Determinants of family physicians' workload

Elementi obremenitve zdravnikov družinske medicine z delom

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Abstract

Background: The aim of the study was to determine and analyse quantitative elements of physicians' workload on an average working day in family practice.

Methods: We performed a nationwide cross sectional study on a representative sample of 50 randomly selected family physicians in Slovenia; 41 out of 50, each collecting data from 300 consecutive encounters, participated in the study. We collected data from 12,297 office contacts and home visits. The workload was defined with activities and with a stopwatch-measured time spent during consultations with/for patients by a family physician on a typical working day. We analysed patients' characteristics, physicians' style of work and the influence of the working environment.

Results: Practices differed 3.70 times in the number of patients on the list, 3.84 times in population points, 2.44 times in average age of patients on the list and 2.51 times in the number of doctor-patient encounters per day. We calculated 1.97 time differences (from 0.67 to 1.32) in mean workload. The mean time used for direct work with patients per day was 390.04 minutes (min. 261.22 min, max. 516.67 min, SD 65.18 minutes). The highest impact on the length of work had visits with ($p = 0.002$) or without ($p < 0.001$) physical examination and performing medical procedures ($p = 0.019$) due to their frequency as well as home visits ($p = 0.001$) and performing coroner duties ($p = 0.038$) due to the length of time in delivering them.

Conclusions: Our observations can be used to develop a model for predicting and/or planning family physicians' workload in the Slovenian health care system. The model needs to be tested in other countries with a similar (capitation combined with fee for service) payment system in order to determine its universal applicability.

Izvleček

Izhodišča: Želeli smo ugotoviti elemente in izmeriti kvantitativne obremenitve z delom zdravnikov družinske medicine v povprečnem delovnem dnevu.

Metode: Izvedli smo nacionalno presečno raziskavo na reprezentativnem vzorcu 50 naključno izbranih zdravnikov družinske medicine v Sloveniji. 41 od 50 povabljenih zdravnikov, vsak je zbiral podatke o 300 zaporednih obiskih, je sodelovalo v raziskavi. Zbrali smo podatke o 12.297 obiskih v ambulanti in na domu. Obremenitve z delom smo definirali z aktivnostmi in časom, izmerjenim s štoparico, ki so ga zdravniki porabili z/za bolnika v tipičnem delovnem dnevu. Analizirali smo lastnosti bolnikov, slog dela zdravnikov in vpliv okolja ambulante.

Rezultati: Opazovane ambulante so se razlikovale za 3,70-krat v številu bolnikov na seznamu zdravnika, za 3,84-krat v glavarinskem količniku, za 2,44-krat v povprečni starosti bolnikov na seznamu in za 2,51-krat v številu stikov na dan. Izračunali smo za 1,97-kratne razlike v povprečni obremenitvi (0,67–1,32). Skupna obremenitev z delom je 390,04 minut (min. 261,22 min, maks. 516,67 min, SD 65,18 minut) neposrednega dela z ali za bolnike na dan. Največji vpliv imajo obiski z ($p = 0.002$) ali brez ($p < 0.001$) pregleda in izvajanje posegov ($p = 0.019$), ker so številni, ter hišni obiski ($p = 0.001$) in izvajanje mrliško pregledne službe ($p = 0.038$), ker so po trajanju dolgi.

Zaključki: Naše ugotovitve so primerne za oblikovanje modela, ki ga je mogoče uporabiti za oceno in/ali načrtovanje obremenitev zdravnikov družinske medicine z delom v slovenskem zdravstvenem sistemu. Za širšo uporabo ga je potrebno dodatno testirati v državah, ki imajo podobno kombinirano (glavarine in storitev) ureditev.

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Introduction

Primary healthcare in Slovenia is based on Andrija Štampar's primary health care model, which placed public health care in the focus of the health care system.[1] The Slovenian health care reform implemented 20 years ago introduced physician's self-employment and remuneration with a combination of a fee-for-service and capitation.[2]

The shortage of primary care physicians and the growing workload of family physicians (FPs) has become an increasing problem throughout the western world.[3] The growing demands on FPs are claimed to be the result of the need for higher quality and accountability,[4] epidemiological and demographic changes (such as increased number of older patients with multiple chronic conditions), greater complexity of medicine, shortening of in-hospital stay and an increased pressure to control the costs of care.[5] Recent practice of evidence-based medicine with introduction of guidelines for treatment of chronic diseases has not only improved the quality of care but also increased physicians' workload.[6] At the same time the supply of physicians is constrained.[7] The dissatisfaction of FPs with their job resulted in a downward spiral in the number of candidates for family medicine, leading to an even higher workload of available practising FPs.[8-11]

There is no doubt that the universal access to primary health care services is the basic foundation of effective health care. Physicians' supply, standardization of their working conditions and estimation of the number needed to serve the growing needs of aging population, are essential for developing the national health policies.[12] One of the many challenges in planning and organizing medical services is providing reliable data about typical workload of FPs, which would serve as a standard for future workforce planning. However, the methodological approaches in measuring workload differ from one country to another, depending on the methodology used as well as on the differences in health care system.[13,14] Therefore, data provided by studies in one country cannot be extrapolated to other countries.

In year 1992, the National Institute of Public Health of the Republic of Slovenia (NHI) arbitrarily introduced population points on a dataset of preventive and curative encounters in three health care centres and divided them among practicing physicians. For the purposes of capitation as a means of payment schemes in family practice, Slovenian population was divided into 7 age groups.[15] The relative weights of capitation for each group are: > 1 year – 3.0 points, 1–6 years–1.9 points, 7–18 years–0.88 points, 19–49 years–0.84 points, 50–64 years–1.4 points, 65–74 years–2.2 points, ≤ 75 years–3.0 points. In the agreement with NHI, capitation as the number of the population points includes the number and age of patients on the list of FP, while the number as well as the variety of encounters and tasks that FP performs is included in the fee for service. There are considerable variations in both elements between FPs. A working day of FP consists of 6.50 hours of direct patient care with a variety of services and activities they deliver. Some activities that are not included separately in the agreement with NHI are dependent on the working place of the physician. In addition to patient care, the FPs who are mentoring trainees, are entitled to 2 hours per week for training or 24 minutes per working day.

A debate on high workload and inequalities in payment schemes for family practice, which implicitly demand changes, has been underway in Slovenia for years.[15]

However, the main drawback in all these discussions was the lack of appropriate data on the actual workload of the physicians.

The present study was performed in order to clarify the workload and differences among FPs in Slovenia. The aim of the study was to determine and analyse all quantitative elements (numbers and not complexity) of workload and their distribution over an average working day of FPs. We also wanted to clarify how the structure of patients on the list of FP, the FP's style of work and the working place influenced their workload.

Materials and methods

Fifty family physicians, representing a typical population of Slovenian FPs with the appropriate distribution between rural an urban areas, were randomly selected from the register of FPs. Forty-one out of 50 participated in a national cross sectional study. For data collecting three questionnaires used in MATRA project were adapted to Slovenian specificities.[16] The first questionnaire collected the information on single encounters; the second questionnaire included daily work synthesis, while the third questionnaire was dealing with the issues concerning practice characteristics. The questionnaires were filled in by FPs. For each recorded activity, time was measured with a stopwatch and expressed as minutes spent on the activity. Each FP was asked to record 300 consecutive encounters. To avoid biased timing (i.e. holidays, epidemic period), different months and days in the six-month period were chosen for registration of activities.

The number and the response rate of the survey met the criteria for a representative national study. The study was approved by the National Medical Ethics Committee.

Hypotheses and data collection

For the purpose of the study, we have defined quantitative workload as all activities and time spent with or for a patient by a family physician on an average working day.

Encounter was defined as any kind of consultation/activity/service with or for the patient in or out of the practice (i.e. examination of patient, performing task, administrative procedure, contact with relatives or other healthcare workers, other duties of PF, etc.).

The average workload of a FP was calculated by multiplying all FP's activities with the time spent in delivering them.

We collected the following data:

- direct patient-physician encounter:
  - patient's characteristics: age, gender,
  - type of encounter–visit: first and follow-up visit for acute problems, first and follow-up visit for chronic problems, preventive examination, preoperative examination, home visit.
  - Content of encounter–visit: visit with physical examination, administrative procedure: (repeated prescription, ordering technical devices and other certificates),
  - tasks performed during the encounter (injections and infusions, minor surgery, stitches, incisions, excisions, application of inhaler drugs, ear wax removal),
  - duration of encounter.
- Other activities during the working day:
  - number of telephone consultations,
  - provision and duration of emergency service (ER) during regular working hours,
  - additional tasks: encounters with district nurse, social worker, relatives,
  - number of activities on the requests of police officers, coroner service.
- Physicians' characteristics:
  - demographic characteristics (gender, age),
  - academic status (mentorship, specialist),
  - years of practice (in observed practice, as specialist),
  - number of days on sick leave.
- Practice characteristics:
  - population points on the patients' list,
  - population density of the area covered by FP,
  - distance to the nearest hospital.[16]

Data were analysed with statistical package SPSS for Windows version 13.0. We used descriptive statistics for the description of samples and the presentation of their characteristics. In order to explain workload elements we used multiple regression analysis to analyse the elements of the dataset and their contribution to the workload. P-value < 0.05 was considered statistically significant.

Results

The final sample consisted of 12.297 office and home encounters from 41 FPs. Due to entry errors we have excluded 2.3 % protocols.

Patients' characteristics

There were 6.727 (54.7 %) encounters with female and 5.570 (45.3 %) with male patients. The age of the patients ranged from 0 to 97 years, mean 51.3 years (SD 19.0 years). The average age of the youngest population in practice was 28.1 years and of the oldest 68.8 years (SD 6.4 years). The biggest cohort in the survey was aged 19–49 years.

The age of patients was related to the number, type and content of the encounters. Although the oldest patients' group ≤ 75 years represented only 7 % of the population, they made 13 % of all encounters. Among the younger patients' group the majority of encounters were for acute problems, in contrast to the older patients' group where follow-up visits for chronic problems prevailed. Within this group of patients, 45 % of encounters were for administrative procedures only: repeated prescription, ordering medical and technical aids and different certificates. The distribution of encounters according to age cohorts and types of visits is shown in Table 1.

Physicians' and practice characteristics

FPs sample comprised 28 female and 13 male physicians, aged 33 to 63 years; the mean age was 43.9 years (SD 7.6 years). There was no statistically significant difference in the mean age of female and male physicians, p = 0.07. Twenty-one physicians were specialists in family medicine, 9 physicians had several years of experience in family practice but no specialist training, while 11 were trainees in family medicine. There were no statistically significant differences between female and male FPs regarding years of work, (p = 0.23), years working in the observed practice (p = 0.42), years working as specialist (p = 0.75), number of patient on the list (p = 0.51), population points (p = 0.64), or days on sick leave (p = 0.46). The observed practices were 1 to 80 kilometres away from the nearest hospital (mean 24.8 km, SD 3.17 km).

Each physician had from 862 to 3,186 patients on the list, a mean of 1,771.4 patients (SD 435.6 patients). The population points ranged from 1,094.8 to 4,202.4, with an average of 2,367.7 population points (SD 627.9 population points) per FP. The FPs performed on average 45.63 encounters (min. 31.25, max. 78.57, SD 1.57) per day. Table 2 shows the distribution of encounters on an average working day.

Consultation times

The mean duration of the direct physician-patient consultation/encounter was 6.93 minutes (SD 1.42 min), with the shortest 3.44 minutes and the longest 12.33 minutes. Among them, performing other tasks took 8.05 minutes, repeated drug prescription 2.65 minutes, and other administrative procedures 3.29 minutes. The average time for a home visit was 38.37 minutes.

Among other activities during the working day, the average telephone consultation

Table 1: Number and percentage of encounters by the type of visit and age.

Age years	Acute first	Chronic first	Acute follow up	Chronic follow up	Home visit	Preventive examination	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No.
> 1	31 (47.69)	2 (3.08)	14 (21.54)	17 (26.15)	0 (0)	1 (1.54)	65
1–6	90 (69.23)	1 (0.77)	18 (13.85)	1 (0.77)	0 (0)	20 (15.38)	130
7–18	168 (64.86)	6 (2.32)	66 (25.48)	15 (5.79)	1 (0.39)	3 (1.16)	259
19–49	1733 (40.17)	177 (4.10)	1379 (31.97)	873 (20.24)	12 (0.28)	140 (3.24)	4.314
50–64	748 (28.79)	204 (7.85)	569 (21.90)	972 (37.41)	12 (0.46)	93 (3.59)	2.598
65–74	378 (23.74)	162 (10.18)	251 (15.77)	762 (47.86)	15 (0.94)	24 (1.51)	1.592
≤ 75	234 (23.24)	101 (10.03)	126 (12.51)	487 (48.36)	52 (5.16)	7 (0.70)	1.007

took 3.24 minutes, the ER (emergency care) visit within the practice 11.92 minutes and ER visits outside the practice 50.29 minutes. Encounters with social worker, district nurse or patients' relatives took 7.14 minutes, a coroner service visit 30 minutes, a service on the request of the police 20 minutes and all the other services or duties 8.05 minutes per case.

Time spent for an encounter correlated with the type of the encounter and patients' age (Table 3). The most frequent content of the direct physician-patient encounter were visits with or without physical examination. With increasing patients' age the number of visits raised. The number of telephone consultations ranged from 10 to 40 in one working day of a FP and the higher numbers of home visits correlated with increasing mean patients' age.

Workload

Workload is measured in minutes of time. The average calculated time was 390.04 minutes (min 261.22; max 516.67; SD 65.18 minutes) or 6.50 hours per day.

Multivariate regression analyses showed high correlation between variables and workload ($R = 0.905$). With this model we were able to explain 81.9 % of the variation in the length of an average working day ($p < 0.001$) (Table 4). Visits with physical examination ($\beta = 0.40$, $p = 0.002$) and administrative procedures ($\beta = 0.51$, $p < 0.001$) had the highest impact on the workload. An important impact on the workload was also found with home visits ($\beta = 0.40$, $p = 0.001$) and performing coroner duties ($\beta = 0.41$, $p = 0.038$).

Discussion

Discussion on the methodology

Data from 12.297 practice and home encounters from a nationwide cross sectional study gave us a reliable dataset to measure workload on a representative sample of family medicine contacts. In the majority of studies where the relationship between workload and consultation time was investigated, the size of the patients' list was used as workload measure.[17-19] The size of a list is not able to give a view on the content of work provided by the physician. It has also been proven, that the size of the list is important only when it is extremely long or extremely short. We have decided to record all the work performed and all the time measured with a stopwatch. With this simple and universally available tool, the actual time taken to carry out duties can be accu-

Table 2: Distribution of encounters of physicians on an average working day.

	Working day			
	Mean	Min.	Max.	SD
Age of patients/practice (years)	51.28	28.12	68.78	6.44
No. of visits with physical examination/day	31.03	10.82	57.14	7.40
No. of visits without physical examination/day	14.60	4.71	36.76	7.10
No. of home visits/day	0.46	0	1.57	0.46
No. of telephone consultations/day	10.51	1.14	40.6	7.54
No. of ER inside/day	0.76	0	6.86	1.30
No. of ER outside/day	0.09	0	0.43	0.13
No. of tasks/day	1.54	0	8.33	1.49
No. of coroner service/day	0.01	0	0.5	0.08
No. for police service/day	0.04	0	0.5	0.11
No. of additional tasks/day*	0.56	0	1	0.38

**Additional: visit of district nurse, social worker, relative; ER: emergency service*

rately recorded for every physician and the workload expressed in units of time.

We used paper protocols, which was time consuming both in entering and analysing data. Electronic patients' records would instantly provide practically all the necessary data in a standardized way.

Different age points, age standardized quotations, are recognized in Slovenia as workload criterion depending on the age of patients but they don't explain their impact on the workload.[4] Our analysis predicts workload in greater detail, taking into account additional elements of physicians' daily work in different working environments and is suitable for use in any system, which has capitation and service integrated in health care.

Discussion on the results

The majority of visits in our study were due to first visits for acute disease and follow-up visits for chronic disease. It is known that the number of visits depends on the category of patients, health system organization and physician's practice.[19] We have found that the numbers and the type of patients' visits differ with the age of the patients. The biggest cohort of our patients was aged 19–49 years and the vast majority of their encounters were due the first or a follow-up visit for acute disease. This group of patients represents the working population and they must "see" a FP in order to get a certificate for reimbursement of the sick leave and not necessarily to receive medical care.

While the younger patients pay more first visits to primary care providers for acute problems, the older do that for follow-up of chronic diseases. The high number of follow-up and preventive visits in this patients' group is the result of national guidelines for management of chronic conditions as well as the age of the population involved. The finding that has shown that older patient group consultations are more frequent and longer than average is supported by other studies.[20] However, neither the frequency nor the duration of visits could be properly estimated solely from the size of the population group.

We have found that home visits, tasks performance, coroner's duties and activities connected with the police requests, although infrequent, are among the most "time consuming" activities and exert a major influence on workload. In addition, high number of telephone consultations during the practice time of the FP is disturbing for the physician as well as for the patient. Telephone consultations are not included in the contract with insurance company. However, we have found that their number is high and increasing with the age of population. Therefore, some time provided for telephone consultations should be included in the future contract with the insurance company. It came as a surprise that some physicians in our study had not performed any home visits at all, neither had they performed any tasks or only few telephone consultations. Since the goal

Table 3: Consultation times for different types of encounters for seven age cohorts, their mean and SD time in minutes.

Cohort year	Type of visit (minutes) ± SD					
	Acute first	Chronic first	Acute follow up	Chronic follow up	Preoperative	Preventive
> 1	7.64 ± 4.64	13.25 ± 6.72	6.46 ± 5.72	12.56 ± 6.63	-	25.00 ± 0.00
1–6	6.63 ± 2.68	12.00 ± 0.00	5.78 ± 390	-	-	9.15 ± 2.25
7–18	7.02 ± 7.15	7.00 ± 3.36	5.53 ± 2.98	6.25 ± 3.09	-	6.00 ± 1.73
19–49	7.49 ± 565	9.37 ± 5.94	6.15 ± 3.61	8.61 ± 6.41	10.27 ± 4.80	11.38 ± 6.99
50–64	8.64 ± 5.99	10.06 ± 5.29	6.96 ± 4.24	8.80 ± 5.21	10.48 ± 4.35	15.77 ± 7.96
65–74	10.63 ± 8.69	11.05 ± 5.86	7.27 ± 4.09	9.36 ± 5.90	11.56 ± 5.69	16.67 ± 9.96
≥ 75	13.15 ± 11.24	11.76 ± 7.50	7.71 ± 4.67	10.99 ± 9.27	13.13 ± 5.90	5.40 ± 4.60

of our study was only to register activities and the time spent on them, we did not include any questions that could explain such attitude of some physicians. However, this finding requires additional studies.

In our study we have found that important additional workload (p = 0.05) for 13 (31.7 %) of participating family physicians is the position of clinical preceptor (trainer). This finding is supported by other studies, which have shown similar results.[21]

In addition to regular practice services, some physicians in small communities perform emergency care of patients. This is similar as shown in other studies, which have found that the working environment of physician predicts the variety of service that the FP delivers along with her/his regular care as a family physician.[22-23]

Every day and each patient has a high impact on the workload (VIF = 4.0) for inside and (VIF = 2.0) for outside practice ER as shown in Table 4, even though the number of cases is relatively small (Table 1).

In contrast to other studies,[24] we did not find any differences in workload related to either age or gender of the physician. This could be explained by specific situation in Slovenia, where female physicians hardly ever work less hours per day than males. On the other hand, young FPs start to work in previously established practices.

We have found that the practices differed for 3.70 times in number of patients on the list, for 3.84 times in population points, for 2.44 times in average age of patients on the list and for 2.51 times in number of encounters per day. We calculated 1.97 time differences (from 0.67 to 1.32) of average workload. It proves that more than one element needs to be taken into account to measure FP's workload. Some FPs have extremely big list size (3,186 patients on the list) or their patients are old (4,202.4population points), some FPs perform more tasks (max. 8.33 per a day) and some encounters are very long (for example ER out of practice 50.29 minutes). We were able to identify three major influences on the workload of family physi-

Table 4: Multiple regression of elements of an average working day R = 0.905, R^2 = 0,819 (F = 9.066, df= 13, p < 0.001).

Model		Beta	t	Sig.	95.0 % Confidence Interval for B		VIF*
					Lower Bound	Upper Bound	
1	(Constant)		1.203	0.240	-0.132	0.503	
	Age of patients/practice	0.068	0.724	0.476	-0.003	0.007	1.288
	Visit with physical examination/day	0.403	3.441	0.002	0.004	0.015	1.971
	Administrative visit /day	0.505	4.034	< 0.001	0.006	0.020	2.251
	Mentorship	0.188	2.006	0.055	-0.002	0.138	1.259
	Home visits/day	0.403	3.729	0.001	0.066	0.227	1.684
	Telephone/day	0.151	1.492	0.148	-0.001	0.008	1.482
	ER inside/day	0.336	2.012	0.055	-0.001	0.087	4.017
	ER outside/day	0.069	0.571	0.573	-0.234	0.415	2.082
	No. of tasks/day	0.230	2.501	0.019	0.005	0.047	1.221
	Additional tasks/day	0.247	2.561	0.017	0.022	0.197	1.337
	Coroner service/day	0.461	2.187	0.038	0.059	1.898	6.382
	Police service/day	-0.639	-2.373	0.025	-1.832	-0.131	10.435
	Population points	0.008	0.076	0.940	0.000	0.000	1.622

*a: Dependent Variable: average workload per day; *VIF = variance inflation factor*

cians and grouped them as follows: i) the number and age of the population on the list, ii) the working style of FP, and iii) the working environment.

Different workload does not necessarily mean a lower number of working hours, but could be explained with longer encounters per patient. Methodology gives an opportunity for reliable benchmarking.

Our analysis is also useful for planning, so that family medicine may become more interesting for young physicians [22,25] and also gives FPs an opportunity to participate in research.[26,27] Planning workload has an impact on the participation of FPs in regular and specialist education[8,28] and is important for patient safety.[29] And last but not least, we could propose financial incentives for excessive workload, services delivered, for teaching practices as for rural practices if we consider that the profession and patients need them.[30-31]

Conclusions

Our study clarified how the structure of patients on the list of FP, the FP's style of work and the working place influenced PF's workload measured in time. It helps to plan and organize health service for different age groups, variety of services delivered or different environment of work, especially if used in combination with the electronic patients' record.

Further research is needed on the limits of adding new burden/workload on family physicians, especially in connection with the influence of workload on decision-making process of physicians while implementing modern primary health care. As the population of children in the survey was small it is necessary to conduct an additional study specifically for this population.

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