A Covid-19 screening strategy based on the use of rapid antigen tests in health care facilities in Niger


Background

In Niger, as in other African countries, the diagnosis of Covid-19 has remained very low up to now, despite several sentinel case studies suggesting a large spread of SARS-CoV-2 (1). As of November 1st 2021, only 6,366 cases have been confirmed and 213 deaths reported in the country. Covid-19 centralized testing capacities, based on PCR, hindered the access to Covid-19 diagnosis. New screening techniques based on rapid antigen detection appeared as an opportunity to screen and manage Covid-19 patients in all health facilities, including the most peripheral.

Our intervention aimed to assess the feasibility, acceptability, impact and cost-effectiveness of a Covid-19 screening strategy based on the use of rapid antigen tests (Ag-RDT) to diagnose symptomatic patients, in order to prepare national scale-up in clinical settings.

Design Method

We conducted an operational research from November 2021 to April 2022 in a representative sample of health care facilities: 5 primary health centers and 3 hospitals in Niamey and Dosso regions. Most had never diagnosed a case of Covid-19. All adults attending medical or emergency outpatient consultations were screened for Covid-19 by trained dedicated nurses. WHO Covid-19 disease case definition was used as a diagnostic tool (3), supported by a digital data collection tool. Suspected cases were tested with Covid-19 Ag-RDT (STANDARD Q COVID-19 Ag Test, SD-Biosensor).

Results

Feasibility and impact of the intervention: Based on consultations data of the participating facilities, an estimated 78% of the targeted patients were triaged. Among the 12,014 patients screened, 2,244 were classified as Covid-19 suspected cases (19%), of whom 2,177 were tested with Ag-RDT (97%). Patients who tested positive were 135 (6%), with a median age of 42 years. Severe symptoms requiring admission were present for 19/135 positive patients (11%) and death occurred for 6/135 Covid-19 positive patients (4%) among hospitalized patients and 1 among outpatients.

Figure 1: Covid-19 screening cascade based on the use of rapid antigen tests (Ag-RDT) in symptomatic patients in 8 health care facilities in Niger.

Covid-19 was present at all levels of the health pyramid, with the same frequency in the capital and in Dosso region. Most severe patients consulted directly in the hospitals (14/15). Among hospitalized patients, 14 were admitted after their first consultation and 1 secondarily worsened and was hospitalized after a second consultation.

The usual risk factors for severe form of the disease and death were found (age, comorbidities, male sex), as well as the protector effect of vaccination. Nevertheless, one third of severe cases had no known risk factor.

Screening based on Ag-RDT was feasible, well accepted and improved access to Covid-19 diagnosis at all levels of the health system in Niger. It contributed to reveal that Covid-19 frequency was underestimated. However, the cost-effectiveness of this screening strategy could be debated in very constrained context, where other health issues could be prioritized.

The use of dedicated staff and of a digital decision-support tool in the study had certainly improved the effectiveness of the screening intervention, but would be challenging to implement routinely.

Despite the study was conducted during an epidemic wave, and the screening protocol well applied, the number of Covid-19 diagnoses was low compared to the catchment population of the participating health facilities (>1 million people), suggesting that few of the Covid-19 infected people sought medical care. Therefore, this screening strategy could probably not be useful to control the epidemic spread. Its main benefit would be to diagnose more correctly the severe forms of Covid-19 requiring specific care.

A relatively high proportion of severe cases was identified in this study, especially among patients who consulted in hospitals. This could be related to a selection bias: the most severe patients have probably consulted more. In order to improve the cost-effectiveness of the strategy, testing could be focused on patients at risk of severe form, patients presenting severity signs, or consulting in hospital settings.

National scaling up of this strategy will require appropriate public health policy and staff training, in order to implement a more systematic approach of Covid-19 screening and a proper identification of severe cases. Beyond diagnosis, improvement of the management of severe cases could reduce mortality.

Discussion / Conclusions

References


Table

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>Positive Ag-RDT screening strategy in routine:</td>
</tr>
<tr>
<td>Average cost per test</td>
<td>14 USD</td>
</tr>
<tr>
<td>Average cost per positive test</td>
<td>23 USD</td>
</tr>
<tr>
<td>Average cost per positive test, severe case</td>
<td>208 USD</td>
</tr>
</tbody>
</table>

Abstract's errors: Updated numbers