Liberia´s experience using home-based care kit for COVID-19, 2021

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KEYWORDS: COVID-19, Public Health, Health Services, Prevention Strategies

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RECEIVED
07/03/2022

ACCEPTED
10/10/2024

PUBLISHED
14/10/2024

LINK

https://www.afenet-journal.net/content/article/7/48/full/

CITATION
Faith Kamara Whesseh et al. Liberia's experience using home-based care kit for COVID-19, 2021. Journal of Interventional Epidemiology and Public Health. 2024 Oct 14;7(4):3.
DOI:
https://www.doi.org/10.37432/jieph.2024.7.4.139

ABSTRACT

As Liberia experienced an upsurge in the number of COVID-19 cases, it became less tenable to isolate all patients in hospital-based treatment facilities. Home-based care (HBC) was introduced for asymptomatic and mildly symptomatic confirmed cases to reduce the burden on health facilities. During the third wave of the COVID-19 outbreak in Liberia, the HBC kit was introduced to help improve the quality of HBC which was compromised due to large number of admissions overwhelming the relatively few case managers. We aimed to describe the purpose, process, and outcome of the HBC kit intervention. We brainstormed with stakeholders in Montserrado County on how to support HBC. Advocacy meetings for HBC kit were held with Montserrado County Health Team, partners and line ministries. We adapted US Center for Disease Control HBC guidelines and Ugandan HBC materials into the Liberian context. Of the 235 persons admitted into HBC, 77 received the HBC kits. Majority 88%, (68/77) said the kit was easy to use and self-reported. Each of the 77 patients who received HBC kit were monitored remotely and visited five times between the day after admittance to before they were discharged by their case managers. Three persons (4%, 3/77) developed severe signs and symptoms (fever > 38°C or difficulty in breathing with SpO_2 of 90% and below) and were transferred to the treatment unit promptly with good clinical outcome. The kits distributed in home-based care were timely and led to early detection of symptomatic cases and subsequent prompt referral to the treatment unit, reducing health worker and family exposure to confirmed cases in HBC.

Perspective

Months after the novel coronavirus (COVID-19) infection first spread across the world, the management of asymptomatic COVID-19 patients still poses a challenge. In cities that were severely affected by COVID-19, local medical capacities were quickly depleted by large influx of patients who rushed to hospitals for treatment. To prevent breakdown of the global health care system, many countries advocated for home-based care (HBC) for infected patients with mild or no symptoms [1] .

As Liberia experienced an upsurge in the number of COVID-19 cases, it became less tenable to isolate all patients in hospital-based treatment facilities. Home-based isolation and care were introduced for asymptomatic and mildly symptomatic confirmed cases to free up the limited bed space in health facilities for severe cases.

However, during the third wave of COVID-19 which started in mid-May 2021, it became clear that the quality of HBC was compromised due to the large numbers admitted to home-based care and very few numbers of case managers. Case managers were deployed to monitor these cases but the ratio of a case manager to patients was an average of 15 patients to a case manager, which was not effective for patient care. There were instances where patients in HBC suddenly deteriorated during the long stretches between visits by the case managers. Also, many patients in HBC were never seen by case managers before discharge. We aimed to describe the process of initiating HBC kit intervention.

The proposed solution

In 2021, during a brainstorming session on supporting home base care, which was held at the Liberia office among African Field Epidemiology Network (AFENET) Liberia team emergency Response Coordinator, field epidemiologists, and the resident advisor, the idea of the HBC kit was conceived [2]. The AFENET team proposed the introduction of HBC kit which could help with patient self-monitoring to support case managers to care for them. The kit would be a package of guidelines, tools and equipment to guide the COVID-19 patient to practice isolation and look out for signs and symptoms suggestive of a worsening disease. This was expected to make the patient responsible for collaborating with his/her case manager during the period of the COVID-19 illness.

Advocacy

The AFENET team initiated an advocacy meeting with the Montserrado County Health team (MCHT) on the HBC kit. The meeting was held with the County Health Officer (CHO) and her officials presenting the purpose and expected outcome of the kit. The call for this intervention was elevated to the MCHT daily coordination Incident Management System (IMS) meeting with all partners and stakeholders in attendance. The idea was again shared with broader government officials from different line ministries involved in COVID-19 response, and other non- government organizations and partners. With consensus achieved, the Montserrado County Health Officer embraced the intervention and welcomed the AFENET team to lead its implementation in the county.

The Intervention Tool Kit Adaptation

An online search was conducted to review the experience of other countries with the home-based care intervention using the words 'COVID-19 home-based care kits' and 'COVID-19 self-monitoring'. For the composition of the kit, eight items were identified for consideration out of which seven were selected. Among the seven items were generic informational flyer for patients and their care givers; which was adapted from the Ugandan tool available online into the Liberian context [3]. Two rounds of reviews were made by Montserrado County Health Team, US Center for Disease Control and Prevention, World Health Organization and National Public Health Institute and the flyer was finalized after approval by the County Health Officer of Montserrado County.

Composition of the Home-Based Care kit

The home-based care kit comprised seven items packaged in a plastic folder (**Figure 1**). The items were one pulse oximeter, one clinical thermometer, 5 pieces of surgical nose mask, education flyer, one bottle of hand sanitizer, one note book and one pen [4] (**Figure 1**).

The pulse oximeter was for the patient to self-monitor his/her oxygen saturation level twice daily, while the clinical thermometer was used to monitor their external body temperature twice daily. Infection prevention materials (nose mask and hand sanitizer) were provided for use to reduce exposure among families, and an educational flyer provided information to guide patient and home caregiver on what to do during the HBC period. The notebook and pen were for recording oxygen saturation and temperature readings (**Figure 2**).

Intervention Area and Site

The intervention was conducted in Montserrado County, within six of the seven health districts. Todee district was excluded because it did not report any case of COVID-19. Montserrado is the smallest county by land size but the most populated in Liberia, comprising approximately 33% of total national population. It hosts the capital city of Liberia and has approximately 1,646,421 inhabitants, with about 70% of the people living in Monrovia City alone. The capital city of Montserrado is Bensonville. The

Montserrado health system has four levels: county, district, zones and community; with 351 health facilities most of which are private. Montserrado County was the epi center of COVID-19 outbreak in Liberia (Figure 3).

Beneficiaries

The intervention began in July, 2021 and ended September 2021 during the third wave of the COVID-19 outbreak in Liberia. The HBC kits were distributed to confirmed COVID-19 cases prospectively enrolled into HBC in Montserrado County. Only patients with mild or no symptoms of COVID-19 and whose homes had been assessed were eligible for home-based care[5]. At the onset of the kit distribution, over 500 persons had been previously enrolled into HBC. These were not eligible to receive the kits.

Training

Patients were trained on the use of the home-based care kit by nurses and physician assistants who were also referred to as case managers. The training took place at every home of the patient and the training was done on the first day for 2 hours upon admittance of patients into home-based care.

The training content entailed:

- The usage of the pulse oximeter and the thermometer
- How to record vitals
- Procedure for reporting
- Importance of home-based care
- Importance of using IPC materials

After the training, each patient was assigned a case manager (Health care Worker) to whom they routinely reported (morning and evening) readings taken using the HBC kit. These case managers lived within five kilometers of the communities where the patients resided. The case managers underwent training by AFENET Liberia team before training the patients.

Data collection and reporting

Patients checked their oxygen saturation using the pulse oximeter, their temperature using the thermometer in the morning and evening and recorded this information on the HBC monitoring form twice a day. Each case manager was assigned a number of patients depending on proximity. Patients and their case managers exchanged phone numbers to facilitate remote patient monitoring [6]. Patients were required to send a report twice a day of their recorded vitals through WhatsApp or regular short message services to their case managers [7]. The monitoring form was a standard requirement for reporting all of the patient´s information (socio-demographics, clinical information and status of the patient) for the entire duration of their stay in home based care. The note book was used to record each reading taken and confirmed as correct before transferring on the monitoring form. During in-person monitoring visits, case managers observed the patients, reviewed their monitoring forms and notebooks, and measured their vitals using the patients´ tools and recorded them in the patient´s notebook. The case managers were required to visit each patient home five times before discharge from homebased care.

The outcomes were measured by identifying the indicators below:

- The number of persons enrolled in the home-based care
- The number of patients who received the home-based care kit
- The number of patients trained to use the home-based care kit
- The number of persons who used and reported the information correctly
- The number of times patients were visited during their stay in home-based care
- Number of patients who were monitored remotely
- Medium through which reports were sent
- Number of persons who developed signs and symptoms
- Outcome

Of the 235 persons admitted into HBC from June -July, 2021, only 77 (33%) received the HBC kit and were trained on how to use it upon admission. 88% (68/77) of the patients said that the kit was easy to use and reported their information correctly. All, 100% (77/77) of the patients who received HBC kits were monitored remotely and visited five times by their case managers during the course of their admission. Sixty-eight percent of the patients (52/77) with HBC kit reported their recorded vitals by WhatsApp only while 32% (25/77) reported using both WhatsApp and regular short message services (SMS).

Awareness on the usage of HBC kit was conducted among patients in HBC within the six districts of Montserrado County where the intervention took place. Two weeks into using the home-based care kit, three persons (3.9%) developed signs and symptoms of severe COVID-19 (fever> 38°C and difficulty in breathing with SpO_2 of 90% and below) out of 77 and were transferred to the treatment unit. This was discovered remotely from information reported by the patients and verified through in-person monitoring. The MCHT reported to AFENET weekly on the HBC intervention, weekly meetings were held which

brought together all the case managers and updates were provided.

The home-based care kit was designed by AFENET Liberia through a brainstorming session with staff to support home-based care. This intervention considered the thermometer and pulse oximeter which were used by patients to self-monitor their external body temperature and oxygen saturation respectively. This intervention also included infection prevention and control materials such as nose mask and sanitizers to minimize exposure among families, case managers and friends while educational material such as a flyer was provided to enhance knowledge from training to support the patient and home care giver if available.

These materials were packaged into a transparent folder and given to all to patients upon admission to home-based care. Patients were trained upon admission and visitations were made before discharge by their case managers. Majority of these patients in HBC were excited upon receiving the kits and responded that the tools were easy to use and reported their information correctly. This is similar to a pilot study conducted on caregivers and their patients receiving tool kits [8,9].

Introducing the kit into home-based care led to early detection of symptomatic cases and prompt referral to the treatment unit. During the first and second waves, these kits were not available for self-monitoring of patients and case managers were required to visit but did not have any equipment for monitoring. Moreover, more patients visited the facilities where focus was placed more than at home-based care due to limited equipment for monitoring at home and fear. Hence, introduction of the home-based care kit in Montserrado County helped patients in HBC to conduct self-monitoring and improved overall monitoring of patients in HBC during the third wave compared to the last two waves. This study is similar to a study conducted in China 2022, which highlighted self-monitoring and reporting as being more feasible and efficient, particularly during the exponential phase of a pandemic [10]. This intervention reduced health care worker exposure to confirmed cases in HBC and also reduced exposure among family members.

There was high acceptance rate of the idea of introducing the kit into HBC. This was due to initiating early advocacy with MCHT, Line ministries and partners. Moreover, this early advocacy triggered the enthusiasm at MCHT and among stakeholders because they understood that the kit reduces the burden of physical contact with the patients and facilitates remote monitoring. All the patients who received HBC kits were visited five or more times and remotely monitored daily by their case managers while in HBC. However, those patients who did not receive HBC kits before the intervention were monitored remotely at the convenience of their case managers though a monitoring schedule was provided. The inconsistency of monitoring was due to lack of communication cards and monitoring tools.

The coordination between AFENET Liberia and the MCHT was good because the MCHT reported to AFENET weekly on the HBC intervention, weekly meetings were held which brought together all the case managers and updates were provided. This led to the successful implementation of the intervention which enhanced patients´ ability to report correctly and on time. However, case managers did not have tools of their own. Upon visiting the patients, they used the patients´ tools for monitoring their vitals and this may have exposed the case managers to Covid-19 since they were working with confirmed cases.

The kit distributed in home-based care was timely and the need cannot be over emphasized, simple to use and self-explanatory materials and tools packaged for patients helped them understand the importance of self-monitoring. This study had some limitations. The number of patients who received the HBC kits was relatively small (77 out of 235 admitted into HBC), which may affect the generalizability of the findings. Also, the intervention was conducted over a limited period (July to September 2021), which may not capture long-term outcomes or sustainability of the HBC kit intervention. More items within the kit were procured to continue the intervention which eventually was going to increase the sample size or number of patients who received the kits. However, the third wave elapsed within a month.

Conclusion

We recommended to the Montserrado County Health team and other county health teams that HBC tool kits be provided for all case managers during future outbreaks or epidemics to prevent exposure to confirmed cases. Also, HBC kit be given to cases who have been confirmed within two or three days before admittance to HBC, this may help in early detection of symptomatic cases and monitoring patients over a period before discharge.

Competing interests

The authors declare no competing interests.

Authors' contributions

FW, MA, conceived this manuscript. FW and MA and LB wrote the first draft. FW, MA, LB, OB, PA, HS, GA, YW and CU reviewed and edited the manuscript. All authors analyzed the work critically and approved the final version.

Acknowledgments

The authors would like to thank the U.S. Centers for Disease Prevention and Control for the financial support and Montserrado County Health Team for the smooth coordination and technical support. They also acknowledge Dr Chukwuma David Umeokonkwo for his technical support especially during the drafting of this manuscript.

Figures

Figure 1: HBC kit packed in a plastic folder, Montserrado County, July 2021

Figure 2: Items in HBC kit, Montserrado County, July 2021

Figure 3: Map showing Intervention Districts, Montserrado County, July 2021

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Figure 1: HBC kit packed in a plastic folder, Montserrado County, July 2021

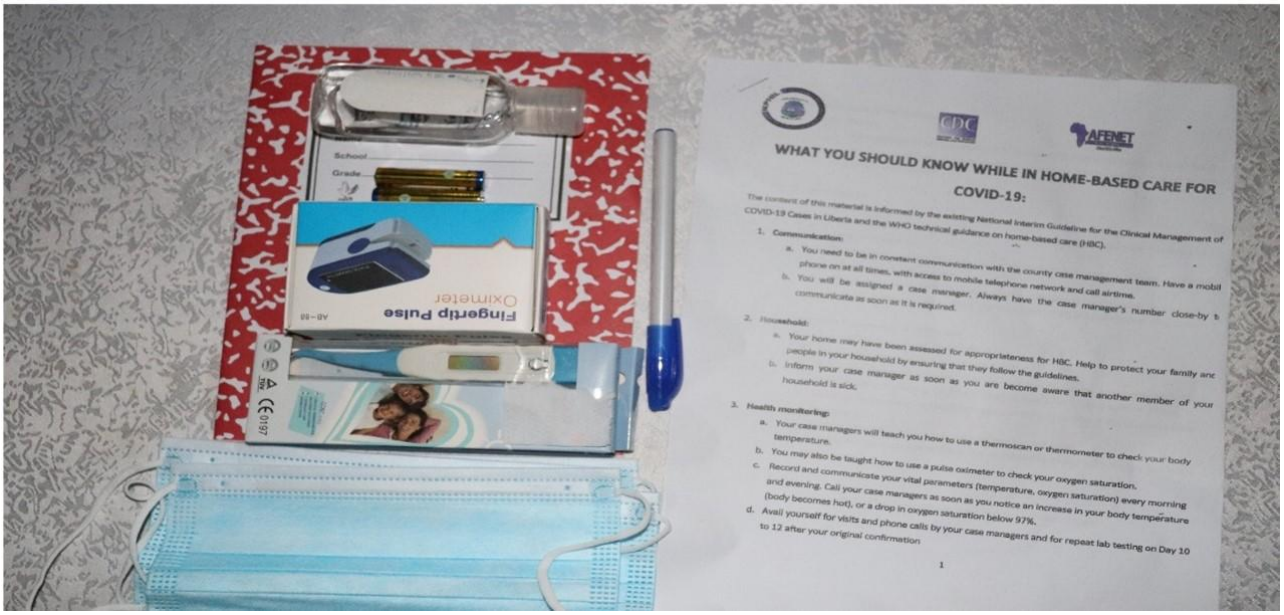
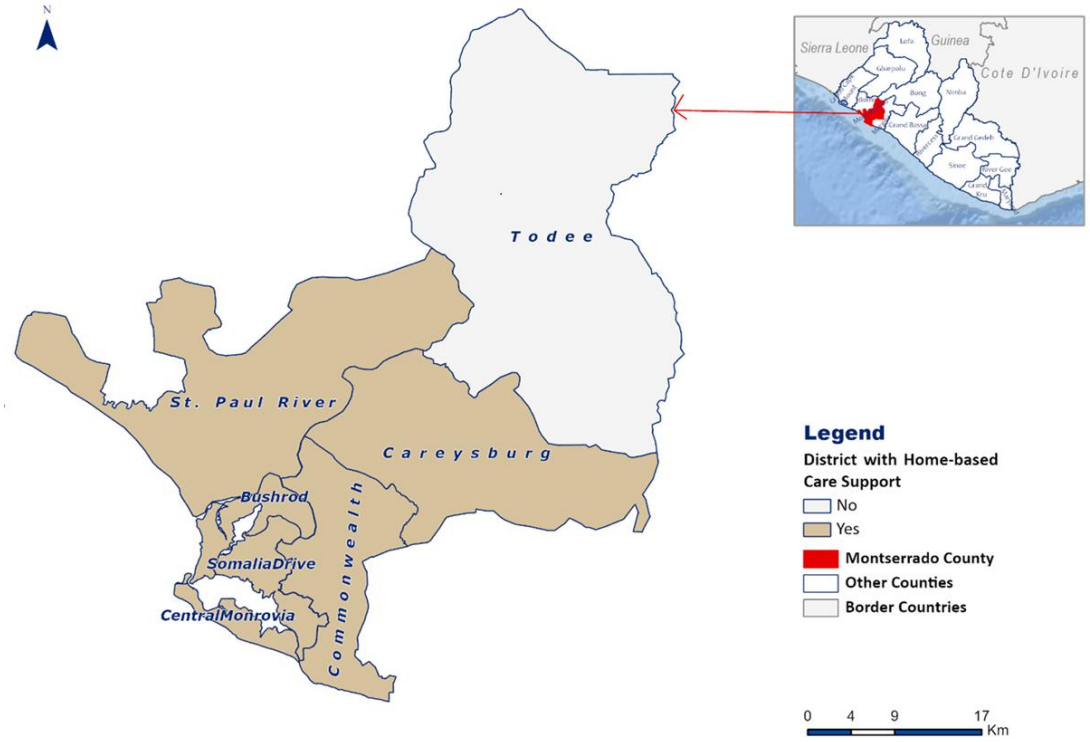


Figure 2: Items in HBC kit, Montserrado County, July 2021



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