SUPPLEMENT ARTICLE

The Médecins Sans Frontières Intervention in the Marburg Hemorrhagic Fever Epidemic, Uige, Angola, 2005. II. Lessons Learned in the Community

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From 27 March 2005 onwards, the independent humanitarian medical aid agency Médecins Sans Frontières, together with the World Health Organization, the Angolan Ministry of Health, and others, responded to the Marburg hemorrhagic fever (MHF) outbreak in Uige, Angola, to contain the epidemic and care for those infected. This response included community epidemiological surveillance, clinical assessment and isolation of patients with MHF, safe burials and disinfection, home-based risk reduction, peripheral health facility support, psychosocial support, and information and education campaigns. Lessons were learned during the implementation of each outbreak control component, and the subsequent modifications of protocols and strategies are discussed. Similar to what was seen in previous filovirus hemorrhagic fever outbreaks, the containment of the MHF epidemic depended on the collaboration of the affected community. Actively involving all stakeholders from the start of the outbreak response is crucial.

Outbreak control in the community plays a crucial role in filovirus hemorrhagic fever (FHF) containment. This includes epidemiological surveillance (investigation of alerts, contact tracing, and follow-up), clinical assessment and isolation of patients with FHF (including barrier nursing), safe burials and disinfection, and information and education campaigns (IECs), plus peripheral health facility support, psychosocial support, and home-based risk reduction, where appropriate.

FHF outbreak control is rooted in a biomedical paradigm that applies principles of biological and other natural sciences to the practice of clinical medicine. The conventional approach to controlling FHF transmission focuses on biosafety, which uses biological knowledge, safety procedures, and specialized equipment to reduce human exposure to the filovirus. Although this focus is epidemiologically efficacious, the outbreak control procedures and paraphernalia terrify and alienate patients, families, and the community at large. Outbreak control, however, depends on the collaboration of the community. Because the treatment of FHF has limited effectiveness, interrupting human-to-human transmission of the disease in the community is essential to outbreak control. Principal routes of secondary transmission include the care of patients with FHF by family members and unsafe burial practices. In the absence of community vigilance, the identification of individuals suspected to have FHF is a mission impossible for an outbreak response team. When fear and anger lead a community to refuse to collaborate, patients do not present to an FHF ward for medical care and isolation, which defeats a crucial component of outbreak control. As events in Gabon and the Republic of the Congo have demonstrated, community resistance can become so severe and violent that international teams may be prevented from completing their mission [1, 2]. Potentially counterproductive effects of the conventional

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approach were recognized, and strategies to avoid alienation of communities and to promote their involvement were developed. Since then, anthropologists have participated in FHF outbreak responses and have formulated recommendations regarding how to make them more acceptable and effective without compromising biosafety [2–5].

In this article, we highlight the learning process of the Spanish section of Médecins Sans Frontières (MSF) during the Marburg hemorrhagic fever (MHF) outbreak in Uige, Angola, in 2005, as far as activities in the community are concerned; lessons learned in the hospital are reported elsewhere in this supplement [6]. Initially, the intervention, focusing on biosafety measures and epidemiological efficacy, caused community resistance; subsequently, the MSF team reevaluated its approach and made substantial changes to its intervention.

BACKGROUND

In February 2005, Uige Provincial Hospital physicians perceived an increase in the number of children presenting with fever and bloody diarrhea. During the same period, several hospital workers reported illness with hemorrhagic fever–like symptoms. On 9 March 2005, the Angolan Ministry of Health (MINSA) and the World Health Organization (WHO) sent 4 patient blood samples to the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, and to the Pasteur Institute in Dakar, Senegal. Five days later, 8 more samples were sent to the CDC, which, on 23 March, confirmed by polymerase chain reaction analysis that 9 of the 12 clinical specimens were positive for MHF [7].

On 27 March, MSF, together with MINSA, the WHO, and others, started prevention, control, and treatment procedures in accordance with established protocols in response to the outbreak in Uige, the largest recorded MHF outbreak to date, with 374 putative cases (158 laboratory confirmed) and 329 deaths (case fatality rate, 88%) [8]. The last patient with laboratory-confirmed MHF died on 21 July. The WHO and MINSA declared the outbreak to be officially over on 7 November 2005 [9]. The majority of the 374 cases reported from the province of Uige came from the city of Uige, a municipality of ~180,000 inhabitants.

The initial outbreak response. When the initial MSF team arrived, the single-room provisional Marburg ward of Uige Provincial Hospital contained 5 patients suspected to have MHF, together with 2 corpses of patients suspected to have died of MHF. In addition, 11 decomposing corpses of patients located in the hospital mortuary were suspected by hospital personnel to have died of MHF. During this initial phase, diagnostic confirmation was obtained for patients but not for corpses, because of their decomposed state.

The first priority of the team was to set up a Marburg ward within the hospital that followed safety precautions to prevent exposure of hospital workers and others to the filovirus. After FHF outbreak control procedures, the provisional ward and 3 adjacent buildings were encircled with 2-m-high opaque plastic fencing and, together with the mortuary at the back of the hospital compound, were thoroughly decontaminated by washing down floors, walls, doors, and interior furnishings with a 0.5% chlorine solution [6].

At a cemetery, the team proceeded to inter corpses, following an MSF protocol [10]. These burials at the start of the intervention upset the community considerably. MSF attempted to contact the relatives of the deceased through hospital authorities and community health workers before starting safe burial procedures. Possibly because of fear, the relatives of some of the deceased declined to accept MSF's invitation to identify their loved ones and witness the burial. Left with a number of unidentified decomposing and possibly highly infectious corpses, MSF decided to proceed with the burials. The team marked the graves to help locate them and to facilitate the relatives' mourning process. Nevertheless, even when fear and anger in the community at large had subsided months later, some relatives were still distressed, not knowing where their loved ones had been buried.

Concurrently, the team received reports from the community about deaths and patients suspected to have MHF. Wearing personal protective equipment (PPE; figure 1), MSF team members expanded the outbreak response from the hospital to the community. Already frightened by the outbreak, the community was alarmed by the team's appearance, particularly because the hood and goggles made it difficult to see the faces of team members. The spraying of households with disinfectant also disquieted the community. In Uige, as in many communities in sub-Saharan Africa, there is a ubiquitous suspicion of deliberate poisoning. It is understandable that the spraying of a milky, poisonous-smelling liquid in one's household by individuals whose features could not be discerned caused indignation—particularly when, a few days later, inhabitants of this household became ill with MHF. Although many requested to have their household sprayed, some found these activities dubious and were suspicious of MSF. As the outbreak progressed, fear and anger intensified, culminating in verbal aggression toward the team and stones being thrown at MSF vehicles. Individuals suspected to have MHF no longer presented themselves for assessment and possible isolation. This resistance led to a temporary suspension of community-based activities while MSF reviewed its strategy. (See figure 2 for a time line of selected events during the MHF epidemic.)

LESSONS LEARNED

Burial and disinfection. Initially, burials and disinfection were conducted in accordance with an MSF protocol used in previous FHF outbreaks [10]. In parallel, the WHO used a

Figure 1. To be avoided: burial team driving to a household already fully dressed in personal protective equipment. The better practice is to dress in front of household members.

somewhat different protocol for the same activities [11]. Although the MSF protocol was technically sound, it failed to emphasize the importance of incorporating local traditions and addressing the psychological and spiritual needs of families in the burial and disinfection process. Furthermore, MSF did not always explain activities to bystanders and the community at large before performing procedures. The protocol employed by the WHO, although more time consuming in its execution, contained the culturally sensitive aspects missing from the MSF protocol.

During the review of its activities, MSF adopted a modified version of the WHO protocol. The burial and disinfection team would now dress in PPE and undress in the presence of household members. This allowed the family to realize that human beings like themselves were performing burial and disinfection procedures. The team entered the house, accompanied by a single family member dressed in PPE who was allowed to witness the procedures. One member of the MSF team, preferably a psychosocial worker, remained outside of the house in civilian clothing and assumed the role of a "cultural interpreter," providing a full and detailed explanation of the procedures to the family and bystanders.

Burial practices were modified, incorporating adapted and safe traditional burial rites and the use of coffins. The modifications involved 3 key elements. The first allowed the family to identify the corpse before burial. Beyond confirming death, this allayed fears and rumors of grotesque incidents happening to their loved ones. Previously, the relatives were not able to observe the placement of the corpse into a body bag and/or coffin because the procedure took place inside the Marburg ward or the household without a witnessing family member. The second element ensured that family members knew the location of the grave so that they would have a place to mourn their dead. In Uige, Christianity is the predominant religion, which places importance on visiting the resting place of the deceased. The third element allowed burial rites during the outbreak to reflect, as much as possible, the traditional rites. This included innocuous practices such as song and dance, carrying and lowering the coffin into the grave while using gloves, and filling the grave with earth. In some families, bodies are traditionally washed and hugged before interment. The modified practice, performed only on request, involved the burial team washing the corpse and placing personal belongings inside the coffin in the presence of a family member. Burial rites were conducted at the cemetery or household, depending on the preference of the family. No family members were allowed to touch the corpse.

Disinfection through spraying with chlorine solution sometimes damaged household items such as mattresses and clothing. Items that possibly were highly contaminated—for example, the soiled mattress and clothing of the deceased—were destroyed by burning. MSF learned that replacing damaged and

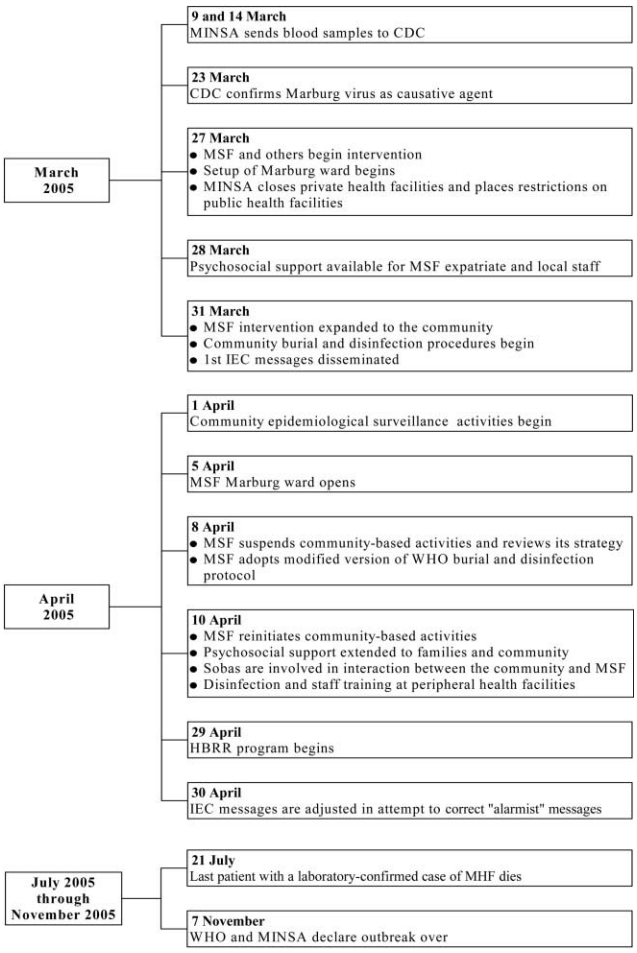

Figure 2. Time line of selected events during the Marburg hemorrhagic fever epidemic, Uige, Angola, 2005. CDC, Centers for Disease Control and Prevention; HBRR, home-based risk reduction; IEC, information, education, and communication; MINSA, Angolan Ministry of Health; MSF, Médecins Sans Frontières; WHO, World Health Organization.

destroyed items mitigated the family's loss and facilitated acceptance of the procedure.

Home-based risk reduction. The concept of home-based risk reduction (HBRR) was implemented in response to community resistance to care and isolation in the hospital and MSF's concern to overcome a deadlock in community relations in this respect. When a patient adamantly refused hospitalization, the patient was advised to stay in 1 room of his household not shared with anybody else. With the exception of 1 designated caregiver, no other individual was allowed into the room. This caregiver was equipped with PPE, including gown, apron, mask, gloves, and goggles, and received instructions regarding how to dress, undress, and maintain the equipment. MSF, represented by a doctor and/or nurse, a water sanitation specialist, and a psychologist, conducted daily visits to the HBRR patients to monitor the health of the patient, encourage adherence to the HBRR protocol, and replenish medical stocks. During home visits, MSF staff engaged the family members in discussion about the progress of the patient, the causes and modes of transmission of the disease, the MSF intervention at large, and advantages of care in the Marburg ward; thus, the patient and family were continuously encouraged to accept hospitalization.

The HBRR program was implemented near the end of the outbreak, and only 4 patients were enrolled, 3 of them with confirmed MHF, 1 with suspected MHF (test result not available). Three patients eventually accepted care in the Marburg ward, and, remarkably, all 4 survived.

As in earlier outbreaks [4, 5, 12], HBRR was meant to be a provisional solution when isolation and care in the Marburg ward could not be implemented, and it became an emergent component of FHF outbreak control. HBRR programs cannot replace health-structure–based patient management in terms of quality medical care or biosafety. Instead, it reduces the risk of disease transmission when care and isolation in an FHF ward is refuted while the patient and family continue to be encouraged to accept hospitalization. Should HBRR be part of outbreak control in the future, provision of sufficient training, supervision, and resources is crucial. If circumstances allow, the safety and effectiveness of HBBR should be evaluated.

Epidemiological surveillance. Epidemiological surveillance in the community was organized by MINSA and WHO. Under their guidance, MSF contributed to the investigation of alerts and contact tracing. These activities aimed at identifying incident cases of MHF and allowed for prompt isolation to stop secondary transmission. Contacts of patients with MHF were followed up for 21 days, which is generally considered to be the maximum incubation period.

Investigation of alerts and contact tracing are labor-intensive activities. At times, insufficient supervision resulted in individuals suspected to have MHF not being properly investigated or referred when appropriate. Also, early in the outbreak, those who were sick were reluctant to accept hospitalization in the Marburg ward because there was a perceived lack of treatment efforts and no clear survival advantage, as demonstrated by the high case fatality rate in the facility [6]. In part, these challenges were overcome by involving the Sobas, traditional and official community leaders trusted by the people, in the interaction with families. A more proactive treatment approach also contributed to improving acceptability of hospitalization [6].

The monitoring of cemeteries was another component of MSF's epidemiological surveillance, producing daily counts of fresh graves at all official burial sites. Attempts to clarify cause of death were often in vain. Such all-cause mortality surveillance aims at early detection of excess mortality due to either MHF itself or other causes of death as a consequence of reduced health service utilization. MSF did not detect an apparent increase in global mortality rates in the community during the MHF epidemic. The usefulness of monitoring burial sites re-

mains unclear, particularly in the absence of reliable pre-epidemic mortality figures. In Uige, it did not lead to any modifications of the outbreak response.

Peripheral health facilities. To facilitate controlling the epidemic, MINSA, under government authority, closed private health facilities and prohibited the use of injections, vaccinations, and blood sampling in public health facilities. MINSA and MSF provided the latter with PPE material, including hoods, masks, and gloves. In the urban sectors most affected by the epidemic, MSF disinfected public health facilities using a 0.5% chlorine solution and trained staff to identify suspected MHF cases, to use protective barriers when providing nursing care, and to report potential cases to the authorities.

Although the support of peripheral facilities did not lead to the identification of new MHF cases, it may have protected staff and patients from nosocomial transmission. The Uige experience suggests that the continuation of properly supported health care services during an FHF outbreak is possible.

Psychosocial support. Psychosocial support started as an activity for stress and fear management for MSF expatriate and local staff. When it became clear that, devoid of psychosocial support, patients and their relatives had acute unmet needs, support was quickly extended to them. MSF psychologists and local staff worked together in teams to provide support during key interchanges with patients, families, and the community. Psychosocial support provided to hospitalized patients and their relatives is described elsewhere in this supplement [6].

The psychosocial teams served as mediators between the patients, families, and community and the burial and disinfection and HBRR teams. Through discussions, they ensured that relatives of deceased individuals participated in burial and disinfection activities while adhering to biosafety norms. In support of the HBRR program, they spoke directly with patients and caregivers to explain procedures, discuss concerns, and ensure agreement to program participation. Concurrent with burial and disinfection and HBRR activities, the psychosocial teams sensitized other family members, neighbors, and bystanders about the causes and modes of transmission of the disease and the MSF intervention.

Given their adverse relationship with an, at times, hostile community and their proximity to the virus, expatriate and local members of burial and disinfection teams and the medical and cleaning teams of the Marburg ward were targeted with stress and fear management sessions. Psychosocial support included training workshops and group and individual sessions on stress and fear management. Participants were encouraged to share thoughts, feelings, and experiences through painting, writing, role playing, and dialogue. Each participant's reported coping mechanisms were analyzed, and suggestions for improvement were made. The causes and modes of transmission of the disease and the intervention strategy were discussed. When appropriate, the psychosocial team also held separate sessions for family members of local staff to address their fears and anxieties. During the outbreak intervention, no expatriate or local MSF personnel were infected with the Marburg virus.

Similar to what was seen in the 2003 Ebola hemorrhagic fever outbreak in the Republic of the Congo, health personnel and the community alike reported that the psychosocial interventions provided during this MHF outbreak allayed fear and anger among family members, reduced patient stigmatization, and quelled rumors and panic in the community [12]. The use of local staff in the psychosocial support program was instrumental in facilitating the community's understanding of the disease and acceptance of the intervention. Postoutbreak surveys that evaluate the community response to psychosocial interventions would provide direction for future support programs.

Information and education campaigns. The initial message about MHF relayed to the community included the statement that "There is no cure for this disease." This was understood by community members to mean "Even if I accept hospitalization, death is certain." Acceptance of isolation, thus, had to rely on the entirely altruistic motive of protecting one's family and neighbors from infection. Not surprisingly, some indigenous community-based healers promised a cure and distracted the community from following advice from the outbreak response team. Later, in an attempt to correct this "alarmist" message, the information, education, and communication (IEC) program, through mass media messages and discussions with community groups and individual families, emphasized that infected individuals should come to the hospital and receive treatment. However, the message was somewhat overcorrected and now made the optimistic claim that "patients will survive due to hospital treatment," as opposed to "patients have a better chance of surviving if treated at the hospital," with a risk of nurturing unrealistic hopes. This illustrates that disseminating accurate and realistic message sometimes means walking a fine line. MSF did not intervene in IEC activities on a large scale but was able to deliver simple messages about MHF and the MSF intervention, although to limited audiences, during outreach activities such as burials, disinfections, and HBRR.

By reinforcing fear and despair, IEC activities at the start of the MHF intervention contributed to nonacceptance of the Marburg ward and security problems in the community. In future outbreaks, IEC should emphasize that treatment—albeit limited in its effectiveness—and care from medical professionals is available at the FHF ward. An effective IEC program is crucial to the control of the outbreak and should be implemented from the start of the intervention.

DISCUSSION

MSF has contributed to the responses to every FHF outbreak since 1995 and thereby has gained considerable outbreak response experience. Nevertheless, previous lessons learned re-

garding how to make FHF outbreak responses more acceptable to the community were not easily accessible to the initial team in Uige. In large part, this was because of a lack of consolidated documentation of these experiences. In principle, MSF updates its protocols and guidelines on a regular basis, but lessons learned have not always been critically evaluated and have usually not been published for the benefit of a larger readership. The team in Uige, similar to previous teams in FHF outbreaks, initially made errors, corrected them, and underwent an important learning process that improved the effectiveness of the intervention. Sharing these experiences with other FHF outbreak response actors will strengthen future FHF interventions.

The experience in Uige clearly demonstrates that biosafety and epidemiological efficacy alone are not sufficient to make an FHF intervention effective. MSF's initially strained relations with the community improved promptly and significantly after modifying burial and disinfection protocols; this improvement is thought to have been due to increased transparency and respect for the psychosocial needs of the family. The Uige experience confirms what had been learned during earlier outbreaks: the adaptation of safe burial practices to accommodate the need for ritual and mourning is crucially important for fostering the community's trust and willingness to cooperate with the outbreak response team [2, 4, 12].

Involving local authorities and respected influential individuals is an established principle of public health interventions in the community. However, this principle is easily forgotten in the heat of an FHF outbreak. When MSF involved such authorities, community relations improved promptly and significantly, ameliorating case finding and outbreak control.

CONCLUSION

When the international organizations in charge of outbreak control arrived in Uige, the epidemic was at its height. A large number of patients with MHF and deaths due to MHF had to be ascertained by community surveillance. Control measures and the setting up of health facilities for patients with MHF required immediate attention and pushed IEC and psychosocial programs aside. In retrospect, we understand that an intervention that neglects the timely delivery of accurate and realistic IEC messages and ignores the psychosocial needs of patients, families, and the community will intensify anxieties and provoke resistance. Because regaining lost trust is more arduous and prone to failure than establishing it in the first place, we believe that IEC and respect for psychosocial needs must be part of an FHF intervention from the beginning. Actively involving all key stakeholders from the beginning is crucial.

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