

The Study of Workload and Working Time of General Practitioners in Health Care Organizations by Taking the Example of Clinic in Kazakhstan.

Aigul Mergentay¹, D.B. Kulov¹, Gulbadan Bekembayeva², Vitaliy Koikov², B.K. Omarkulov¹,
Galia Mussina², A.M. Tazabekov²

¹RSE "Karaganda State Medical University" MoH RK

²RSE "Republic Health Development Center" MoH RK

Abstract: in article are given results of the chronometric analysis of patients a polyclinic in Kazakhstan, at the same time were analyzed and studied costs of working hours of the doctor for accomplishment of various labor transactions. We determined the basic factors influencing duration of acceptance of the general practitioners (GP) organizations and also we constituted the forecast of duration of acceptance of the general practitioners depending on the accounting for certain variables.

Statistical analysis defined the basic factors influencing duration of reception of patients by doctors GPs. They are communicative factor, operating procedures and work with documents. The basic factors influencing duration of reception of patients by doctors of GP doctors are the Communicative factor or a component 1 ($r=0,805$), Operational procedures or a component 2 ($r=0,736$), and Work with documentation or a component 3 ($r=0,528$).

Keywords: *patient, disease, dispensary observation, reception time, population.*

Introduction: Today, Kazakhstan health care system is faced with problems of the imbalance of human resources, aggravated by the impact of demographic, political, socio-economic, technological, epidemiological changes (WHO, 2006) [1]. In connection to this, the planning of staffing needs and staffing evaluation [2,3], based on the standards of health experts, workload are important elements of staff management, and should be based on common methodological approaches [4,5,6].

The main objectives of the labor rationing in health care is to define the labor costs, workload and staffing levels, to find the optimal proportions for different groups in the performance of their work [7, 8, 9, 10, 11], as well as the planning of certain areas of the health sector. The standard workload on the healthcare professional is obtained because of studying the working time, taking into account current and future needs of the population in specific types of medical care. Naturally, this need cannot be satisfactory everywhere, and in some cases it can be less than optimal as at present and in the near future [12,13, 14].

Established standards are designed to calculate the maximum number of positions, the establishment of entitlement to perform its function, and their complete use is possible only with the creation of conditions that have been taken at a centralized rationing. Therefore using established standards should be at a certain correction [8, 15, 16], in some cases with restrictions, taking into account local features and conditions of work. At the same time, staff standards of outpatient organizations. Clinics (hospitals) must provide the need of the population in certain types of medical care [17, 18].

Among other things, the effectiveness of public health organizations, including primary health care organization depends on the proper organization of the work of all its departments and medical staff [19, 20, 21]. In this regard, one of the key areas of public health development program "Densaulyk" (Health) (2016-2019) defines "Improving human resources management in the health care industry." Within this area, the activities of "a shift in emphasis on the need for older staff regulations and standards to the flexibility of human resource planning and labor, in accordance with the applicable technologies, standardized operating procedures, and the needs of patients" [22] are planned.

In this regard, the aim of our study was to develop evidence-based approach to improve the workload of general practitioners (GP), taking into account the strategic initiatives of the State Program for Health Development "Densaulyk" (Health) (2016-2019).

To achieve the objective the following tasks were set:

1. To study the workload and duration of working time of GPs.
2. To identify the main factors affecting the duration of reception by general practitioners in primary health care organizations of Kazakhstan.
3. To create the duration of the forecast reception by doctors (GP's), depending on the accounting for certain variables.

Methods: To study the workload and duration of working time of general practitioners in primary health care organizations, we carried out a study of working time chronometer at GP clinic in Karaganda. Chronometer research is a method of analysis and study of working time needed to perform consistently recurring labor operations [8]. It consists in drawing up a list of work operations, which is grouped based on type of activity, and the study was carried out on the health professionals over the course of three weeks. The study determined the length of the elements of labor operations. Duration found by subtracting the start time of each subsequent element by the start time of the previous one. The duration of the first element is obtained by deducting - the start time of observation from the time of its completion [23]. The calculated results are then transferred to the column of operation. Then we grouped the same named elements of the work process. For that purpose next to the name of operation we placed, the code (showing operation belongs to which category). Ciphers are marked in the diary of the employee. After that, the duration of the same operations are summed. As a result of all the collected data, a summary table which consists of a study on working time was made. At the end of the table were taken the average of each type of activity, which was the result of research.

Method of continuous analytical study was used to process and analyze the results. We made a statistical analysis by using SPSS 16. In analyzing descriptive (descriptive statistics) factor, correlation and multivariate analysis of variance.

Results: By the method of descriptive analysis, we analyze the timing of working time of GP in the clinic of Karaganda within 3 weeks of GP doctors.

4-chronometer research specialist covered GPs in the observed period in the clinic to carry out reception of patients within 45 hours 19 minutes (according to the chronometric cards). By solid research method, we analyzed the time spent by doctors (GP) on 256 patients, including 155 adults and 101 pediatric patients.

As analysis has shown, patients in half of cases (50%) addressed concerning diseases and primary consultation, 20% of patients of the dispensary contingent applied to polyclinic concerning recrudescence of process or for observation, and 30% of patients addressed concerning issue of various references, recipes etc (social and medical actions).

It should be noted that for the patients attending appointment for paperwork the auscultation and percussion was not carried out, and time for clarification of the anamnesis and complaints of the patient has not been spent. However,

at the same time, for such patients more time was required on filling up documents (issue of references, sick list, appointment cards to procedures, etc.).

Irrespective of, the patient concerning disease came or the reference was necessary for him, the medical staff had to enter his data into the automated information system therefore this indicator has been also considered by us in the analysis of the time interval spent for reception of the patient.

At the accounting of the time interval spent for registration of the patients and introduction of these data to the automated information system it has been found out that 46% of general practitioners requires 0.5 to 2 mins, 14% of doctors takes 3.5 to 5 mins, and 14% doctors take up to 12.5 mins. That is, optimum time for nearly a half of doctors is about 2 mins. However 39% of experts, during attendance didn't enter these data that has been noted when ranging, and left this procedure on off-duty hours.

For patient in take 36% of doctors took 2-7 min., and for clarification of patient's complaints 2 to 6 min. More than a quarter of experts (27%) have spent for clarification of patient's complaints 0.5 up to 1 minute of time, and one third of doctors spent 1-2 min for collecting the anamnesis. That is, generally doctors spent 6 mins for attendance, and for collecting the anamnesis at 33% of doctors left of 3-7 min.

To 37% of doctors patients came for various doctor's certificates or paperwork and therefore no time has been spent for clarification of complaints and for collecting the anamnesis.

For Checkup, measurement of arterial pressure, body temperature, calculation of pulse rate 28% of doctors of VOP spent 0.5 to 1 min, 36% of doctors spent 2-3-min, while 37% of doctors didn't measure these indicators because nurses were engaged in it.

59% of doctors ausculted within 0.5 to 1 minutes, while this procedure has taken 2-3 minutes of 4% doctors. The palpation of 94% wasn't carried out by doctors, and 6% carried out it during 0.5-1 minutes.

Additional actions while carrying out attendance, in a video review of a pharynx of the patient, delivery of medicinal drugs, consultation on administration of drugs, etc., were held by only 6% of doctors from which 4% spent for it 0.5-2 min., and 2% of doctors spent 3 to 5 minutes.

62.5% of doctors have spent 0.5-3 min for filling of patient's documentation., 22.5% spent 4-10 min., and the remaining 24% of general practitioners spent from 11 to 27 min. That is, more than a half of doctors during attendance of patients spent 0.5 to 3 min for filling of documentation, at the same time, nearly a quarter of doctors spent up to 27 min of time for attendance of the patient for filling of documentation.

Paper work was subdivided into internal and external correspondence. For internal correspondence 58.7% of general practitioner spent 0.5 to 2 min, 37% spent 3 to 7 min, and 4.3% of doctors spends 11 to 15 min.

Thus, most of doctors occupation with internal correspondence took 0.5 to 2 minutes of working hours.

External correspondence took less time, than internal, so 57.2% of doctors took 0.5 to 1 min, and 42.8% doctors took 2 to 3 minutes.

Only 13% of doctors spent time for commission of technical works from which about 6 (46.1%) doctors took 0.5 to 3 minutes, and other (53.8%) doctors spent 4 to 6 minutes. That is, most of doctors (87%) didn't use time during attendance for disguise of a dressing gown, preparation of a workplace, washing of hands, or a technical break for room sanitary processing (infectious patients – measles, a rubella, tuberculosis, a pediculosis, etc.), and also transitions (in other office), etc. All these events were held by doctors in off-duty hours.

We have carried out the factorial analysis for definition of some variable's influence on duration of time of the general practitioners spent for attendance of the patient. Attendance consisted of time spent for clarification of

complaints and the anamnesis, additional actions in the form of pharynx survey of the patient, delivery of medicines, consultation on administration of drugs, etc., and also technical procedures and external correspondence.

We could define the factors uniting the variables, which are strongly correlating among themselves by the Factorial analysis. Variables from different factors do not correlate among themselves. Thus, we have found the complex factors, which explained observed communications between the variables.

Table 1
Values of the factors influencing duration of patient attendance in polyclinic

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1 factor	2.714	19.386	19.386	2.714	19.386	19.386	2.569	18.353	18.353
2 factor	2.423	17.308	36.695	2.423	17.308	36.695	2.041	14.581	32.934
3 factor	1.431	10.223	46.918	1.431	10.223	46.918	1.911	13.654	46.588

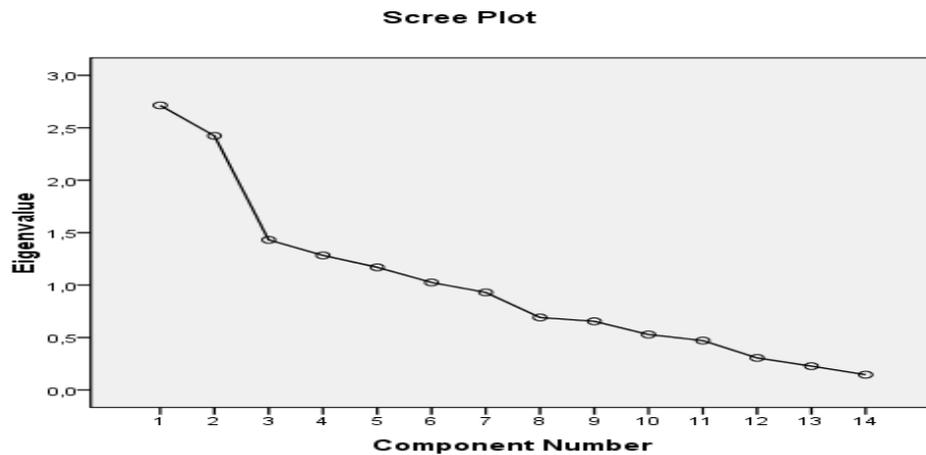
Extraction Method: Principal Component Analysis.

From the table No. 1 it is clearly visible that three own factors had values more than one. Therefore, for the analysis we have selected only three factors. The first factor explained 19.386% of total dispersion, the second factor of 17.308%, and the third factor of 10.223% of total dispersion. Such variables as collecting the anamnesis ($r=0.805$), clarification of complaints of sick ($r=0.553$), measurement of temperature, arterial pressure, pulse ($r=0.648$), invoicing of the directions on additional analyses, inspections ($r = -0.565$), and introduction of personal data to information base of polyclinic ($r=0.535$) have entered the first factor called by us Communicative component. Negative value of work indicator with internal documentation, in the form of invoicing by the doctor of recipes, doctor's certificates, the directions indicates that there is an inversely proportional communication, that is, less than present time will be spent by the doctor for this work, the doctor will have more opportunities for direct communication with the patient.

The second factor, designated by us as a holding operating procedures included variables such as holding auscultation ($r = 0.736$), additional measures in the form of examination of the throat, skin, prescribing and dispensing of medicines, etc. ($R = -0.638$). Also of great importance the patients' time visiting ($r = -0.527$). Moreover, the negative value of the variable, says that if the reason for visiting the doctor, the patient has disease while receiving increases in conjunction with the physician additional measures. The inversely proportional relationship points to the fact that a patient will be visiting the doctor more often, the patient has disease, and the doctor had to perform additional steps to make the diagnosis of the patient and his appointment of adequate treatment.

The third factor, named as 'work documentation'. There correlated only two variables : to work with internal documents ($r = 0.528$) and holding palpation and percussion ($r = 0.503$), and both variables were of positive sign, that is, the more carefully conducted examination of the patient, the more likely he was heading a doctor for additional tests or procedures, additional drugs were discharged. However, it should be noted that in this case we had a moderate correlation link. Work with documentation, it has been associated with a variable such as the technical work, in the form of dressing gown, workplace preparation, hand washing, or a technical break in the sanitization of premises

(infectious patients - measles, rubella, tuberculosis, lice, etc.) and a shift to another room as needed, etc.



Picture 1.

The diagram of the significant factors making communication model between variables.

Word Screeplot, used to refer to this diagram consists of two parts: the English word scree that means rubble, and the word plot, that in English corresponds to the graphical representation. Such a diagram can separate unimportant factors - macadam - from the most significant factors. These important factors in the chart formed in a kind of slope, the part of the line, which is characterized by a steep rise. In the diagram of such a steep rise seen in the first three factors. Three factors based model. If you look at the chart, we can see that the slope, there is an area of significant factors, there is a third factor above (the fourth, third, second ...), and below the fourth factor (the fifth, sixth, seventh, eighth, ...) located rubble, the region insignificant factors.

If the calculation factor analysis characterizes the strength of relationship between two variables, the regression analysis is used to determine the type of communication and provides an opportunity to predict the value of one (dependent) variable starting from the value of another (independent) variable.

We analyzed the variables that influence the duration of the patient's medical reception about the disease, dispensary observation of the concomitant chronic diseases or in the production of vaccination, as well as in connection with various social and medical interventions. According to the calculations by the method multinomial logistic regression, we forecasted, time indexes spent on the reception of patients (adults, children, pregnant women) were analyzed. So, for an adult patient, examined by a doctor GP about the disease, if the doctor will not waste time to perform maintenance work, further manipulation and filling of internal documentations, the forecast figure of reception time will be increased from 56.2% to 60.9%, for children it will almost remain the same, but for pregnant women it will decline from 12.5% to 7.8%. That is, the reception doctor will be sent directly to communicate with the patient. Reducing the time taken with pregnant women, in our opinion, the disease will be associated with the early deployment of these women doctors GP directly to the profile obstetrician-gynecologist.

For dispensary observation, the forecast of expense of time for attendance for the patient's contingent, in the absence of technical works, additional manipulations and filling of internal documentation, for adult population will decrease from 66.7% to 49%.

The predicted values for social and medical actions for adults will increase from 62.5% to 67.9% and for pregnant women it will increase by 2%, and for children will decrease from 37.5% to 30.1%.

If general practitioner for filling of internal documentation spends from 0.5 to 2 minutes, then time of attendance of the adult patient will be reduced from 50% to 28.8%. In addition, if, for example, they spend 3 to 7 minutes, then time of attendance is increased from 50% to 66.6%. That is, filling of internal documentation on reception of adult patients with symptoms of a disease needs to be redistributed on nurses.

Reception time at medical examination of the adult patient in case of holding additional procedures within 0.5 to 2 minutes will be reduced from 100% to 31.8%, and among children from 85.7% to 47.9%. It indicates that time spent for additional survey of patients promotes right and fast obtaining of results of examination.

In the presence of technical works, time of patients' attendance will be reduced, at a disease, of adults from 100% to 61.2%, children from 100% to 15.5%. When carrying out medical examination, existence of technical work will also promote reduction of attendance time of the adult patient from 100% to 72.9% and children from 33.3% to 13.7%.

In a case with pregnant women, value will be increased in the presence of a variable - filling of internal documentation. In case of attendance of these patients in connection with dispensary observation and filling of internal documentation, time of attendance by the general practitioner will increase from 16.7% to 32.5%, and when holding socially medical actions it will increase by 8.5%.

Table 2
The test results of the likelihood coefficients for significance indicators

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 LogLikelihood	Chi-Square	df	Sig.
Intercept only	103.284			
before	72.033	31.251	18	0.027

Table 2- contains the test likelihood ratios change the likelihood function for the case when appropriate excluded the main acting factor; these changes are expressed in terms of the relevant test values chi-square. Issue significance level of $p < 0.027$ indicates that three factors (technical work, internal documentation and additional procedures) have a very significant effect on the dependent variable (patient reception).

Conclusion: Therefore, statistical analysis allowed us to determine the main factors affecting the duration of reception of patients by doctors GPs. They are communicative factor, operating procedures and work with documents. At the same time, most of the time is spent at the communicative part - communication with the patient, consultation, conversation with him. The second time duration (doctor's appointment with the patient) is a part associated with the implementation of diagnostic activities - inspection, palpation, auscultation and other additional procedures to clarify the patient's diagnosis. Third, an important factor affecting the duration of the reception, was filled with medical records.

Drawing forecast data reception time (by GP doctors), depending on the availability of technical work, the documentation showed us that basically three factors (technical work, internal documentation and additional procedures) have a very significant effect on the dependent variable (patient reception). It turns out that the time spent on the additional inspection of patients, contributes to a more rapid and faithful inspection of results and reduce the patient's time of receipt, on the other hand the presence of technical work and the work of documentation will help to increase the time of reception of GP doctor.

Acknowledgement

Authors are grateful to the republican Center of development of Health care, Department of Science and Human resources of the Ministry of Health of the Republic of Kazakhstan for cooperation in this research. We are sincerely grateful to doctors who developed poll for receiving a high-quality collection of data on operating time of doctors for reception of patients in healthcare institutions in Kazakhstan. We express our profound gratitude to heads of medical institutions that encourage active participation of doctors and their active contribution to a research of this important problem.

We have no corresponding financial interests in this manuscript.

References:

- [1] Methods of planning, forecasting of health care personnel resources: Method. recom. / Authors: T. B. Turumbetova, G. A. Mussina, M. M. Kabdullina, etc. - Astana: Republican center for health care development, 2015. – Page 6
- [2] Popovich V.K., Shikina I.B., Turchiyev A.G., Baklanova T.N. The role of medical shots at realization of policy in the field of medical care quality. Social aspects of public health. [Online scientific magazine] 2011; (17) URL:<http://vestnik.mednet.ru/content/view/270/30/lang, ru/> (Date of the address on July 17, 2016).
- [3] Koykov V.V. Modern approaches to the problems solution of personnel security in the field of health care. Platform of discussion G-Global. 9/11/2013.
- [4] Glukhova E.A., Potemkin E.L., Analytical system of complex assessment of workforce capacity of the scientific medical organization / Electron. Scientific Magazine. "Social aspects of public health".-2012. - No. 4 (26).
- [5] Lukichyova L.I. Human resource management: manual. 6th prod. M.: Omega-L, 2011. 264 pages.
- [6] Maslov E.V. Human resource management of the enterprise: manual. M – Novosibirsk: INFRA-M, 2000.
- [7] Shipova V.M. Rationing of work of nursing staff and medical attendants//Chief Nurse, 2008. No. 8. Page 37-59.
- [8] Technique of development of norms of time and load of medical personnel: method. Instructions. M.: TSNIIOIZ Ministry of Health of the Russian Federation. 2013. 28 pages.
- [9] Shipova V. M. Rationing of work in health care. Lectures. – M.: Federal State Budgetary Institution TSNIIOIZ RIO printing house of the Russian Ministry of Health, 2013. - 88 pages.
- [10] Shipova V. M., Eldasheva S.A., Abayev Z. M., Logina N. Yu. Methodical recommendations about the organization of work rationing in health care. Russian Academy of Medical Science. GUTsNIOZ. Moscow.2004.
- [11] I.M.Son, Shipov V. M., Ivanov M. A., Armashevskaya O. V., Bantyeva M. N., Sokolovskaya T. A., Gazheva A. V., Leonov S.A. Labour rating of doctors of outpatient appointment when rendering primary medical care. Health care. 2014; (7):76-85.
- [12] Popovich V. K., Shikina I. B., Turchiyev A. G., Baklanova T. N. Rol of medical shots at realization of policy in the field of quality of medical care. Social aspects of public health. 2011; (17)
- [13] URL:<http://vestnik.mednet.ru/content/view/270/30/lang, ru/>(Date of the address on July 17, 2016).
- [14] Grol R, Mokkink H, Smits A, et al. Workload and job satisfaction of general practitioners and the quality of patient care. Fam Pract. 1985;2:128–35. [PubMed]
- [15] David C Dugdale. J Gen Intern Med. 1999 Jan; 14 (Suppl 1): S34-S40. DOI: 10,1046 / j.1525-1497.1999.00263.x
- [16] Department of Health. The new NHS: modern, dependable. London, 1998
- [17] I.M.Son, Shipov V. M., Ivanov M. A., Armashevskaya O. V., Sokolovskaya T. A. Calculation of working hours of cardiologists, endocrinologists and stomatologists-therapists. Health care. 2016; (3):76-79.
- [18] Ivanova M. A. Work rationing is one of optimization ways of medical care patient quality/ Electron. Scientific. "Social aspects of public health".-2007. - No. 4 (4). <http://vestnik.mednet.ru/content/view/42/30/lang, ru/>
- [19] The order Ministry of Health care of RK from 4/7/2010 years No. 238 "About the statement of standard states and regular standards of the organizations of health care"
- [20] World Health Organization: The World Health Report 2008 - Primary Health Care (Now More Than Ever), 2008
- [21] The World Health Report, 2002,WHO, Geneva

[22] Chudnov V. P. "The organization of primary health care at the municipal level in modern conditions", a dessert. M, 2005.

[23] The state program of health care development of the Republic of Kazakhstan "Densaulyk" for 2016-2019:Decree of the President of the Republic of Kazakhstan of January 15, 2016, No. 176

[24] Judith Rosta, Olaf Gjerløw Aasland (Se alle biografier) Doctors' working hours and time spent on patient care in the period 1994 – 2014 / Publisert: 16. september 2016 Tidsskr Nor Legeforen 2016; 136:1355-9 DOI: 10.4045/tidsskr.16.0011