

Mobile Application for Dosing and Dilution of Magnesium Sulfate

Health need

Preeclampsia and eclampsia (PE/E) are among the leading causes of maternal death and disability worldwide. The World Health Organization (WHO) estimates that at least 16% of maternal deaths in developing countries result from hypertensive disorders in pregnancy, of which PE/E are the primary contributors. PE/E rank second only to obstetric hemorrhage as specific, direct causes of maternal death.¹ Magnesium sulfate ($MgSO_4$) is the recommended treatment, however it remains underused or unavailable due in part to difficulties with administration, a general lack of experience with the therapy, and the complexity of the regimen. $MgSO_4$ requires intravenous (IV) and intramuscular (IM) administration, different dilutions for IV and IM doses, and different doses for IV, IM, loading, and maintenance.

Technology solution

PATH, in collaboration with the University of Washington, developed a mobile application for $MgSO_4$ administration which includes a dosing calculator and detailed checklist based on the WHO protocol. This application is a job aid designed specifically to address the challenges with correctly calculating $MgSO_4$ dosage. Using a smart phone or tablet, health care providers enter the dosing stage and route (e.g., loading IV or IM maintenance) and the concentration of the $MgSO_4$ being used into the application and it calculates the amount of $MgSO_4$ that should be administered, provides the proper steps for dilution (if needed), reminds providers to check vital signs, and includes safe parameters for continued administration.

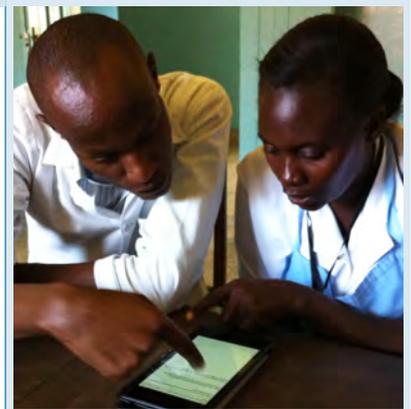
Current status and results

In December 2013, PATH conducted a small-scale, design-stage user evaluation in Kenya in collaboration with the APHIAplus Western Program. The objective was to validate the content and feasibility of the approach of the $MgSO_4$ application. The application was validated by health care providers in Kenya; 15 of 18 participants felt the content of the job aid was very accurate, and 3 of 18 felt it was somewhat accurate. Health workers felt it was an easy-to-use valuable tool, and overall were enthusiastic about the use of mobile devices. In the facilities that participated, there were both high-volume and low-volume caseloads; participants felt the job aid was appropriate in both situations.

PATH is currently updating the $MgSO_4$ application and incorporating the feedback received from users in Kenya. In 2014, we will launch the mobile application in the Google Play Store as a free, publically available download.

We are seeking funding to develop an expanded set of mobile application tools to include more job aids that address maternal and neonatal health needs in low-resource settings.

1. Khan KS, Wojdyla D, Say L, Gulmezoglu M, Van Look PFA. WHO Analysis of causes of maternal death: a systematic review. *The Lancet*. 2006;367:1066–1074.



PATH/Adriane Berman

Health workers in Kenya using the mobile application.

“Health workers felt the mobile job aid was easy to use and perceived [it] as a valuable tool for facilities.”

PATH. *Final Report: Design-stage user evaluation of a job aid for magnesium sulfate dosing and dilution (mobile application)*. January 2014. [unpublished]

Availability

For more information regarding this project, contact Adriane Berman at aberman@path.org.

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