The Impact of Packaging and Messaging on Adherence to Malaria Treatment in Uganda

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Sector(s): Health

Fieldwork: Innovations for Poverty Action (IPA)

Location: Eastern Uganda

Sample: 2,641 households

Target group: Children under five Mothers and pregnant women Rural population

Outcome of interest: Communicable diseases Malaria

Intervention type: Information

AEA RCT registration number: AEARCTR-0000490

Data: Download dataset (.zip)

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Partner organization(s): Clinton Health Access Initiative (CHAI), Gates Foundation, UK International Development

Despite the existence of effective medication, malaria remains a leading cause of illness and death, health system costs, and lost productivity in Africa. This is, in part, due to the fact that patients do not always complete a full course of treatment, increasing their risk of reinfection as well as the risk of the emergence and spread of a more resistant malaria parasite. Researchers evaluated the effects of different medication packaging and messaging on individuals' adherence to malaria treatment in Uganda. They found that colorful, "high quality" packaging had no effect, while adding low-cost stickers with simple informative messaging to existing packaging improved adherence.

Policy issue

Despite substantial public and private costs of non-adherence to infectious disease treatments, patients often do not finish their medication. While the existence of artemisinin-combination therapies (ACTs) to cure malaria has contributed to a 50 percent decline in malaria deaths, the disease remains a leading cause of illness, death, health system costs, and lost productivity in Africa. Poor adherence to medication is part of the problem—in some contexts, up to 60 percent of individuals do not finish the full course of drugs. Since ACTs relieve symptoms quickly, many patients feel substantially better after the first few doses, even if they are not yet cured. Not adhering to the full course of ACTs reduces the drug's effectiveness, places the individual at a higher risk of reinfection, and contributes to widespread pathogen resistance.

More than 40 percent of patients in sub-Saharan Africa obtain malaria treatment in the private healthcare sector, where many providers carry older, less effective antimalarials or counterfeit anti-malarial drugs. Additionally, few private healthcare providers offer a malaria diagnostic test. As a result, patients face substantial uncertainty about the effectiveness of different medications

and how to take them properly (or if they should take them at all). With such large consequences for both the individual and society, how can ACT drug adherence be improved?

Context of the evaluation

This evaluation took place in the Luwero district of Uganda, a low-income rural area less than 70 km from Kampala. Malaria is highly endemic in Luwero, with an average of over 100 infective bites per person per year. Though 64 percent of household members in the study slept under a mosquito net the night before they were surveyed, 75 percent of households reported one or more members contracting malaria in the past month. Among individuals who sought treatment for a previous malaria case, 43 percent first went to a private hospital or clinic and 30 percent first went to a drug shop. Sixty-six percent of female headed households surveyed knew about ACTs prior to the intervention and 53 percent of all households who had previously taken antimalarials took ACTs.

ACT treatment consists of a three-day, six-dose course. The standard packaging of ACTs sold in this region had the name, brand, and manufacturer of the medication. Inside the box was a blister pack with the pills, and a paper insert with small print about dosing, side effects, and other information. From 2007 to 2010, the Uganda Ministry of Health, Medicines for Malaria Venture, and Population Services International collaborated to offer a colorful, glossy, and informative new packaging under the Consortium for ACT Private Sector Subsidy (CAPSS) pilot program. A key objective of the glossy packaging was to convey that the ACT drugs were of high quality and effective in treating malaria. This may be particularly important for patients who are unfamiliar with ACTs or their effectiveness. This new packaging added an additional 15 to 20 cents to the cost of ACT, and could be a source of bottlenecks in the drug supply chain.



A doctor gives medicine to a patient while sitting outdoors.

Photo credit: Shutterstock.com

Details of the intervention

To test the effectiveness of CAPPS packaging and other lower-cost alternative ACT packaging and messaging on drug adherence, researchers conducted a randomized evaluation of five different ACT packages in Uganda.

Study teams identified 2,641 eligible households within 2.5 km of nine participating private drug stores. Every household was given a "Purchase ID" card that provided a 95 percent subsidy for ACT purchases at the nine stores, reducing costs to between 200 and 800 Ugandan Shillings (US$0.09 and US$0.35) per treatment. All 2,641 households included in the study were eligible to use the cards. Of the eligible households, 42 percent used the card at least once during the study period.

To evaluate the effectiveness of various packaging and messaging on treatment adherence, researchers randomly distributed five different versions of ACT packages to the nine drug stores, varying the package a given store sold on a daily basis.

1. CAPPS package: 354 households visited a store when the CAPPS packaging was sold and bought the treatment with their Purchase ID, as described above. The colorful, glossy packaging was designed to provide customers quality assurance and to ensure the correct usage of the drug and included pictorial instructions, making it accessible to illiterate parents and caretakers. The packaging also had several small messages related to adherence such as: "Complete the full course, even if the child improves. This is important for your child's full recovery" and "Do not share this drug."
2. Photocopy package: 292 households purchased the medication wrapped in a black-and-white photocopy of the CAPPS packaging. Because the colorful packaging was expensive, the photocopy package was designed to test if a cheaper, less

flashy version that conveyed the same information could increase adherence rates.

3. Nonadherence messaging sticker: 306 households purchased the medication in the standard package with a yellow sticker with the text “Malaria is NOT gone until ALL tablets are finished.” These stickers were designed to address non-adherence caused by the belief that illness was cured when symptoms had been resolved.
4. Community messaging sticker: 334 households purchased the medication in the standard package with a yellow sticker with the text “Finish ALL tablets. Saving tablets for later can be harmful for malaria control in your community.” This message aimed to discourage households from saving pills for the next malaria episode, while encouraging them to consider the impact of their nonadherence on the community.
5. Standard packaging: 499 households purchased the medication in the standard packaging, with the name, brand and manufacturer of the medication on the exterior and an interior informational insert on dosing and side effects, as described previously.

To evaluate whether patients completed the full dosage of ACT pills, study teams conducted follow-up visits with 75 percent of eligible households three days after a household member purchased an ACT—the amount of time needed to take all six ACT doses. At each three-day visit, surveyors recorded the number of pills remaining in the treatment pack and asked individuals to remember how they felt each day while taking the medication, as well as how they felt at that time.

Results and policy lessons

While the more expensive CAPPS packaging did not improve adherence to ACT treatment compared to the standard ACT packaging, the low-cost “nonadherence messaging” stickers led to higher adherence than the standard ACT packaging.

The CAPPS packaging with glossy, colorful branding and information, did not lead to higher treatment adherence compared to the standard packaging. The CAPPS packaging did not impact adherence even among those who were illiterate or who had not previously heard of ACTs; the colorful detailed packaging did not increase people’s understanding of dosing compared to the standard ACT packaging. Similarly, the lower-cost photocopied versions of the same packaging had no effect on adherence on average relative to the standard packaging in the comparison group, nor did the “Community messaging” sticker.

Meanwhile, the “Nonadherence messaging” stickers increased adherence on average, especially as patients reached their final doses. Patients who received ACT packaging with this message were 5.9 percentage points (9 percent) more likely to complete their treatment relative to the 63.8 percent adherence rate in the comparison group. These stickers reduced the number of remaining ACT tablets by 0.70, a 31 percent reduction relative to the average of 2.27 tablets remaining in the comparison group. Given that this sticker had no impact on the probability of having five or fewer doses, the results suggest that the messaging led to improvements in adherence in later stages of the treatment course.

Researchers also estimated the average effect of receiving either sticker message, rather than analyzing the sticker impacts separately. They found that the stickers were most effective at improving adherence compared to the standard packaging among patients who felt much better in the middle of their ACT treatment, or who believed they were cured before completing all ACT doses. Among those who reported feeling much better on the second day of treatment, the simple messages increased adherence by 11 percentage points relative to the standard packaging. Among those who believed they were cured on the first day, the simple messaging increased adherence by 51 percentage points.

The sticker messages, as well as all other package types, did not impact individuals’ beliefs at the end of the survey on the importance of ACT adherence. This suggests that the stickers did not improve adherence by changing people’s beliefs about the importance of adhering to the full treatment. Instead, it is possible that stickers may have made the importance of adherence

more prominent and salient to patients.

The simple stickers that focused on nonadherence were more effective than the glossy, colorful packaging at improving adherence. Researchers estimate that the simple messaging costs US$0.82-US$3.93 per averted malaria infection. Thus, they predict that these types of stickers could be a very cost-effective way of increasing the number of patients cured of malaria through higher ACT adherence rates.