



@PhDtoProfMentor

How to Read a Research Paper 10x Faster

scientific reports

www.nature.com/scientificreports

OPEN Developing home cleaning intervention through community engagement to reduce infections and antimicrobial resistance in Ghanaian homes

Emmanuel Tsekleves^{1†}, Dziedzom de Souza¹, Roger Pickup¹, Collins Ahorlu² & Andy Darby¹

Globally Antimicrobial Resistance (AMR) constitutes a health crisis, particularly in developing countries, where infectious disease are commonly fatal. There is clear evidence for microbial exposure and infection transmission within the home. Personal and environmental hygiene are the best ways of reducing household infections thus decreasing the need for antibiotics and consequently diminishing AMR. Despite this being an obvious step, research efforts to understand the home environment and its impact on AMR, cleaning and possible interventions on household cleaning are limited. We combined design and microbiology methods in an innovative mixed-method approach. A traditional survey design (n = 240), a design ethnography (n = 12), a co-design workshop and a pre-intervention microbiological dust sample analysis was undertaken to provide insights for codesign workshops in which new cleaning practices might be developed to minimise any AMR bacteria present in the household environments located in the Greater Accra Region of Ghana. Microbiological analysis of household dust showed that 36.6% of bacterial isolates detected were found to carry at least one resistance to the panel of antibiotics tested. Four scenarios were generated from an economic segmentation of the survey data. 50 ethnographic insights were 'presented' and descriptions of 12 bacteria species that showed resistance to one or more antibiotics (representing 176 bacterial isolates that showed resistance to one or more antibiotics found in the dust samples) were presented to the participants in a codesign workshop. An intervention, a new regime of cleaning practices agreed through the co-design workshop and practiced for thirty days, was made in (n = 7) households. The high prevalence of multidrug resistance observed in this study indicate the need for antibiotics surveillance program, not only in hospital settings but also in the household environment. There is, thus, an urgent need for targeting of interventions at the household level. Activating knowledge through community engagement in the research helps in increasing public perception and breaking down the scientist-public barrier.

Abbreviations
AMR Antimicrobial resistance
HIG High income group
LIG Lower income group
LMIG Low-middle income group
LU Lancaster University
MAR Multiple antibiotic resistance
MIG Middle income group
NMIR Noguchi Memorial Medical Research Institute

¹ImaginationLancaster, Lancaster University, Lancaster, UK. ²Noguchi Memorial Institute for Medical Research, University of Ghana, Accra, Ghana. [†]Biomedical and Life Sciences, Lancaster University, Lancaster, UK. [✉]email: e.tsekleves@lancaster.ac.uk

Scientific Reports | (2023) 13:20595

| <https://doi.org/10.1038/s41598-023-37317-4>

nature portfolio

www.nature.com/scientificreports/

Conclusions

The high prevalence of multidrug resistance observed in this study indicate the need for antibiotics surveillance program, not only in hospital settings but also in the household environment. In 2018, Ghana launched the Antimicrobial Use and Resistance Policy and the accompanying comprehensive National Action Plan on Antimicrobial Resistance. Which deals with high level policy and targeted at hospitals and prescribing. There is also an urgent need for targeting of interventions at the household level through education, communication, and surveillance since studies on AMR have mostly focussed on the hospital setting. This study showed that household dust is just one of many human exposure points for bacteria carrying single or multiple resistances and contributes to the household microbiome. In this study only opportunistic pathogens were found to carry one or more resistances but still they contribute a threat to human health. The study revealed different nuances in the cleaning patterns and tools across the four socio-economic groups. Social norms and the social judgement of others was found to be a strong motivator affecting local cleaning practices Co-design and community engagement, and enlightenment about this invisible world will drive better cleaning strategies and hopefully reduce the health burden and AMR. It also demonstrated the need and value of providing insights into the behavioural challenges, promoting best practices for public health implementation and improved targeting of interventions at the household level.

Data availability

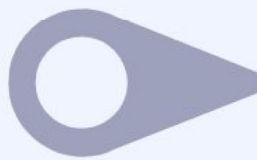
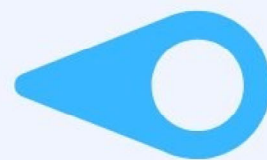
All data (qualitative and quantitative) generated and analysed during this study are included in this paper. Raw qualitative data are not available and will not be shared, as this would compromise the protection of participants' identity; however, some data could be made available upon a reasonable request from the NMIMR IRB, nimb@noguchi.ug.edu.gh.

Received: 7 December 2022; Accepted: 20 June 2023
Published online: 28 June 2023

The Title Test
Does it pick your research interest?



Conclusion Examination
Does it offer value?



Skim Read Paper
Quickly skim through paper. If still useful save & read the full paper



The Abstract Check
Does it align with your research?

Discussion Dive
Does it provide insights for your research?