslo Norway. Department of Behavioural Sciences in Medicine. The impact of job stress and working conditions on mental health problems among junior house officers. A nationwide Norwegian prospective cohort study. Med Educ. 2000 5;34(5):374–84.

[12] Grotmol KS, Vaglum P, Ekeberg , Gude T, Aasland OG, Tyssen R; Faculty of Medicine University of Oslo Oslo Norway. Department of Behavioral Sciences in Medicine. Alcohol expectancy and hazardous drinking: a 6-year longitudinal and nationwide study of medical doctors. Eur Addict Res. 2010;16(1):17–22.

[13] Rvik JO, Tyssen R, Hem E, Gude T, Ekeberg O, Moum T, et al.; Faculty of Medicine University of Oslo Oslo Norway. Department of Behavioural Sciences in Medicine. Job stress in young physicians with an emphasis on the work-home interface: a nine-year, nationwide and longitudinal study of its course and predictors. Ind Health. 2007 10;45(5):662–71.

[14] McManus IC, Keeling A, Paice E; Gower Street London WC1E 6BT United Kingdom. Department of Psychology. Stress, burnout and doctors' attitudes to work are determined by personality and learning style: a twelve year longitudinal study of UK medical graduates. BMC Med. 2004 8;2:29.

[15] Deary IJ, Blenkin H, Agius RM, Endler NS, Zealley H, Wood R; UK. Department of Psychology. Models of job-related stress and personal achievement among consultant doctors. Br J Psychol. 1996 2;87 (Pt 1):3–29.

[16] Costa PT, Terracciano A, McCrae RR; Baltimore Maryland 21224-6825 USA. National Institute on Aging. Gender differences in personality traits across cultures: robust and surprising findings. J Pers Soc Psychol. 2001 8;81(2):322–31.

[17] Midtgaard M, Ekeberg , Vaglum P, Tyssen R; Faculty of Medicine University of Oslo N-0317 Oslo Norway. Department of Behavioural Sciences in Medicine. Mental health treatment needs for medical students: a national longitudinal study. Eur Psychiatry. 2008 10;23(7):505–11.

7. Appendix

Have you experienced any of these?	**T2** Last 12 months	**T3** Last 12 months	1998	1999	2000	2001	1st quarter 2002	Last 12 months	2003	2004	2005	2006	2007	1st quarter 2008	Last 12 months
			T4											**T5**	
Serious disease/accident/ hospital admission	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Divorce/separation/ broken relationship	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Have got married/started	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
living with cohabitant															
Have had children	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Death of family member/close friends	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Other difficulties in nearest family	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Serious financial	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
problems															
Serious problems with your residence/dwelling	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Partner being unemployed/ granted leave	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
You, or someone in nearest family, have been involved in serious violation of the law	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Problems with your partner	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
moved away from parents	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Other serious event (self-specified).	2	2	2	2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2

Table 5: 1= student cohort, 2=doctor cohort.

		No. of children during medical school							
		None		One		Two or more		Total	
No. of children	None	44	24,6 %	0	0,0 %	0	0,0 %	44	18,7 %
at time of	One	37	20,7 %	2	5,6 %	0	0,0%	39	16,6%
specialization	Two or more	98	54,7%	34	94,4%	20	100,0%	152	64,7%
	Total	179	100,0%	36	100,0%	20	100,0%	235	100,0%

Table 6: