Economic Analysis of Requests for Laboratory Tests in Primary Health Care Centers

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SUMMARY

Introduction: Operation of the Primary health care center and Medical-biochemical laboratories depends on the number of performed laboratory tests. The number of unnecessary tests significantly affect the operation of health institutions. **Material and methods:** We analyzed the 1000 requests for laboratory tests at the Primary Health Care Centre in Gracanica from primary care units. Based on the requests for laboratory diagnostics advisable diagnoses from primary health care unit in the Primary Health Care Center (PHC) we made an economic analysis of the total required laboratory tests in the requests for labora-

tory diagnosis. Incorporating the economic analysis of laboratory tests in requests for laboratory diagnosis by doctors in primary health care (PHC) and the economic analysis of laboratory tests by the disease in primary health care. **Results:** The economic value of 5333 laboratory tests was 84 312 points (1 point is 0.80 KM). Of the total value of the index score requirements of GPs are 44, 1%, the requirement of family doctors account for 40% and requirements of other specialists make up 15, 9%. **Discussion:** In the requests of the PHC units for laboratory tests are required all levels of services: urine, CBC, SE, glucose, bilirubine, ALT, AST, AF, CK, cholesterol, HDL chol., triglycerides, creatinine, urea, uric acid, CRP, fibrinogen,

calcium and phosphorus. The following requests are the most common laboratory tests: urine, CBC, blood glucose, cholesterol, triglycerides, aminotransferases, creatinine, urea. The doctors in family practice most often requested: blood glucose, urine, CBC, SE, TGL., Chol., ALT, AST, creatinine and urea. General practitioners were demanding more cholesterol and triglycerides, and family medicine doctors were demanding less cholesterol and triglycerides and more often CRP, fibrinogen, ALT, AST, what from the level of economic cost analysis rises the issue whether this was justified?

Key words: primary health care center, biochemical diagnosis, economic analysis of resource use.

1. INTRODUCTION

Number of laboratory analysis has a great impact on the operations of the primary health center. Due to the fact that the payment of services is done by the number of service users in the interests of the institution that the number of unnecessary index reduces to a minimum. Organization of family medicine, medical-biochemical diagnosis is defined as a branch of diagnostic activities of the primary health care. To produce the results of laboratory tests needed are great material resources (1,2). This is evident in the economic analysis where laboratory tests are valued with a score of: Search by type and material resources expended for analytical examination. These technical, financial and technical performances of laboratory medicine are not appropriately classified, as it is obvious in other industries, technology and other primary health care (PHC) and family medicine (FM). World Health Organiza-

tion (WHO) in its key action program "Health for All" in the 21 century, as necessary emphasizes the education of health personnel (3, 4, 5, 6).

Assessment of medical laboratory technology should be implemented within the interdisciplinary team including: manufacturers of laboratory technology, employees in the laboratory, financiers of health care, patients, clinicians, and to use explicit analytical method (7).

This contributes to improving health care, especially in supporting development and regeneration of a wide range of standards, guidelines and other aspects of health care (8, 9, 10, 11, 12, 13).

2. MATERIAL AND METHODS

The study included a total of 1000 respondents. All subjects were users of primary health care in Primary Health Care Center Gracanica (Tuzla Canton); and in units of primary

health care have received requests for laboratory diagnosis. This work was done as an economic analysis of laboratory tests in the requests for the laboratory diagnosis of primary health care in PHC center. Incorporating was the economic analysis of the laboratory tests based on requests for laboratory diagnosis by doctors and diseases in primary health care, also incorporating the economic analysis of the most common laboratory tests based on requests for laboratory diagnosis by doctors in primary health care. For statistical analysis was used Student's t test and Chi square test.

3. RESULTS

General practitioners and family medicine doctors have a great need for laboratory diagnostics indicating frequent requests for laboratory diagnostics, or the total number and variety of laboratory tests on a sample of 1000 doctors. Among requested laboratory diag-

Type of test	Total	Price	Financial cost
Urine	743	17	12631
CBC	747	26	19422
SE	551	4	2204
BS	748	14	10472
Chol	450	12	5400
HChol	35	38	1330
Trig	448	16	7168
Urea	258	14	3612
Creat	357	12	4284
ALT	358	19	6802
AST	358	19	6802
Fibrin	49	13	637
CRP	44	14	616
Ca	31	13	403
P	29	15	435
AF	44	31	1364
Ac.uric.	30	15	450
Tbil	47	3	141
GGT	4	30	120
CK	1	19	19

Table 1. Economic representation of the test required by doctors in the Primary Health Care Center

nosis was done 5333 tests. Laboratory tests have their economic value, so the 5333 results would cost 84,312 points. Table 1 shows the requests for tests by doctors and number of points of performed tests in Primary Health Care Center.

3.1. ECONOMIC ANALYSIS OF LABORATORY TESTS AS REQUIRED IN PRIMARY HEALTHCARE CENTER

The value of search is expressed in points for ease of comparison. Economic value of 5333 laboratory tests was 84312 points (1 point is 0.80 KM).

Table 1 shows the total representation and total value of tests in points. The highest point value among the required laboratory tests have: CBC, urine, blood glucose, lipids, aminotransferase, creatinine, and urea.

3.2. ECONOMIC ANALYSIS OF PERFORMED TESTS BY DOCTOR

Requirements include a variety of tests and the different number of points required for testing by doctors. In Table 2 are presented the number of tests and the number of points that bear these tests. The economic value of the index expressed through the number of points for general practitioners was 37190 (44.1%) points. The economic val-

ue of tests that are required by family medicine doctors is 33681 (40%) points. The economic value of tests that are required by specialists: pediatricians, gynecologists and specialists in occupational medicine were 13441 (15.9%) points.

Analytical review of laboratory tests has values in points. The type and number of tests per doctor has a different number of points which bear these tests.

Test	General practice	Family medicine		Specialist		
	No. tests	No. points	No. tests	No. points	No. tests	No. points
SE	231	924	225	900	95	380
CBC	305	7930	276	7176	166	4316
BS	341	4774	292	4088	115	1610
CHOL	226	2712	189	2268	36	432
HDL CHOL	27	1026	5	190	3	114
TGL	227	3632	187	2992	34	544
UREA	117	1638	115	1610	26	364
CREAT	165	1980	130	1560	62	744
URIC	7	105	20	300	3	45
TBIL	13	39	29	87	5	15
ALT	152	2888	161	3059	45	855
AST	152	2888	160	3040	46	874
AF	19	589	17	527	8	248
FIBRINOGEN	11	143	36	468	2	26
CRP	13	182	22	308	9	117
Ca	14	182	14	182	3	39
P	12	180	13	195	4	60
GGT	1	30	3	90	0	0
CK	0	0	0	0	1	19
Urine	315	5355	273	4641	155	2635
Total	2348	37190	2167	33681	818	13441

Table 2. Representation of points and number of laboratory tests by type of doctor

Similar was percentage share of tests and the percentage evaluation in points of the tests required by general practitioners and family medicine physicians or 44% of the share index of for GPs and 40.7% share index for doctors of family medicine and 15.3% for specialists.

Form the total value of the index score requirements of GPs are 44.1%, the requirement of family doctors account for 40% and requirements of other specialists make up 15.9%.

Economic value of most frequent tests by doctors.

General practitioners after the review of patients in family medicine offices mostly requested in this order the following tests: glucose, urine, CBC, SE, TGL, Chol, ALT, AST, creatinine, which amounted to 34109 points (40.9%).

Doctors of Family Medicine (FM) after examination of the patient in family medicine offices mostly requested the following tests: glucose, CBC, urine, SE, Chol, TGL, ALT, AST, creatinine, which amounted to 29914 points (35.5%).

Other specialty doctors in primary health care mostly requested in this order the following tests: CBC; urine; BS; SE, ALT, AST, Chol., Tgl.; which in points was 12504(14,8%).

Figure 1. Representation of value in points of completed tests by the type of doctor

4. DISCUSSION

There is large use of laboratory diagnosis in PHC because it is a comprehensive diagnosis of multi disciplinary nature without special preparation, waiting lists, and the result are obtained immediately. There is large representation of laboratory tests, but the number and type of laboratory tests done in the Biochemical and Hematology Laboratory of the Primary Health Care Center Gracanica (9,10,11,13). In our study, among the total of 1000 required laboratory diagnosis was analytically examined 5553 tests; economically valued at 84,312 points. Analytical analysis of laboratory tests have examined their economic value expressed in number of points and the point value is defined as 0.80 KM.

But the fact is that the consumption for laboratory diagnostics is in the constant increase (12,14). Due to the increased cost of health care and especially the cost of laboratory diagnostic criteria to establish cost and cost spent points on test. Each diagnostic test should be analyzed from the aspect of cost effectiveness, i.e. to determine its efficacy and safety as outlined in the Accreditation Standards for Primary Health Care centers. If we omit technology and the labor, than only for reagents and supplies there is the daily increase in material costs by 15% in PHC Gracanica. Family Medicine doctors often require extensive medical and biochemical services of the laboratory (MBL), although the teams of FM and FM ambulatory with existing equipment can perform certain tests. For

all types of physicians in family practice, one can conclude that for all patients in the studied population, based on large number of requests for laboratory tests so it is necessary to apply the analysis: cost and effectiveness (CEA), cost and benefits (CBA), cost and utility (CUA) and cost and minimizing (CMA). Request for

laboratory diagnosis, which often contains over 10 tests; which by economic costs is valued by 1 request as an average of 84 points. The user often has repeated identical request because the previous test results was overseen. Effective would be to perform immediately the required analysis of test results when the required test results have the utility in health and healing.

Economic analysis such as CBA in the work points to the possibility of **rationalization of laboratory diagnosis by using self-control, self-discipline or self-criticism both of patients and physicians.** For the development of laboratory services, along with plenty offered laboratory tests, a good selection and interpretation of results, with a range of other factors with more rational approach can be continuously used in the prevention, diagnosis and therapy. In studies of this type in account may be taken also the concept of contingent evaluation (evaluation contingent-CV) as a measure of readiness for allocation of funds by individuals or groups: labor organizations for the systematic, periodic dental check-ups, pilot projects. Analyses of this kind, for example, in determination of HgA1C; markers of hepatitis B, C can be difficult to determine the economic benefit: from improving health to prevent epidemics of infectious and noninfectious diseases today such as metabolic syndrome.

But by using the test protocol can be obtained **faster and more cost-effective results.** For reasons of transparency and harmonization

of economic analysis and the term should be adopted guidelines for the implementation of individual analysis, especially for cost-effectiveness analysis, as the fullest.

These analyses are the indicator that it is economically unjustified to almost routinely require e.g. urine, blood glucose, CBC, SE, cholesterol, triglycerides, creatinine, urea, AST, ALT, Ca. There is a need to establish criteria for the rational requesting supplemental tests with clear guidelines.

We can ask a question for needed requirements, or unnecessary requirements for certain laboratory tests.

Cost-Utility Analizys can be compared with the cost-effectiveness analysis, considering that with this analysis, costs are expressed in monetary units and benefit in non monetary, often in the quality of life or QALY (quality adjusted life years). This analysis applies, for example on the value of preventive, systematic laboratory examination in improving quality and extending the life of diagnosed patients. Utility is a basis for evaluating the application of the results of laboratory diagnostics in preventive examinations. In cost-utility analysis results can be expressed as the cost of obtaining a healthy health care beneficiaries. "Better safe than sorry." Always, and the results of this analysis indicate that if you invest in prevention will later be saving in the treatment of e.g. metabolic syndrome, hepatitis, respiratory, urinary disorders and anemia of children, and other population age groups (3).

Cost-benefit analysis measures the total costs of laboratory tests with the overall benefits and cost savings that result from the use of laboratory examinations (11). The percent of the total points of required tests, and can be viewed as the ratio of total costs, expressed in monetary units by the total benefits.

In family practice **the price index of the total requested tests: glucose, triglycerides, and urine were 25482 which could be mainly in family practice quickly diagnosed or ratio-**

nalize, which could be saved and get the same result of health.

The used means are not justified by anyone; and laboratory team with the economic irrationality also suffering by great unvalued and unappreciated effort and risk. Costs of technologies are becoming an obstacle for smaller laboratories and those anticipated in family medicine. Worldwide, there have been changes in the organization of laboratories to convert these units into family medicine centers so the samples are sent for processing to larger laboratories. The aim of the new organization, linked into a unified information system, is the need for availability of services as close as possible, and on the other side efficiency benefits of sophisticated and expensive technology and knowledge that are financially inaccessible to smaller laboratories.

Family medicine and laboratory professionals need to be connected and work together. With this concept the laboratory professionals, with the successful management of human, financial and labor resources have an economic role in the health care of patients. The role is that in good cooperation with the patient, family medicine doctors and health care management provide a rational and economically viable health care (11,12).

5. CONCLUSIONS

In today's system of organization of Health care in the Federation B&H, there are few studies that take into account the need for reform and rationalization of health care, and that there have not compromised the health care system

and the implementation of the quality of health care.

To success we need to be driven by the quality, enthusiasm, cost/benefit that is the rationalization that is used in the model of health care, i.e. treatment, diagnosis, where among other things today emphasizes the effect. The question is whether it can survive a system where everyone has the right to all???

We should strive for success and benefit of laboratory tests in family medicine, that is demand an analytical review of laboratory testing that is economically justified and, if it is possible, to rationalize other laboratory tests.

Conflict of interest: none declared.

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