

ORIGINAL ARTICLE

Working Hours of Hospital Doctors in Germany

Preliminary Data from a Nationwide Survey in Autumn 2006

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SUMMARY

Introduction: The primary aim of this analysis was a statistical evaluation of hours of work on working days, and the amount of monthly on call duty, as well as to identify those groups with the greatest work load. **Methods:** Data on hours of work (length of an average working day, number of monthly on call duties) were gathered using a written, anonymized survey entitled "Work, health and life style in hospital physicians in 2006". Working full-time, a working day of 10 or more hours, and being on call 6 times or more per month was defined as work overload. **Results:** The response rate was 58% (n = 1917 of 3295). The majority of doctors were working full-time (89.4%), doing regular on call duty (73.4%). Over the half of full-time doctors (52.3%) has a working day of 10 hours or more and over one third of them (35%) performed more than 6 on call duties per month. Being employed in a surgical speciality (odds ratio [OR] 1.81; 95 % confidence interval [CI] 1.42–2.32), under 35 (OR 1.72; 95 % CI 1.30–2.28), and male (OR 1.71; 95 % CI 1.32–2.23) were significant predictors of work overload. **Discussion:** Working hours and rate of on call duties is high among hospital doctors across Germany. The structuring of working patterns is in need of review, for the sake of doctors. Dtsch Arztebl 2007; 104(36):A 2417–23

Key words: working hours, hospital, doctors, reforms

Work intensity for hospital doctors in Germany has increased steadily in recent years. The time required for administrative tasks has increased, average length of patient stay had decreased, and caseloads have increased. All of these factors can lead to increased pressure of work, both due to time pressure and to longer working hours (e1–3).

True working hours are difficult to determine, however, due to inadequate documentation (e4–6). Estimates from previous studies vary due to differing definitions of weekly working time and study population. The German Institute for Economic Research (1) calculates an average weekly working time of 46.3 hours for all doctors, including those working in public service, administrative or ministerial roles. Longer working hours were found in studies comprising only hospital doctors and including on call as part of working time. According to these studies, hospital doctors in Berlin worked on average 57.8 hours, 60 hours in Hesse and 59 hours in Munich hospitals, and 68 hours per week in a representative selection of German hospitals (5). These results invite the conclusion that German hospital doctors are working considerable amounts of overtime. As most studies to date are from individual cities or regions, care must be exercised in generalizing from these to Germany as a whole. One representative survey of working hours among hospital doctors does exist (5), but lacks detailed information about working hours and on the group with the highest workload.

The documentation of working hours among hospital doctors is politically important, since excessive working hours impair not only patient care (6–7), but also the social wellbeing, quality of life and health of individual doctors (8). The aim of this article is therefore the representative documentation of working hours among hospital doctors and the identification of those groups most affected by high workload.

Materials and methods

As part of the national survey "Work, health and health related behaviour in hospital doctors, 2006," data were gathered on working time using validated questions, excluding

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TABLE 1
Selected demographic and job specific characteristics of hospital doctors

Variable(s)	Category	%
Gender (n = 1914)	Female	38.9
	Male	61.1
Age (n = 1912)	≤ 35 years	43.1
	36–45 years	35.8
	≥ 46 years	21.1
Specialty (n = 1915)	Surgery* ¹	25.7
	Internal medicine* ²	29.3
	Anesthesiology	13.8
	Obstetrics and gynecology	7.1
	Pediatrics	5.2
	Neurology	3.4
	Psychiatry and psychotherapy	2.8
	Radiology	4.3
	Urology	2.9
	Other* ³	5.5
Level of seniority (n = 1917)	Consultant	9.2
	Non-consultant senior doctor	20.1
	Junior doctor with completed specialist training	23.6
	Junior doctor without specialist training	47.1
Length of service (n = 1880)	< 10 years	54.9
	10–20 years	30.7
	≥ 21 years	14.4
Geographical location (n = 1917)	Former East German states (incl. Berlin)	16.1
	Former West German states	83.9
Hospital type by bed number (n = 1917)	100–299	21.4
	300–599	34.5
	600 and above	44.1
Contract (n = 1891)	Full time	89.4
	Part time	10.6
Working pattern (n = 1896)	Traditional on call* ⁴	54.1
	Late shift model * ⁵ – infrequent	8.3
	Late shift model – frequent	37.6
On call duties (n = 1906)	Yes	70.7
	No	29.3

*¹ Surgery: general surgery, cardiothoracic and vascular surgery, pediatric surgery, neurosurgery, orthopedics, plastic and esthetic surgery, trauma surgery

*² Internal medicine: angiology, endocrinology, gastroenterology, hematology, oncology, cardiology, nephrology, respiratory medicine, rheumatology, care of the elderly

*³ Other: clinical genetics, pathology, forensic medicine, virology, laboratory medicine, pharmacology, medical microbiology, phoniatory, dermatology, ophthalmology, ENT

*⁴ Traditional working pattern: day time work from around 8:00-16:30 followed by on call duties

*⁵ Late shift pattern: unlike traditional pattern, i.e., later work start time and full work intensity in the late afternoon and evening

on call duties, but including overtime, as well as on the number of on call duties on weekdays and at weekends. The questions used were drawn from questionnaires formulated by the German Institute of Hospitals (e7) and of the Institute for Health Economics and Clinical Epidemiology at the University of Cologne (e8). Influences such as gender, age and job related factors such as specialty, level of seniority, working arrangements, number of beds and hospital location were also documented.

Data were collected from mid September until the end of October 2006. Participation was voluntary and the data anonymized, and used in the strictest confidence in accordance with the German data protection act. The random sampling and data collection were carried out by the German Institute of Hospitals. The average random sample at hospital level comprised 964 hospitals with 100 or more beds. All hospitals with more than 100 beds in the former East German states and all hospitals with more than 600 beds in the former West German states were mailed. In the case of hospitals with less than 600 beds from former West German states, a random sub sample was drawn.

The number of doctors randomly selected per hospital varied with hospital size. The number of doctors in the sub samples from all participating hospitals (515 of 964) was 3295, with a response rate of 58% (n = 1917). The raw data were weighted according to hospital size, geographical location and specialty, in order to achieve a representative picture of the totality of doctors for whom clinical work is their primary occupation, in hospitals with more than 100 beds.

The first stage of the survey was to divide the sample into groups by length of working day (*table 2*) and monthly number of on call duties (*table 3*). The reason for this was in part to allow comparison with an existing study from Hesse (3).

The second stage entailed the calculation of the medians for length of working day and number of monthly on call duties, by agreed criteria. For ease of interpretation, the original categories were recoded in binary form (*table 4*).

The third step was to analyze the group with work overload. The inclusion criteria for work overload were full time employment, a working day of at least 10 hours, and at least 6 on call duties a month. These criteria conform both with the EU definition of long working hours, which is set at 10 hours or more (e9), and with the regulations of the Federal Employee Tariff (Bundesangestelltentarif, BAT, SR 2c). The latter recommends that no more than 6 on call duties be required per calendar month.

After the individual analysis, a binary logistic regression analysis was performed for the group with work overload, with adjustment for age, gender and job specific factors. For this purpose, the original control variable categories were dichotomized (*table 1*). The analyses included Fisher's exact test, ANOVA (analysis of variance) and logistic regression.

Results

Table 1 shows selected demographic and job specific characteristics of hospital doctors. The majority of respondents were male, from younger age groups, in junior positions, in full time employment, perform regular on call duties, work in hospitals with more than 300 beds, are from the former West German states, and work within a traditional on call rota system, rather than shift system.

The categories of working hours by full and part time patterns are displayed in *table 2*. 85% of doctors have a working day of at least 9 hours, 52% work at least 10 hours and 23% work as many as 11 hours on an average weekday. Part time doctors work on average fewer hours per day, which is largely accounted for by the reduced number of hours worked per day.

Table 3 shows the distribution of average on call duties per month. 34.5% of all full time doctors and 54.3% of all part time doctors perform up to 6 on call duties per month, 20.1% and 14.6% respectively work up to 7 or 8 on calls, and 15% and 5.5% respectively work as many as 9 or more on call duties.

The average daily hours of work and the monthly number of on call duties for full time doctors are shown in *table 4*. 9.9 hours per weekday and 4.7 (or 6.7) on call duties were worked per month. In comparing different types of hospital, there is a notable difference between hospitals with more and fewer than 600 beds, with larger hospitals showing longer working hours and smaller hospitals greater numbers of on call duties per doctor. Comparison between specialties shows equivalent length of working day between surgical and non-surgical specialties, but a greater number of on call duties in surgical specialties.

Senior doctors have longer working weekdays on average, in comparison with junior doctors, whereas juniors work greater numbers of on call duties. Averaged across working patterns, traditional on call rotas are associated with longer working weekdays but fewer on call duties. Comparison between regions shows longer working weekdays in the former West German states, but a greater number of on call duties in the former East German states. Analysis by gender shows longer working days and greater numbers of on call duties for male doctors. The under 35s work both longer weekday hours, and more on call duties than older doctors.

19% of doctors are affected by a work overload (*table 5*). Comparison of specialties shows that doctors in surgical specialties including obstetrics and gynecology and urology have the heaviest workloads. General physicians are in the mid range. Doctors working in psychiatry, psychotherapy and radiology have the lightest workloads.

Subgroup analyses (*table 6*) show work overload to be significantly higher in surgical specialties, in traditional on call rotas, among younger and junior doctors, and male doctors.

TABLE 2

Daily working hours by full and part time patterns (%)

Hours	Total (%) n = 1905	Full time (%) n = 1676	Part time (%) n = 200
< 9	20.9	15.3	68.2
≥ 9	79.1	84.7	31.8
≥ 10	48.1	52.3	13.4
≥ 11	20.5	22.7	3.0

TABLE 3

Number of monthly on call duties by full and part time working pattern (%)

Number	Total (%) n = 1906	Full time (%) n = 1676	Part time (%) n = 200
0	29.3	29.7	25.5
1–6	36.6	34.5	54.3
7–8	19.4	20.1	14.6
9–10	9.5	10.1	3.5
> 10	5.3	5.7	2.0

The regression analysis in *table 7* also shows that employment in a surgical specialty, age under 35 and male gender are significant predictors of work overload.

Discussion

This study shows that heavy workloads affect almost all full time hospital doctors in Germany of all levels of seniority. Only a small minority of full time doctors (15%) claims to work fewer than 9 hours per working day, compared with the regular full time working day of 38.5 to 42 hours per week – i.e. 7.7 to 8.4 hours per day. This is in agreement with previous cross sectional studies carried out in Berlin, Hesse and Munich, all of which show a significant excess of work over contracted hours (2–4, 9).

A comparison with the data from Hesse suggests that on average every other hospital doctor in Hesse, (49%) (3) as well as in the present study (52%), works 10 or more hours per day. What also becomes clear is that the daily working hours of doctors in larger hospitals are longer than those in smaller hospitals, whereas doctors in smaller hospitals work more on call duties. A trend towards longer weekday working hours was also found among senior doctors. The significantly reduced number of on call duties among senior doctors relative to junior doctors is doubtless related to the fact that senior doctors are more commonly on call from home, which was not counted in this study.

Both relatively long working days and frequent on call duties are burdensome. If only doctors who actually work on call duties are analyzed, an average of 6.7 on call duties per month is found. At first sight this appears implausible, as no more than 6 on call duties per calendar month are contractually permitted. It is, in fact, plausible however, if one takes into account that doctors in smaller hospitals or covering holiday or sickness absence perform more than 6 on call duties per month. In addition, doctors in certain specialties, such as obstetrics and gynecology, may have 10 or more on call duties because two doctors must be on call per time period – for example, where an emergency caesarean section may need to be carried out.

According to the definitions used in this study, every fifth doctor is affected by work overload. In interpreting the significant differences between the age groups it is important to remember that junior doctors, who tend to belong to the younger age group, are more commonly engaged in on call rotas. Both national (3, e24–26) and international (10, e13) studies have shown that surgical specialties, especially general surgery, traditionally have

TABLE 4

Average daily working hours and number of monthly on call duties for full time doctors by selected demographic and job specific characteristics (ANOVA)

Variables	Daily working time in hours* ¹		Monthly on call duties* ²	
	means (n)	p value	means (n)	p value
All doctors (excl. doctors with no on call duties)	9.9 (1676)	–	4.7 (1677) (6.7 [1397])	–
Geographical location Former East German states (incl. Berlin) Former West German states	9.4 (307) 9.7 (1595)	0.001	5.4 (305) 4.5 (1601)	0.0001
Hospital type 100–299 and 300–599 beds 600 and above beds	9.8 (932) 10.1 (744)	0.0001	5.2 (929) 4.2 (751)	0.0001
Specialty Surgical specialties* ³ Non-surgical specialties* ⁴	9.7 (973) 9.6 (899)	0.135	5.5 (974) 3.8 (900)	0.0001
Level of seniority Consultant or senior doctor Junior doctor with or without completed specialist training	10.2 (529) 9.7 (1147)	0.0001	2.8 (529) 5.6 (1151)	0.0001
Working pattern Traditional on call pattern Shift system, infrequent and frequent	9.9 (895) 9.8 (762)	0.047	4.2 (894) 5.3 (767)	0.0001
Gender Female Male	9.7 (546) 10.0 (1127)	0.0001	4.6 (555) 5.0 (1123)	0.092
Age ≤ 35 years Over 35 years	9.8 (762) 9.5 (910)	0.002	5.3 (821) 4.2 (1080)	0.0001

*¹ includes overtime and those with no on call duties

*² includes doctors with no on call duties

*³ The following count as surgical specialties: general surgery, cardiothoracic and vascular surgery, pediatric surgery, neurosurgery, orthopedics, plastic and esthetic surgery, trauma surgery, anaesthesiology, urology, obstetrics and gynecology, ENT, ophthalmology.

*⁴ Non-surgical specialties include: internal medicine: angiology, endocrinology, gastroenterology, hematology, oncology, cardiology, nephrology, respiratory medicine, rheumatology, care of the elderly, pediatrics, radiology, neurology, psychiatry and psychotherapy, dermatology, laboratory medicine, clinical genetics, pathology, forensic medicine, virology, pharmacology, microbiology, and phoniatory. ANOVA = analysis of variance.

longer working hours. The reasons for this are likely to relate to the special characteristics of a specialty involving emergency surgery, more frequent on call duties, and doctor shortages, especially in general surgery (e14–15).

The gender specific differences in work load found here concur with previous studies, showing that male doctors work a longer working day on average than female doctors. Dual family and working responsibilities are often quoted as the reason for the reduced working hours seen in female doctors (11, e2). This hypothesis is supported by the fact that the majority of female doctors work in specialties with more convenient and flexible working arrangements, such as psychiatry (12, e4–e6). The situation outside of Germany is different, however, with growing numbers of practising female doctors, and similar working patterns between the genders. However this appears to be due to a reduction in working hours among male doctors, not, as might be supposed, an increase in working hours among female doctors (13, 14). Assuming that the gender distribution in the work place affects behaviour, in respect both of working hours and lifestyle in general (14, 15), it would be of interest to track the effects of growing numbers of female doctors in clinical practice on the development of working patterns.

Heavy workloads among doctors are by no means an isolated phenomenon specific to Germany (e20). A working week of 60 hours is not uncommon in England (16), or of 85 hours in the United States (7, 17, e9, e34). Nevertheless, there are examples in neighbouring countries of ways of regulating working hours so as to comply with regulations on working time. This is reflected in the growing numbers of German doctors seeking work in Norway, (18), New Zealand, England (e22), Austria and Switzerland (19) – or in other spheres of

TABLE 5

Degree and proportion of work overload in hospital doctors by specialty

Specialty	Significant overwork (%)	Order
Total (n = 1874)	19.0	–
Surgery (n = 481)	31.6	1
O&G (n = 131)	22.1	2
Urology (n = 53)	20.8	3
Internal medicine (n = 555)	17.3	4
Other (n = 97)	16.5	5
Neurology (n = 64)	14.1	6
Pediatrics (n = 99)	13.1	7
Anaesthesiology (n = 260)	9.2	8
Radiology (n = 81)	4.9	9
Psychiatry & psychotherapy (n = 53)	3.8	10

TABLE 6

Percentages of work overload in hospital doctors by selected demographic and job specific characteristics (Fisher's exact test)

Variable (n = 1917)	%	p value
Geographical location		
Former East German states (incl. Berlin) (n = 304)	15.5	0.094
Former West German states (n = 1587)	19.7	
Type of hospital		
100-299 and 300-599 beds (n = 1060)	19.5	0.596
≥ 600 beds (n = 832)	18.5	
Specialty*1		
Surgical (n = 964)	23.7	0.0001
Non surgical (n = 898)	14.3	
Level of seniority		
Consultant and senior doctors (n = 549)	13.7	0.0001
Junior doctors with or without specialist training (n = 1342)	21.2	
Working pattern		
Traditional on call (n = 1013)	16.8	0.006
Shift system, infrequent and frequent (n = 857)	21.8	
Gender		
Female (n = 736)	15.5	0.001
Male (n = 1152)	21.4	
Age		
≤ 35 (n = 813)	24.4	0.0001
> 35 (n = 1073)	15.0	

*1 see table 4

work (20) – in pursuit of better pay and working hours (e23). New working patterns are urgently needed to combat the current "brain drain" of doctors in Germany. It is notable that doctors working in the new shift systems – designed to protect against excessively long working days – experience no significant relief from heavy work load. A final analysis will however only be possible on completion of ongoing detailed analyses.

Like all studies this one has strengths and limitations. A strength is the high response rate of 58%, which although less than optimal, is significantly better than previous studies on working hours in Germany (who quoted response rates of between 17 and 51%) (4–5, 9, e24–25). The high responsiveness is attributable to the clear interest of doctors in reporting

TABLE 7
Logistic regression analysis of data on work overload among hospital doctors

Variable (n = 1 838)	OR	CI-95%	p value
Specialty* 0 = non-surgical 1 = surgical	1.811	1.416–2.317	0.0001
Gender 0 = female 1 = male	1.713	1.316–2.229	0.0001
Age 0 = over 35 1 = 35 and under	1.718	1.295–2.279	0.001
Level of seniority 0 = consultant or senior doctor 1 = junior doctor with or without specialist training	1.407	0.996–1.987	0.053
Hospital bed number 0 = 100–299 and 300–599 1 = 600 and above	0.869	0.681–1.110	0.262
Geographical location 0 = former West German states 1 = former East German states (incl. Berlin)	0.762	0.537–1.081	0.762
Working pattern 0 = shift pattern, yes and infrequent 1 = traditional on call rota	0.833	0.652–1.062	0.145

*1 see table 4
 OR, odds ratio; CI, confidence interval

on their working conditions. This may, however, introduce bias, with those doctors least satisfied with their working conditions most likely to respond, and doctors leading the most unhealthy lifestyles tending not to respond, in order to avoid identification. It should also be noted that the data were weighted by hospital size, geographical location and specialty, hence the data on individual specialties must be interpreted with caution (table 5).

A further limitation concerns subjective estimation of working hours, whose accuracy cannot be ascertained. Nevertheless, self reporting of working hours remains a plausible methodology since actual working hours remain inadequately documented (e4–6) and "clocking on" for doctors appears unlikely in the near future.

An additional limitation is that the frequency and intensity of on call from home was not measured. Many junior doctors but in particular senior doctors perform non-resident on call duties, not infrequently every other day, as "backup cover". This should certainly be taken account of in the next survey.

It should also be taken into account that scientific and administrative tasks are often carried out at home out of working hours (e26–29). In addition, some doctors also carry out undocumented and unpaid ward rounds at weekends (9). These factors would increase actual working hours still further, as this questionnaire only asked about week day work. On the other hand, data is also missing on free time taken in lieu of overtime. However, as time taken in lieu is relatively rare (e30), its effect on the overall results is likely to be small.

Considering all limitations and strengths of this study, it can nevertheless be concluded that German hospital doctors work significantly beyond their contracted hours. This situation is in need of urgent reform, since overlong working hours impair the quality of service delivered (21, e31–33), quality of life for the individual doctor (e34), and increase the risk of personal injury and accidents (e35, 22). Excessive workload has also been identified as a key cause of distress (23, 24), which is associated with certain psychological and somatic disorders (25). Whether, and if so, how, heavy work load is associated with stress induced disturbances and illness in hospital doctors in Germany will be the subject of future analyses.

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Conflict of Interest Statement

The author declares no conflict of interest in the terms of the International Committee of Medical Journal Editors' guidelines.

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