



Role of Rapid Antigen Test for Covid 19 in Family Medicine Outpatient Clinic

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Abstract

COVID-19 is a worldwide medical problem affecting majority of people with different age groups, where family medicine outpatient clinics is the first line in detecting and managing this medical issue, we tried to put our hands to explore the role of rapid antigen test for covid 19 in family medicine outpatient clinic and its effectiveness.

Keywords: keyword1; keyword2; keyword3 covid 19; rapid antigen test; family medicine outpatient clinic.

1. Introduction

COVID-19 rapid antigen tests, which are also referred to as RATs, or COVID-19 lateral flow tests LFTs are quick antigen tests that are utilized in detecting SARS-Cov-2. They are fast to use and require slight training. Also, they are reasonably cheaper compared to other kinds of COVID-19 testing and provide results in 5-30 minutes. The usage of RATs has been seen in many countries for purposes of mass testing as well as population screening purposes.

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Additionally, individuals can also use RATs for self-testing, whereby a person collects their specimen and interprets the results on their own. Incidences of false positives are rare with RATs since the specificity of the tests is usually at 98%-99%. The tests, however, have a 70%-72% sensitivity, which is low compared to the COVID-19 polymerase chain reaction (PCR) tests that have a 88%- 99% sensitivity[1].

This paper aims to discuss the role of rapid antigen tests for COVID-19 in family medicine outpatient clinics.

2. The clinical problem

More than 300 million cases involving confirmed infection with SARS-CoV-2 and 5.5 million fatalities have been reported to the WHO. The testing of SARS-COV-2 has become instrumental in identifying COVID-19 cases, decreasing transmission, and updating public health infection regulation procedures. Inadequate accessibility to diagnostic testing, however, in communities that are under-served, as well as inadequate COVID-19 information reportage to the WHO, imply that the approved numbers, even though astounding, are possibly a representation of a portion of the complete contagions and fatalities from COVID-19[2].

In the past several decades, RDTs like urine tests to determine the presence of human chorionic gonadotropin have been used increasingly across various healthcare settings, both in low and high-resource settings. These tests have been instrumental in facilitating the diagnosis and treatment and reducing dependence on laboratory infrastructure. Health institutes and other agencies started assisting and funding the investigation and advancement of new diagnostic assessments in the early COVID-19 epidemic phase[3]. Diagnostic firms focused their priorities on the manufacture of antigen-based and molecular-centered RDTs for COVID-19.

3. Use in diagnosis

Since the beginning of the COVID-19 pandemic, the fast recognition and isolation of the infected persons proved to be important factors in limiting the pandemic and preventing the further spread of the disease.

The timely and accurate COVID-19 patients' identification in medicine outpatient clinics was a major challenge. Apart from the confirmation and exclusion of SARS-CoV-2 infection in symptomatic patients, the Emergency departments need to manage many patients simultaneously, even those with pathological conditions apart from COVID-19[4]. The failure to correctly identify COVID-19 patients, whether asymptomatic or symptomatic, can have catastrophic consequences. COVID-19 RATs are widely employed for making a diagnosis of COVID-19.

According to WHO, the COVID-19 case description, an individual with a positive RAT (also referred to as Antigen-RDT) may be regarded to be a "confirmed infection with SARS-Cov-2 in two means. First, an individual having a positive Antigen RDT might satisfy the "probable cause" description such as exhibiting recent loss of taste or smell with no any established reason, or also satisfy some "suspect criteria" such as severe acute respiratory disease. Second, an individual having positive Antigen RDT may be asymptomatic but a "contact of the person with a possible or confirmed case." [5] Furthermore, different nations could have various case descriptions of COVID-19.

4. Use in screening

In the period ranging from mid-2020 up to early 2021, scientific inquiries with the usage of mathematical models attempted to estimate the benefit associated with frequent RATs when screening COVID-19 among populations. Carcione and colleagues evaluated a hypothetical college campus that had a total population of 5000 students. All students were screened after every two days using a “high-specificity test, low sensitivity” (for instance, RAT), which would have the capacity to control a COVID-19 outbreak[6]. Ebrahimi and colleagues [7] theorized that screening with high frequency with lower sensitivity RATs might be more convenient in contrast to lower-frequency screening using higher sensitivity PCR tests since the lower-frequency screening would be able to “detect most of the infections while they are contagious.”[8] The timely RATs outcomes would be beneficial in limiting asymptomatic transmissions. Ebrahimi and colleagues [7] replicated different COVID-19 strategies for population screening. The scientists established that “effective screening is principally dependent on frequency of testing and reporting speed and can only be marginally improved through high test sensitivity[9].

5. For “return to normal”

Spain was among the leading nations to utilize rapid tests in facilitating a return to normal with the usage of rapid tests extensively accessible in healthcare facilities, including outpatient clinics, in December 2020. A free music performance in the city of Barcelona was also organized for people that undertook a rapid test[9]. Also, the same tactic was implemented in Albania to allow for music concerts. Numerous professionals were doubtful of this scheme, saying that using rapid tests would not be the key to reinstating ordinary life but can be implemented in association with further control measures[11].

6. Concerns about the sage

6.1 False negatives (low sensitivity)

Even though the RATs’ sensitivity is high (98%-99%), they were highly disapproved in 2020 for portraying sensitivity levels as low as 50%. When a positive PCR test determines people have COVID-19, half of them will turn out to be harmful when tested with a RAT. As of 2022, Ebrahimi and colleagues.

Reference [7] established that RATs’ collective sensitivities ranged from 70%-72%. In one logical assessment, the sensitivities range in various trials was 37%-90%[7]. WHO advises that RATs have a sensitivity exceeding 80%, and most of the RATs have been in the spotlight for not meeting the WHO recommendation[7]. A study conducted in 2022 followed 225 grown-ups and children having COVID-19 for more than 15 days with the use of PCR tests, home ARTs, and viral cultures. It was established that RAT sensitivity rose from 0% two days before the onset of symptoms or first positive PCR test to 77% 4 days following the first positive PCR test or onset of symptoms, with a general sensitivity of 50%. In comparison to the PCR tests received on the same day, the RAT sensitivity was at 64%; compared to the viral loads collected on that day, the sensitivity of RAT was at 84%. RAT sensitivity is lesser in people who have received COVID-19 vaccination than those who have not received vaccination[13].

6.2 Potential for the false negative outcome because of new variants

In November 2020, there was a new slightly infectious SARS-CoV-2 acknowledged within the United Kingdom, known as the SAES-CoV-2Alpha variant. This strain spread quickly all over the globe. The extensive universal usage of RATs for testing COVID-19 raised concern about whether the strain would make rapid testing outdated. Being part of the enhanced technology assessment of lateral flow in the U.K., the public health laboratories in the U.K. confirmed that RATs did not fail, in that they could recognize the new variant[14].

This was achieved because rapid test normally tests the capsid protein contrary to the spike protein. According to a study that was published in 2022, it was established that the sensitivity of six rapid antigen recognition tests was 69.6%-78.3% for the omicron variant, and 70.0%-92.9% for the Delta variant across an array of viral loads. For omicron samples, however, samples with lower viral loads had between 0.0% and 23.1% [10].

6.3 False positive results when instructions are not properly followed

When a COVID-19 RAT becomes used in a different way from the commendations of the manufacturers, it can display incorrect positive results.

From December 2020, there were TikTok videos circulating on how a false positive COVID-19 RAT result can be created using soft drinks. Researchers later discovered that adding bottled water, alcoholic drinks, fruit juices, and other products straight into an Abbot Panbio COVID-19 RAT without adding the buffer solution recommended by the manufacturer produced false positives[15]. In contrast, the B.D. veritor, which is a different RAT, did not produce incorrect positive outcomes under similar conditions[10].

In conclusion, RATs can be essential in general COVID-19 testing capacity since they offer advantages in terms of reduced costs and shorter turnaround time. Together, the ART benefits can contribute to more efficient protection against transmission due to the possibility of more timely identification of cases as well as faster contact tracing. The data currently available indicate that RATs can be able to perform efficiently in settings where the onset time of symptoms is unknown. Currently, there are several varieties of RATs available in the market, but the data regarding their clinical performance is limited, and most of the data is centered on a limited number of mainly symptomatic individuals. Additionally, most of the available reports are still blueprints, and hence the data should be cautiously interpreted.

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