

Impacts and lessons learned from the local production of WHO-Recommended Alcohol-Based Hand Rub during Covid-19 Pandemic in Uganda.

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Abstract

In January 2020, the World Health Organization (WHO) declared the outbreak of a new coronavirus disease, COVID-19. The WHO and the Centers for Disease Control and Prevention (CDC) recommend using an alcohol-based hand rub (ABHR) as one of the measures to combat the spread of COVID-19.

Objective

To assess the impacts and lessons learned from the local production of WHO-recommended alcohol-based hand rub during the COVID-19 Pandemic in Uganda.

Method

Space for local production was identified at a health facility in Central Uganda that was air-conditioned and well ventilated. Volunteers were trained on the local production of ABHR. The volunteers were trained theoretically and practically for Four days; and each was able to produce at least a batch of ABHR. Logistical support for supplying the raw materials needed for production was from the Infectious Diseases Institute. There were also already established ABHR production units and trained staff on local production of ABHR in 2019 in the Kabarole and Kasese districts, respectively in Western Uganda. These districts were threatened by several outbreaks, including Ebola virus disease, and were monitored for ABHR production during the COVID-19 Pandemic.

Result

Two production units were set up during the Ebola outbreak, in awake of COVID-19, a production unit in Kasese, was able to produce 3020 litres, and the Kabarole unit produced 2020 litres respectively. A new production unit was set up at Kasangati HCIV in central Uganda and eight laboratory technologists trained on Local Production of ABHR, and within Eleven days they were able to produce 2300ltrs.

Conclusion

The initiative to produce WHO-recommended hand rub locally during an outbreak is feasible, especially in a resource-limited country like Uganda. There is a need to rapidly scale-up the production capacity of ABHR and to ensure and maintain quality assurance at each production unit.

Introduction

A novel coronavirus (COVID-19) was first detected in Wuhan City, Hubei Province in China on the 17th of November 2019, has now spread globally. On the 30th January 2020, the WHO declared COVID-19 a Public Health Emergency of International Concern and later declared it a global epidemic on the 11th of March 2020 (1).

Globally, there are currently over 2.4 million confirmed cases and 150,000 people have so far died. Uganda confirmed her first case on 21st March 2020, a 36-year-old Ugandan male who arrived from Dubai presenting with symptoms of high fever and poor appetite. Uganda currently has 56 confirmed cases, 22 recoveries, and no deaths have were registered at the time of this study (2).

Various public health measures have been put in place to prevent the spread of COVID-19 including; handwashing with soap and water, a recommendation that has been adopted in most countries. However, in the absence of soap and water, the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) recommend using an alcohol-based hand sanitizer (ABHS) that contains at least 60% alcohol (also referred to as ethanol or ethyl alcohol) to combat the spread of COVID-19 (3).

The World Health Organization (WHO) published 2 alcohol-based formulations to be used in healthcare settings. For outbreak-associated infections, inactivation efficacies of these products have been determined against (re-)emerging viruses(4)

Various studies have been done to demonstrate the efficacy of WHO-formulations and their roles in reducing hospital-acquired infections (5), (6). Another study demonstrated that SARS-CoV-2 was highly susceptible to WHO-formulations with reduction factors greater than 5.9 (7).

Thinking globally and acting locally is a means of adopting solutions that have been proven effective in other comparable settings. It may greatly increase the efficiency to solve many global health issues if we approach these issues with a globally focused perspective. (8)

This study, therefore, establishes the impacts and lessons learned from local production of WHO-recommended alcohol-based hand rub during the Covid-19 Pandemic.

Method

A district multi-modal design was established in 2019 in Kabarole, a district in Western Uganda that was threatened by several outbreaks, including Ebola. Part of the strategy was to set up an ABHS production unit. Production, distribution, and consumption of ABHS were monitored throughout 2019 to date.

Another production unit was set up in neighbouring Kasese district in the same year 2019 during the Ebola outbreak, in which 4 cases were imported in that district. Monitoring majorly involved ABHS consumption monitoring that was carried out by the Health Centre IPC focal person and production quantities monitored by ABHR production personnel. The prevailing COVID-19 outbreak has instigated set up at centrally located Kasangati HCIV. We analyzed the demand and production of ABHR, produced before and during the COVID-19 outbreak. This study assessed the feasibility of scaling up local production of ABHR during outbreaks in Uganda. The factor was to look at variations if any in quantities of production during COVID-19 pandemic and before; and feasibility of scaling up production.

Implementation Of ABHR Production Units

A multidisciplinary team from the Infectious Diseases Institute visited the suggested production sites by district officials. The rooms were well ventilated away from any kind of fire source with the possibility of Lock and Key.

Facilities that had no pharmacists, laboratory technologists/technicians were considered to be trained for ABHR production.

A cost evaluation analysis was made and found 45% savings on local production of ABHR especially at the time of the Covid-19 pandemic where costs of raw materials escalated due to demand by commercial manufacturers.

ABHR Distribution

Distribution was integrated into the district drug distribution mechanism; however, during the pandemic, consumption was higher than before and this prompted facilities to pick the ABHR from production units using facility motorcycles or vehicles.

The initial distribution was done by the Infectious Diseases Institute team that even mentored health workers on how to use the ABHR where the WHO's "5 Moments of Hand Hygiene" and "How to Hand Rub Technique" job aids were distributed and used as the training materials for hand hygiene (9).

Results

2060 litres were produced in Fort Portal in March 2020 around the time Uganda registered her first case of COVID-19 compared to the monthly average production of 141 litres before the outbreak. In Kasese, approximately 3020 litres were produced compared to the average 1500 litres, while 2000 litres were produced in Kasangati HCIV, a newly set production unit and a total of 8 people trained on local production of ABHR.

Discussion: Impact And Lessons Learnt

This study demonstrated a component in the WHO multi-modal hand hygiene strategy in a resource-limited setting, especially in low middle-income countries of local production of ABHR (9).

The WHO Formulation-1 was mainly considered in this project due to the availability of ethanol, unlike isopropyl alcohol which is not readily available on the market nevertheless ethanol being cheaper than isopropyl alcohol.

There was a high demand for locally produced alcohol hand sanitizers from the districts being supported by the Infectious Diseases Institute. However, the high demand may not serve as a marker of hand hygiene compliance using ABHR. Various studies have demonstrated high HHC using ABHR compared to soap and water when hands are not feasibly soiled (10).

Another study demonstrated poor tolerability of the WHO-recommended formulation of hand sanitizer and identified it as a barrier of hand hygiene (11). However, in this study we demonstrated a high demand for locally produced ABHS to combat the pandemic which is a key

sign of acceptability during outbreaks.

A total of 8 staff members were trained on local production using the WHO protocol on local production during the Covid-19 pandemic. The ABHS was quality controlled using an alcoholmeter, $75 \pm 85\%$ ethanol.

Even when the prices of raw materials escalated, the costs of locally produced ABHR were lower than the commercial sanitizers. This made savings of 45% compared to savings of 60% before the pandemic. Costs of dispenser bottles escalated by 100% price compared to before the pandemic, in local production bottles were recycled after being cleaned with chlorinated water and this increased savings.

Conclusion

With a high demand for ABHR during this pandemic, prices for commercial hand sanitizers have escalated; therefore, there is a need to roll out local production of ABHS in other parts of the country since it saves more than 45% of the costs compared to commercial hand sanitizers. The production units should be embedded in regional referral hospitals or IPC guidelines to major health facilities for the benefit of healthcare workers and patients who are at risk of emerging and re-emerging infectious diseases.

Article Summary: Strengths And Limitations Of The Study

The study was able to capture data about ABHR production and prices even before COVID- 19 pandemic.

In the study, more ABHR producers were trained.

The study did not involve human subjects to observe hand hygiene compliance with ABHR.

Abbreviations

ABHS; alcohol-based hand sanitizer, WHO; World Health Organization, IPC; infection prevention and control, HHC, hand hygiene compliance.

Declarations

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