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Original Contribution

TRENDS IN USE OF RAPID DIAGNOSTIC TESTS

E. Georgieva[1]*, N. Ermenlieva[2], S. Stamova[3], K. Varlyakov[4], P. Teneva[4]

[1]Medical Laboratory Assistant, Medical College, Medical University – Varna, Bulgaria
[2]Department of Microbiology and Virology, Faculty of Medicine, Medical University – Varna, Bulgaria
[3]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Medical University – Varna, Bulgaria
[4]Department of Health Care, Medical College, Trakia University, Stara Zagora, Bulgaria

ABSTRACT

INTRODUCTION: Laboratory diagnostics worldwide is changing daily. Digitizing it by introducing sensors and new rapid diagnostic tests plays an important role in protecting public health. There is still a lack of widespread use of these types of sensors and tests in Bulgaria.

The aim of this study was to establish the level of awareness and frequency of use of rapid tests.

MATERIALS: The study used a documentary method comprising a systematic review of scientific publications from medical journals published in electronic databases such as PubMed, Scopus, Web of Science, etc. in the studied field. Sociological methods were used by anonymous survey among 980 respondents to explore the opinion of users of rapid tests and sensors for laboratory parameters. The study covers the period October 2018 - February 2019 and November - December 2024. MS Office Excel package and ANOVA statistical method were used for data processing. RESULTS: We investigated the use of rapid tests and devices for determination of laboratory indices, and found that the predominant users of monthly tests were 73.5%, only 1-2 times a year occupying a relative share of 16.3%, and the users who self-tested weekly were 10.2%.

The survey data showed the largest difference in the use of rapid tests for influenza (2018-2019 3.20%/2024 jumped to 25%) and COVID (2018-2019 3.20%/2024 jumped to 32%) followed by tests used for glucose testing and glucometer and sensor supplies. Pregnancy test use also increased to 23.3%, other tests roughly maintained their use over the studied period. CONCLUSION: Globally, the consumption of sensors and rapid diagnostic tests is a growing trend due to the dynamics of viral diseases, aging population and centralization of healthcare. The use of rapid diagnostic tests in Bulgaria is projected to continue to increase, especially in the context of greater availability of technology and in response to pandemic or epidemic threats. Rapid diagnostics are expected to become more prevalent not only in hospitals and healthcare settings, but also in other public and corporate spheres as part of efforts to prevent the spread of disease and improve public health.

Key words: sensors, awareness, use, diagnostics

INTRODUCTION

Prompt and correct diagnosis and follow-up of all diseases require laboratory diagnosis based on the principles and standards of good practice. Rapid tests aim to realize rapid, simple and automatic detection of various indicators (1). Influenza tests have been developed for screening large groups of people. They are affordable, rapid and find their place in the diagnosis of symptomatic patients. In addition to standard detection methods used in routine laboratory diagnostics, rapid tests, sensors and miniaturized PCR devices are now making inroads (2, 3). The capabilities offered by new technologies are with a wide range of diagnostic tests that can be performed by PCT (point of care testing) tests or automated analyzers. Manipulations and new laboratory devices allow the tests to be performed by the patient, which promotes better self-management of the disease and leads to improved quality of life (4).

***Correspondence to:** *Emilia Georgieva, Medical Laboratory Assistant, Medical College, Medical University – Varna, Bulgaria Tsar Osvoboditel 84, tel. +359 889704430, e-mail: emiliya.georgieva@mu-varna.bg*

The menu of POCT tests is constantly expanding, covering more than twenty medical fields (pediatrics, endocrinology, rheumatology, cardiology, gynecology with prenatal diagnosis, allergology, drug testing, various tests for sexually transmitted diseases, etc.) (5, 6). Home-use devices for glucose, uric acid, INR and other laboratory parameters are preferred by patients. They are suitable for the management of diabetes mellitus, hypertension, anticoagulant therapy and others (7, 8). The development and dissemination of these technologies is a major factor in achieving control of chronic non-infectious diseases. After the COVID pandemic, attitudes toward rapid testing changed significantly. Initially, they were perceived as a new and underproven technology, but as they became part of everyday life, attitudes towards them changed (9, 10). More and more people began to see them as a convenient way of self-testing, especially when there was a need for rapid detection of an infection. Combined rapid tests for COVID and influenza are sufficiently accurate and reliable, but should be used in the early days when the virus is in the nose or nasopharynx. A positive test result is not a diagnosis. It indicates that, with some probability, the patient is infected and contagious.

RESULTS

The study was conducted between October 2018 and February 2019 and November and December 2024 to investigate the trend in the use of rapid tests and sensors for laboratory indicators. The survey is in electronic format with open access. Participants included in the survey were 59% females and 41% males (n=980), with an average age of 46.10 years.

Awareness matters a great deal to the population, as do the sources of this information. As the most informed users of rapid tests for laboratory indicators occupied 70%, followed by 16.7% who felt that they were partially informed. Only 13.3% were not informed. Information about the availability and how to use rapid tests a higher proportion of respondents said they found it on the internet (40.7%). This proves that the internet is the most commonly used source of medical information for a significant proportion of the population. A relative or friend informed 32.2% of the participants, whereas a relative proportion - 18.6% - were informed by their GP. Products recommended by a pharmacist occupied 8.5%.

In our study, use of rapid tests and devices for determining laboratory indicators predominated monthly users 73.5%, only 1-2 times a year occupied a relative share of 16.3%, and users who self-tested weekly were 10.2%.

The survey data showed the largest difference in the use of rapid tests for influenza (2018-2019 3.20%/2024 jumped to 25%) and COVID (2018-2019 3.20%/2024 jumped to 32%) followed by tests used for glucose testing and glucometer and sensor supplies. The use of pregnancy tests also increased to 23.3%, while other tests maintained their overall use over the study period (**Figure 1)**. It is likely that the dynamics in the use of various tests during the studied period is driven by the changing lifestyle dynamics of viral diseases.

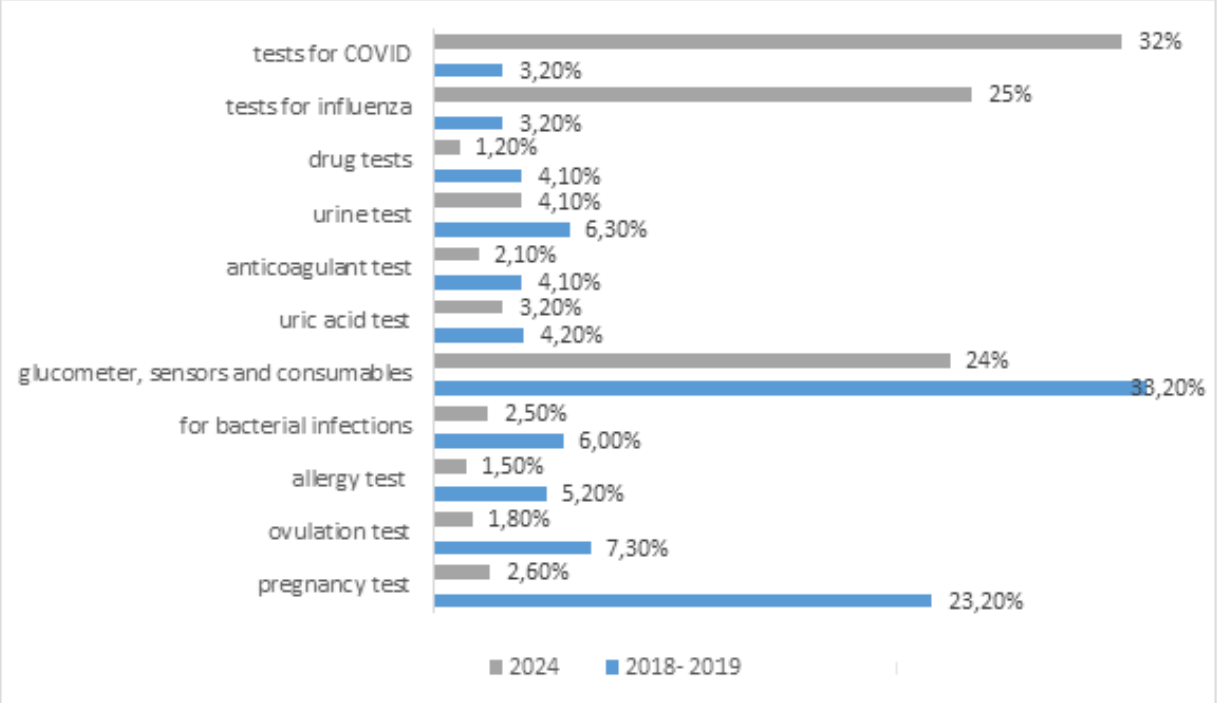

Figure 1. The types of rapid tests used for laboratory tests in the period 2018-2024

A large proportion of rapid test users said they use them to monitor and control their health (23.4%), while for others the purpose is more indicative (19.8%). A significant proportion of respondents 56.8% indicated that they use them when in contact with sick people or when a viral infection is suspected. The high proportion of people using rapid tests indicates their reliability **(Figure 2).**

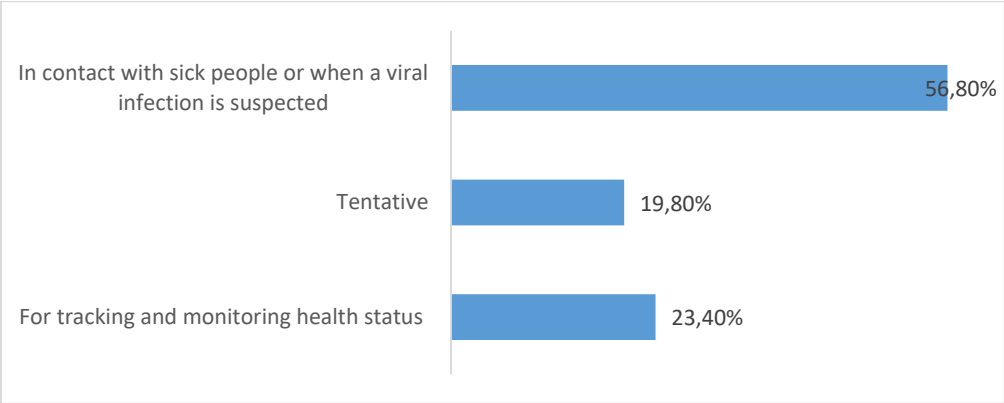

Figure 2. Purpose of using rapid tests

The purpose of rapid tests is to meet the needs of the population, which determines their social aspect. The satisfaction of the user depends largely on his condition - age, type of disease, stage, severity, seriousness, willingness, consent, etc. The degree of satisfaction depends not only on the importance of his health problem, but also on the occurrence of concomitant problems and circumstances. Satisfaction with the use of rapid tests is also indicated by the high degree of recommendation for 96.6% of the study participants.

DISCUSSION

In England, the use of rapid tests has increased significantly over the past 5 years, with the advent of ROST technologies easing the workload of GPs (11). In Germany, the consumption of this type of test accounts for 54% of the European market. The variety of rapid tests is extremely large and new product lines offer great variety, uncompromising quality, high specificity, sensitivity, and accuracy (12, 13). The use of rapid tests is on an increasing trend. The study by Dinnes J. et al. showed similar results to ours. Their respondents indicated that 68% of medical professionals and 55% of patients preferred rapid diagnostic tests over traditional laboratory tests (14). The reason is faster results and convenience in performing them. The greatest use of rapid tests is in the diagnosis of infectious diseases, such as influenza (34%), COVID-19 (29%) and streptococcal infections (17%). Rapid tests are also widely used to measure blood sugar and cholesterol levels (12%). 45% of respondents indicated that new technologies in rapid tests significantly improved the accuracy and sensitivity of results. The ability to self-test was also cited as a major advantage, with 38% of respondents using such tests at home. According to 70% of respondents, rapid tests produce results within 15 to 30 minutes, which is significantly faster than traditional laboratory tests that take 1 to 3 days (15). Despite their increasing use, 35% of medical professionals emphasized that rapid tests still have accuracy issues in some cases, such as low viral loads (16, 17). Challenges and limitations to rapid tests relate to cost and availability in more remote areas. The global economic outlook for the use of rapid diagnostic tests is expected to reach $40.50 billion by 2030. The rapid diagnostic tests market is projected to grow at a compound annual growth rate (CAGR) of around 6.8% over the next decade (18, 19).

FINDINGS

These observations show that the trend in Bulgaria is positive, with an increasing use of rapid diagnostic tests both in medical institutions and among the population. However, challenges, such as test quality and affordability remain key issues that need to be addressed by governing bodies.

CONCLUSION

Future trends in the use of rapid diagnostic tests will increase over the next 5 years. Increased use is driven by the dynamics of viral diseases aging population and centralization of healthcare. The use of rapid diagnostic tests in Bulgaria is projected to continue to increase, especially in the context of greater availability of technology and in response to pandemic or

epidemic threats. Rapid diagnostics are expected to become more prevalent not only in hospitals and healthcare settings, but also in other public and corporate spheres as an effort to prevent the spread of disease and improve public health.

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