ORIGINAL ARTICLE

Fasting state requirements for blood sampling: a survey of patients in Cantonal Hospital Zenica, Bosnia and Herzegovina

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ABSTRACT

Aim To explore patient's awareness and appliance of the fasting state requirements for blood sampling.

Methods This observational survey was performed at the Department of Medical Biochemistry and Immunology Diagnostics, Cantonal Hospital Zenica, from June to July 2019. An anonymous questionnaire was conducted on 200 consecutive outpatients older than 18, who were admitted to the laboratory for routine blood testing.

Results A total of 134 (67%) patients were informed that they needed to be at fasting to perform laboratory tests. Patients were mostly informed by a requesting physician or a nurse, 68 (50.8 %), and by other patients, members of the family and friends, 58 (43.3%); only seven (5.2%) patients were informed in the laboratory. A total of 75 (37.5%) patients arrived to the laboratory properly prepared.

Conclusion Most patients were not well informed about fasting state requirements for blood sampling and consequently they were not adequately prepared for laboratory tests. Laboratory should establish updated fasting recommendations available to patients and healthcare professionals, and conduct continuing education of patients and health care staff.

Key words: blood specimen collection, diagnostic errors, patient safety, pre-analytical phase

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INTRODUCTION

Patient safety is one of the most important challenges in healthcare. From the laboratory perspective, pre-analytical errors make the largest contribution to the overall rate of diagnostic and therapeutic errors (1,2). Pre-analytical phase is the main source of errors in laboratory testing procedures (3-5) and blood sample collection for laboratory tests is a crucial pre-analytical activity. Errors occurring before this pre-analytical step may impair sample quality and patient test results (6).

Adequate preparation of the patient is the most important step for ensuring the sample quality. Blood sampling in a non-fasted state, even a sugar-free gum chewing, may have an impact on the laboratory test results (7-10). Patients should be in the fasting state before blood sampling for most biochemical, haematological and coagulation analyses. Some biochemical, haematological and coagulation analytes are changed directly, due to various metabolic and hormonal mechanisms in non-fasting state. Other analytes are changed indirectly, due to interference caused by lipemia, during the measurement of an analyte. Postprandial response depends on a number of factors, such as fasting duration, eating behaviour, smoking, coffee and alcohol consumption. Therefore, it is of crucial importance to control as many of these factors as possible in order to prevent spurious laboratory test results (11-14).

Unfortunately, there is still grate heterogeneity in the fasting state definition in health care institutions as well as in the scientific literature (12). The standardization of fasting requirements, among other preanalytical activities, is most important for mitigating the impact of pre-analytical variability (6). The European Federation of Clinical Chemistry and Laboratory Medicine Working Group on Preanalytical Phase (EFLM WG-PA) recommends that fasting state requirements include 12 hours fasting state and water ad libitum prior to blood sampling. Fasting instructions also include abstinence from alcohol a day before blood sampling, and abstinence from coffee, tea and smoking intake in the morning before blood sampling (15).

In Cantonal Hospital Zenica, a written recommendation about blood sampling for laboratory tests exists, but not on-line or on leaflets. Blood samples are taken in the morning, from 8-10 AM. The previous evening, after 8 PM, patient should not eat food and drink beverages (except water), or consume alcohol and cigarettes.

The aim of this study was to investigate patient's awareness and appliance of fasting state requirements for blood sampling to gain insight into the compliance with EFLM WG-PA fasting recommendations in Cantonal Hospital Zenica. These data will serve to all health professionals to understand the need for active clarification of fasting requirements to patients in order to prevent spurious laboratory test results.

PATIENTS AND METHODS

Patients and study design

This observational survey was performed during a 2-month period, from June to July 2019 at the Department of Medical Biochemistry and Immunology Diagnostics, Cantonal Hospital Zenica (Zenica, Bosnia and Herzegovina), serving general and specialized clinical chemistry, haematology, immunology and coagulation testing services. The laboratory is not accredited by the ISO 15189 standard.

An anonymous questionnaire (Tables 1-3) was conducted on a consecutive sample of 200 outpatients older than 18 years, who were admitted to the laboratory in the morning between 8-10 h AM for routine blood testing. All patients were informed about the survey and consented to participate in the survey.

The research was done respecting ethical standards of the Declaration of Helsinki. The study approval was obtained from the Ethics Committee of Cantonal Hospital Zenica.

Methods

Patients were interviewed by a specialist of the medical biochemistry. A 12-question survey contained data about patients' demographics, degree of education and the use of internet as a source of medical information, how often do they draw blood for laboratory tests, are they currently at fasting, are they informed that they need to be at fasting to perform laboratory tests, are they informed that consumption of food or beverages

before laboratory tests affects their results; the patients were asked to explain the term fasting state, what they consumed before blood sampling in the case that they declared about non-fasting, and if they consumed alcohol and cigarettes. A questionnaire was developed by authors of this study in accordance with similar studies.

Statistical analysis

Frequency of each answer given in the questionnaire was calculated. Data were shown in the table as absolute numbers and percentages.

RESULTS

A total of the 200 outpatients enrolled in the study (Table 1). When asked, 134 (67%) patients reported that they were informed that fasting is required to perform laboratory tests, of which 68 (50.8%) were informed by requesting an physician or nurse and 58 (43.3%) by others (other patients, members of the family, friends). Seven (5.2%) patients were informed in the laboratory and one (0.7%) from the Internet (Table 2), although 101 (50. 5 %) patients stated that they used the Internet as the source of medical information (Table 1).

Table 1. Characteristics of 200 outpatients

Characteristic	No (%) of patients
Gender	
Males	65 (32.5)
Females	135 (67.5)
Age group	
<25 years	16 (8.0)
25-49 years	43 (21.5)
50-65 years	78 (39.0)
>65 years	63 (31.5)
Degree of education	
Elementary school	49 (24.5)
High school	113 (56.5)
College	31 (15.5)
Other	7 (3.5)
Use of internet as a source of medical information	
YES	101 (50.5)
NO	99 (49.5)
How often do you draw blood for laboratory tests?	
First time	1 (0.5)
Weekly	3 (1.5)
Monthly	36 (18.0)
Half-yearly	61 (30.5)
Yearly	29 (14.5)
Sporadically	70 (35.0)

When they were asked if consuming food or beverages before laboratory tests affected their results, 123 (61.5 %) patients answered affirmatively (it affects only some test results). However, when they were asked about the correct definition of the fasting state (at least 12 hours must pass from the last meal to blood sampling, it is allowed to drink water) 35 (17.5 %) patients answered affirmatively. Almost half, 86 (43%) patients believed that it was enough to take the last meal at any time on the day preceding the blood sampling; 36 (18%) patients thought that they could consume light breakfast or coffee and tea before blood sampling (Table 2).

Table 2. Patients' knowledge about the fasting state requirements

Question	No (%) of patients
Are you informed that you need to be fasting to perform laboratory tests?	
NO	66 (33.0)
YES (a way of information)	134 (67%)
In laboratory verbally	6 (3.0)
In laboratory by written instruction	1 (0.5)
By doctor	47 23.5)
By nurse	21 (10.5)
By internet	1 (0.5)
By other persons	58 (29.0)
Does consuming food or beverages before laboratory tests affect your results?	
NO	31 (15.5)
YES	169 (84.5)
for all tests	46 (23.0)
only some tests	123 (61.5)
What does the fasting state mean?	
From the last meal to blood sampling at least 12 hours must pass, it is allowed to drink water	35 (17.5)
From the last meal to blood sampling at least 12 must pass, it is not allowed to drink water	17 (8.5)
From the last meal to blood sampling at least 10 hours must pass, it is allowed to drink water	11 (5.5)
From the last meal to blood sampling at least 10 hours must pass, it is not allowed to drink water	2 (1.0)
From the last meal to blood sampling at least 8 hours must pass, it is allowed to drink water	8 (4.0)
From the last meal to blood sampling at least 8 hours must pass, it is not allowed to drink water	5 (2.5)
The last meal was taken the day before, the exact time does not matter	86 (43.0)
In the morning light breakfast can be consumed	33 (16.5)
In the morning coffee or tea can be consumed	3 (1.5)

Half of the patients, 102 (51%) stated that they were currently fasting. However, when they were asked what they had consumed before blood sampling, it turned out that 75 (37.5%) patients arrived to the laboratory properly prepared, i.e. their last meal was 12 hours before blood sampling; 80 (39%) patients consumed coffee or tea and cigarettes in the morning, before blood sampling (Table 3).

Table 3. Patient appliance to fasting state requirements

Question	No (%) of patients	
Are you currently fasting?		
YES		102 (51.0)
NO		43 (21.5)
I do not know		55 (27.5)
What did you consume before blood sampling?		
The last meal consumed 12 hours before		75 (37.5)
The last meal consumed 10 hours before		6 (3.0)
The last meal consumed 8 hours before		13 (6.5)
Coffee or tea in the morning		45 (22.5)
Water		1 (0.5)
Other		51 (25.5)
I did not pay attention		9 (4.5)
Did you consume alcohol?		
NO		188 (94.0)
YES		12 (6.0)
Within 24 hours before blood sampling	6 (3.0)	
More than 24 hours before blood sampling	6 (3.0)	
Did you consume cigarettes?		
NO		147 (73.5)
YES		53 (26.5)
The day before blood sampling	18 (9.0)	
In the morning, before blood sampling	35 (17.5)	

DISCUSSION

To our knowledge, this is the first study evaluating these pre-analytical requirements in any laboratory in Bosnia and Herzegovina. Our study showed that not all patients were informed about fasting state requirements for blood sampling, Although the majority of them were informed about that, they were still not well acquainted with the correct definition of the fasting state. The major source of the instructions for laboratory testing were a requesting physician and nurse, then other people (other patients, members of the family, friends). Unfortunately, very small amount of information was obtained from laboratory staff. The least amount of information was obtained from the Internet.

Our study also revealed that most patients were not adequately prepared for laboratory tests. But still, even though patients were not well enough informed about fasting requirements, they were mostly aware of its relevance and the fact that consuming food or beverages before laboratory tests affected their results. This is probably the reason why twice as many patients then those who knew proper definition of the fasting state still came to the laboratory adequately prepared.

Similar to our findings, López-Garrigós et al. (Spain) found in their survey of 254 patients who attended a blood sampling that substantial proportion (27.6%) of patients did not receive any information about fasting prior to the analysis; from those who were informed, 68.0% were informed by the healthcare professionals, and 11.9% knew that the 12-hour fasting period was required. Although not all patients received information about fasting, 22% fasted for 12 hours (16). The results of the study of Sareen at al. (India) performed on 200 outpatients revealed a lack of knowledge and awareness about the fasting requirements for blood glucose estimation: 69% knew that 12-hour fasting was required for a test, their major source of instructions for laboratory testing was a requesting physician and nurse (73%). Very small amount of information was obtained from the laboratory (17).

The results of the study of Hepburn at al. (United Kingdom and Republic of Ireland) performed on 235 outpatients also revealed that majority of patients were not informed or informed well about fasting state requirements; a total of 103 patients did not receive any information about preparing for blood sampling, none of the patients was informed about the need to fast for 12 hours (18).

A crucial issue in the laboratory medicine is to assure the quality throughout the whole total testing process (TTP) (19). Quality of the preanalytical phase as a part of TTP is the responsibility of the laboratory staff, even though many pre-analytical steps are performed by the non-laboratory staff (3). Although it is too late for patients coming for the first time to be informed in the laboratory, it would still be of great importance because our study showed that most of the patients come to the laboratory on a regular basis. Laboratory staff should be more active in clarifying fasting requirements to the patients. Despite the lack of official written recommendations of national scientific communities, laboratories, even non-accredited, should have updated instructions for the patient preparation for laboratory tests.

Although we obtained results similar to other studies, our study showed that only written recommendations inside our hospital are not enough, and that we should provide those recommendations in the form of leaflets as well as on-line. Those should provide patients as well as physicians and nurses with information for fasting requirements, with clear and understandable instructions for the preparation of the patients for laboratory tests. Since the instructions for laboratory testing are obtained by patients mainly from physicians and nurses, laboratory professionals

should be proactive in organizing educational meetings for non-laboratory health professionals to disseminate knowledge about the importance of fasting requirements in preventing spurious laboratory test results.

In conclusion, we detected that most patients were not well informed about fasting state requirements for blood sampling and were not adequately prepared for laboratory tests. The study results point to the need for each laboratory to establish its own updated, visible and available fasting recommendations in accordance with those of EFLM in the absence of official written national recommendations. And finally, laboratory professionals should conduct continuous education of patients and healthcare staff in order to reduce preanalytical errors.

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TRANSPARENCY DECLARATION

Competing interests: None to declare.

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