Local production of the World Health Organization-recommended alcohol-based handrub formulation worldwide: a global survey

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Objective: Inadequate infrastructure and lack of alcohol-based handrub (ABHR) are significant barriers to best hand hygiene practices, especially in resource-limited settings. Between 2006 and 2008, the World Health Organization (WHO) developed and tested two alcohol-based handrub (ABHR) formulations for hand antisepsis suitable for local production in healthcare facilities (HCFs). We investigated the feasibility, advantages, costs and barriers related to the local production of the WHO-recommended ABHR formulations worldwide.

Methods: In 2011, we conducted an online survey based on a previously pilot-tested questionnaire including 58 questions related to the WHO formulation preparation and storage, ingredient and dispenser procurement, quality control, tolerability, acceptability, and promotion. One hundred and twenty five potential local producers of the WHO formulations were identified through the WHO networks and contacts and invited to participate.

Results: Among 100 respondents to the invitation (80%), 56 were not currently producing the WHO formulations, 4 did not wish to participate, and 1 was excluded due to incomplete data. Thirty-nine sites (34 HCFs and 5 private companies) from 29 countries (7 low-, 16 middle-, and 6 high-income economies) were included in the final data analysis. In all 39 sites the WHO formulation local production proved feasible, using locally sourced alcohol in 72% of sites, and with 54% replacing a previously used ABHR. Product tolerability and acceptability was excellent in 82% of sites and its use was promoted as part of a multimodal strategy in 88%. Cost evaluation was possible in 16 sites and showed WHO formulations to be less expensive than marketed products. Difficulty identifying staff with adequate skills for local production was experienced by 41% of sites with a need for training in 74%. Constraints in ingredient and dispenser procurement were encountered in 51% of sites; some quality control issues and sub-optimal reprocessing of dispensers potentially leading to contamination were reported by 46%.

Conclusion: Local production of the WHO ABHR formulations is feasible and provides a solution particularly suitable for low- and middle-income countries as an alternative to unavailable or unaffordable commercially-produced ABHR. Improvement is required for quality control and ingredient and dispenser procurement.

Objectives

Inadequate infrastructure and lack of alcohol-based handrub (ABHR) are significant barriers to best hand hygiene practices, especially in resource-limited settings.[1] Between 2006 and 2008, the World Health Organization (WHO) developed and tested two alcohol-based handrub (ABHR) formulations for hand antisepsis suitable for local production in healthcare facilities (HCFs).[2]

In 2011, we conducted a survey **to investigate the feasibility, advantages, costs and barriers** related to the local production post roll-out of the WHO-recommended ABHR formulations worldwide.

Methods

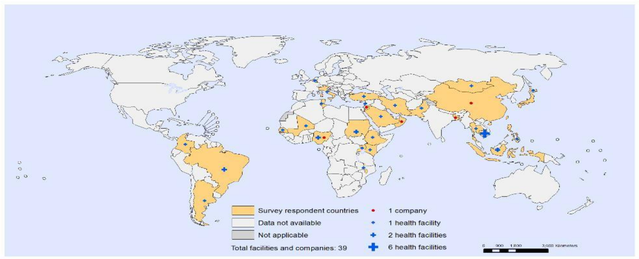
One hundred and twenty five potential local producers of the WHO formulations identified through WHO networks and contacts were invited to participate in an online survey in 2011.

The survey was in English and based on a previously pilot-tested questionnaire. It included 58 questions related to: **WHO formulation preparation and storage, ingredient and dispenser procurement, quality control, tolerability, acceptability, and promotion.**

Results

Among 100 respondents to the invitation (80%), 56 sites stated that they were not currently producing the WHO formulations, 4 sites did not wish to participate, and 1 site was excluded due to incomplete data.

The **Figure** illustrates the 39 sites (34 HCFs and 5 private companies) from 29 countries (7 low-, 16 middle-, and 6 high-income economies) included in the final analysis.



Main results

- WHO formulation local production proved feasible in all 39 sites.
- Locally sourced alcohol was used in 72% of sites, either sourced from the chemical industry (53%) or from the agro-industry (47%) e.g. sugar cane, corn, manioc, mahogany and walnut.
- Product tolerability and acceptability were excellent in 82% of sites.
- Quality control was performed by 87% of sites but 4 countries lacked access to equipment required for quality control.
- WHO ABHR was promoted as part of a multimodal strategy in 88% of sites.
- Reliable cost evaluation (16 sites) showed WHO formulations to be less expensive than marketed products.

The **Table** illustrates advantages of and barriers to local production identified through the survey.

Table 1. Local production of the World Health Organisation (WHO)-recommended alcohol-based handrub (ABHR) formulations: advantages and potential barriers

Advantages	**Number of sites/Total (%)**
Less expensive than marketed ABHR products	7/9 (78)
Excellent tolerance and acceptability	31/38 (82)
Product used in conjunction with a multimodal approach to improve hand hygiene practices	30*/34 (88)
Manufactured from locally sourced alcohol**	28/39 (72)
Potential barriers	**Number of sites/Total (%)**
Staff training required on production process	29/39 (74)
Occasional difficulty procuring ingredients locally due to unavailability, shortages or high cost	20/39 (51)
Reduced product acceptability due to smell	4/38 (11)
Difficulty procuring appropriate dispensers	19/37 (51)
Sub-optimal reprocessing of dispensers due to simple washing only	11/24 (46)
Lack of equipment available to perform quality control	11/24 (46)

* Number of health facilities

**Sugar cane, corn, manioc, mahogany and walnut

Discussion

Local production of WHO ABHR formulations proved to be feasible and provides an acceptable and excellently tolerated solution particularly suitable for low- and middle-income countries as an alternative to unavailable or unaffordable commercially-produced ABHR.

The cost was significantly lower than marketed products. This could be in part due to reduced local labour costs and manufacture from locally sourced alcohol associated with reduced import costs.

Our study highlights the need for improved ingredient and dispenser procurement and access to quality control equipment in some sites.

As confirmed by previous research, the promotion of WHO ABHR as a multimodal approach by most HCFs in our study most likely contributed to enable improvement in hand hygiene practices and related reduction in incidence of hospital acquired infection.[3]

Large scale commercial local production contracted by governments or available for purchase on private local markets are an exciting prospect which potentially reduce product cost due to lower import-associated costs economies of scale.

References

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