PharmaChk: Poor quality medicines screening tool for resource-limited areas

A. Fernandes[1], D. Desai[2], M. Zaman[3]; [1]Boston University, Cambridge, MA/US, [2]Boston University, Brookline, MA/US, [3]Boston University, Boston, MA/US

Program/Project Purpose: Substandard medicines account for $75B of a $962B global pharmaceutical market and over 100K preventable deaths annually, leading to tremendous financial loss and emergence of drug resistance. Estimates indicate that 30–50% of all antimalarials are substandard. Additionally, while oxytocin has demonstrated high efficacy in saving maternal lives, it often fails quality tests in LMICs. Similar challenges are seen with many high impact pharmaceuticals. Production and sale of substandard drugs are indicators of a compromised health system that greatly undermine health programs. In absence of proper storage, drugs that initially pass quality testing often deteriorate before the point of sale. This project's primary objective is to develop a scalable platform that comprehensively screens for substandard medicines, expand implementation from central to regional testing facilities, and create demand through awareness workshops over a four year period.
Structure/Method/Design: Project goals: 1) Optimize PharmaChk platform based on pilot user feedback and testing results, 2) Scale-up testing ability to include fixed-dose combination artesunate therapies and oxytocin, 3) Scale-up PharmaChk pilot from one central location to three regional and six community health facilities in Ghana, and 4) Scale-up user demand and awareness by implementing education workshops targeting regulators, pharmacists, manufacturers, and other stakeholders. We work with local stakeholders in Ghana (Procurement and Supplies Department in Ghana's Ministry of Health and leadership at the Ghanaian FDA and Central Medical Stores) through the US Pharmacopeia's Promoting Quality of Medicines program. PQM is well-versed with challenges on the ground and provides valuable input on user and technology needs.
Outcomes & Evaluation: PharmaChk was pilot tested at the Center for Pharmaceutical Advancement and Training in Accra, Ghana in March 2014. Samples of artesunate pills and injectables were locally sourced and tested using MiniLab®, HPLC and PharmaChk. Quantification: Assay accuracy was tested and showed an average error of less than 6% compared to HPLC. Precision/Reliability: Field test revealed excellent device precision, with tests on both tablets and injectables showing < 5% variability. User-friendliness: User training and sample preparation was reduced. Throughput: Testing time was significantly decreased. MiniLab® tests took two hours while PharmaChk tests took 15 minutes.
Going Forward: Risk mitigation strategy: Inadequate chemical shelf-life might complicate commercial viability of device. User errors and fatigue - we will work closely with users to incorporate their feedback and experiences. Further reduce sample preparation and develop a testing protocol. Basic training protocols need to be designed. Lastly, strong program management, and contingency planning will ensure that we meet our milestones.
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Job satisfaction, self-efficacy, and performance of community health workers participating in a mobile health (mHealth) program to improve maternal, newborn and child health (MNCH) in Rural Tanzania

K.M. Hackett, D. Sellen; University of Toronto, Toronto, ON/CA

Background: In Tanzania, frontline CHW are uniquely positioned to offset the country's critical shortage of human resources for health. Despite this potential, CHW performance can be limited by weak delivery of appropriate training and re-training, unsupportive supervision and ineffective job aids. The emerging field of mHealth offers innovative and potentially powerful approaches to strengthen health system support for CHW and increase their effectiveness in achieving key MNCH outcomes. Few studies have evaluated the impacts of mHealth on CHW performance.
Methods: A cluster-randomized, controlled, mixed-methods trial design was used to evaluate the process and impact of an mHealth intervention in Singida, Tanzania. CHWs were recruited through a larger MNCH project, implemented by World Vision. Sixteen CHW pairs were randomly allocated to the experimental group, and 16 pairs to the control group (total N = 64); group assignment was unmasked. All CHW were trained on the Ministry of Health's national community-MNCH program. Shortly thereafter, CHW in the experimental group were trained on a smartphone application designed to improve data management, patient tracking, and delivery of key health/nutrition messages to pregnant women and mothers. Using Likert-scale questionnaires, we explored: 1) changes in CHW job satisfaction and self-efficacy over a 6 month period (N = 59); and 2) cross-sectional measures of CHW performance and quality of care as assessed by 14 CHW supervisors and a randomly selected sample of female clients (N = 572). Written informed consent was obtained from all study participants. The University of Toronto Health Sciences REB and Tanzania's National Institutes of Medical Research (NIMR) approved the study.
Findings: Data are mean ± standard deviation. Scales measuring CHW job satisfaction, self-efficacy, and performance had high levels of internal consistency (Cronbach's alphas > 0.85). Independent-samples t-tests showed that shortly after program implementation, mean job satisfaction scores were higher among experimental group CHWs (2.09 ± 0.25) versus the control group (1.89 ± 0.31), $t(59) = 2.718$, $p = 0.009$, however these scores converged over time and no significant difference was observed after 6 months ($p = 0.422$). CHW self-efficacy and assessments of CHW performance by supervisors did not differ significantly between groups. Female clients in the experimental group reported higher satisfaction with CHW performance (2.02 ± 0.34) than those in the control group (1.95 ± 0.40), a difference of 0.07 (95% CI, 0-0.13), $t(570) = 1.957$, $p = 0.051$.
Interpretation: Smartphone-based tools for CHW can improve job satisfaction in the short term, which may impact perceived quality of care among intended beneficiaries. Further investigation is required to elucidate causal links between CHW job satisfaction, performance and ultimately, MNCH outcomes.
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Using a performance improvement approach to improve quality of maternal and neonatal care in Namibia's Kavango region

M. Hamilton[1], P. McQuide[2]; [1]IntraHealth International, Chapel Hill, NC/US, [2]IntraHealth International, Windhoek, NA

Program/Project Purpose: Maternal mortality has been declining globally, but Namibia continues to experience unacceptably high maternal and neonatal mortality. Meanwhile, best practices are evolving. Health workers need updated training, follow-up, and supervision to ensure that they understand and are putting new procedures into practice. In September/October 2012, IntraHealth

International worked with Namibia's Ministry of Health and Social Services to provide comprehensive emergency obstetric and neonatal care (EmONC) and lifesaving skills (LSS) training in four district hospitals in Kavango region (Andara, Nankudu, Nyangana, Rundu). Recognizing that services improve and communities thrive when health workers perform their jobs efficiently and effectively, IntraHealth also used its performance improvement approach to correct outdated practices and enhance and monitor health worker performance.

Structure/Method/Design: Performance problems are often complex, with difficult-to-pinpoint origins. IntraHealth's approach identifies the root causes of performance problems and offers solutions. The approach includes structured interviews, observation, record reviews, and on-site mentorship. The interviews assessed how well health workers in maternity departments were preventing, identifying, and managing obstetric/newborn complications; considered facilities' provision of essential services based on EmONC signal functions (a shortlist of key lifesaving obstetric interventions); and identified resource and expertise shortages. Observations of health workers during deliveries assessed practices—especially during active management of third stage of labor and immediate newborn care. Record review examined a 20% random sample of deliveries (past two months), focusing on timely, accurate, and complete partograph use and follow-up. When these methods identified problems or gaps, mentoring and coaching led by the ministry's regional management team and IntraHealth were put into place, including hospital team meetings to identify performance improvements.

Outcomes & Evaluation: Three of the four hospitals documented improvements in the quality of maternity care provided. Providing an excellent example of management's ownership of performance improvement initiatives, one hospital implemented best practices such as regularly reviewing maternity ward records and displaying posters on maternity ward walls to make it easier for staff to find information in emergencies and provide standardized care. In other instances, nurses who attended the EmONC/LSS training identified the need for more support from hospital managers to implement improvements, which became the focus of subsequent site visits.

Going Forward: Health workers who receive training require managers' support to institute new ways of doing things. Regional management teams must provide follow-up to reinforce learning and correct misconceptions. Moreover, because only a few staff can be trained at a time, colleagues should receive in-service training to expose all maternity staff to key EmONC concepts. Obtaining buy-in from managers at the regional/facility levels includes working through contentious issues to obtain support for best practices that may represent a shift from current practices.

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Review of the impact of demand-side interventions to improve maternal and neonatal outcomes: Is quality of care a problem?

T. Hurst[1], K. Semrau[2], M. Patna[3], A. Gawande[2], L. Hirschhorn[4]; [1]Harvard School of Public Health, Cambridge, MA/US, [2]Ariadne Labs, Boston, MA/US, [3]Cambridge Health Alliance, Harvard Medical School, Cambridge, MA/US, [4]Ariadne Labs, Harvard Medical School, Boston, MA/US

Background: Reducing maternal and neonatal mortality is essential to improve population health. Demand-side interventions are designed to increase uptake of critical maternal services, but associated change in service uptake and outcomes is varied. We undertook a literature review to understand current evidence of demand-side intervention impact on improving utilization and outcomes for mothers and their newborn children.

Methods: We completed a rapid review of literature in PUBMED. Title and Abstracts of publications identified from selected search terms were reviewed to select articles meeting inclusion criteria: demand-side intervention in low or middle income countries (LMIC), published after 2004, study design described and reporting on >1 priority outcome: utilization (antenatal care visits (ANC), facility based delivery, delivery with a skilled birth attendant) or a clinical measure (maternal mortality ratio (MMR), stillbirth rate, perinatal mortality rate (PMR), neonatal mortality rate (NMR)). Bibliographies of articles were searched to identify additional relevant papers. Articles were Abstracted using a standardized data collection template with double extraction on a sample to ensure quality.

Findings: 487 articles were screened with 49 selected for full review; 15 met the extraction criteria (eight community mobilization interventions, six financial incentive interventions, and one including both). Community mobilization interventions included participatory women's groups, training of community facilitators, and community-focused health promotion. Financial incentive interventions included conditional cash transfers or voucher schemes. Interventions were implemented across a range of LMICs and in rural and urban settings. We found that demand-side interventions are effective in increasing the uptake of key services important to reducing maternal and early neonatal mortality. Five of the seven community mobilization interventions and all of the financial incentive interventions reported an increase in utilization of maternal health services. Reported associations with clinical outcomes were more varied. Two studies reported reductions in MMR and four reported reduced NMR. None of the studies found an effect on stillbirth rate. Of the ten studies that reported on both utilization and clinical measures, only four (40%) reported both increased utilization and decreased mortality.

Interpretation: Although demand side interventions improve access to more skilled childbirth care, the variable effect on outcomes indicates that measures strengthening the quality of facility-based care will remain critical to achieving the promise of these interventions. Further research is needed to identify how to combine interventions focused on increasing demand and those designed to improve quality to more effectively reduce mortality for women and their newborn children.

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Evaluating progress in data availability and timeliness: A scorecard assessment of ministry of health and national statistical office websites in low-income countries

O. Joos; Johns Hopkins Bloomberg School of Public Health, Bethesda, MD/US

Background: Demand for health information is growing beyond national policymakers as other stakeholders and decision makers are also participating in program development, implementation, and evaluation. Though research has shown that policy is often influenced by a multitude of factors, the increase in evidence-based practice, calls for data sharing, and accountability concerns are refocusing attention on the importance of accessible health information to guide decision-making. I designed a study to evaluate country progress in data availability and timeliness on the Ministry of Health (MOH) and National Statistical Office (NSO) websites of countries considered low-income (as classified by the World Bank) from January 2011 to September 2014.