Eliminating the barriers to cataract surgical access amongst resource-poor communities - a proposed randomised controlled trial

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Abstract

The sustainable development goals (SDGs) of providing universal health coverage for all and ending poverty by 2030 aim to make healthcare accessible and available for all, irrespective of status, gender or race. Unfortunately, access to universal healthcare is still hampered by preventable inequalities, especially amongst the Low-Middle income countries (LMICs).

Cataracts are the leading cause of preventable blindness globally, affecting over 17 million people; 80% of these people reside in the LMICs and cost-effective cataract surgery is the only way to treat it. However, barriers exist that prevent access to cataract surgery amongst these people. Despite widespread reports of these barriers to cataract surgical access, the complex relationships between the barriers and cataract surgical access have yet to be fully explored by researchers or policy-makers.

A randomised control trial involving three groups is proposed and presented in this paper to test the relationship between well-known barriers to cataract surgical access in resource-poor communities and programmes designed to overcome them.

Keywords

cataract, barriers, randomised control trial, health policy

Overview and background

The sustainable development goals (SDGs) of providing universal health coverage for all and ending poverty by 2030 aim to make healthcare accessible and available for all, irrespective of status, gender or race. Unfortunately, access to universal healthcare is still hampered by preventable inequalities, especially amongst the Low-Middle income countries (LMICs).

Globally, health inequalities are favourably weighted towards the affluent, urban dwellers, educated and gainfully employed, leaving those in the rural areas, poorly educated, in subsistence or manual employment with the wrong end of the stick (Commission on Social Determinants of Health 2008). Health inequalities explain poor maternal and child health rates, increasing malnutrition amongst growing children, increasing levels of preventable blindness, worsening out-of-pocket payments for healthcare and continued inequitable access to healthcare (O'Donnell 2007Solar and Irwin 2010, Dupas 2011, O'Donnell 2007).

Evidence shows that the interventions in healthcare provisions aimed at the poor are effective. It is economically wise to channel resources towards preventative and curative interventions because of the external effect treating one person or preventing disease has on other people and parts of the community (Dupas 2011). However, uptake of these services is often limited due to barriers in the supply and demand for health services.

Cataracts are the leading cause of preventable blindness globally, affecting over 17 million people; 80% of these people reside in the LMICs and cost-effective cataract surgery is the only way to treat it (Burton et al. 2021). An estimated 1.8% of the population in Nigeria is blind from cataracts, which is likely to increase to over 43% by 2020 (Abdull et al. 2009). Bearing a more significant burden of this blindness are females and people in poor households residing mainly in rural areas (Dineen et al. 2008, Tafida et al. 2015). Furthermore, the number of people accessing cataract surgery in the country is estimated to be only 28%, leaving over 70% of people needing surgery needlessly blind (Dineen et al. 2008). The South-South geo-political zone of the country currently has the poorest cataract surgical coverage.

Finance and distance to treatment centres are amongst the most reported barriers to cataract surgical services (Aboobaker and Courtright 2016). This is not surprising because most people blind from cataracts reside in rural areas with poor roads and are far from hospitals that provide these cataract surgical services. Even though evidence documents the barriers to accessing cataract surgeries, very little is understood about the relationships between these barriers and their roles in preventing access to cataract surgeries (Mailu et al. 2020). For example, a randomised control trial in rural China where the government reimbursed people who had surgery showed no difference in uptake when researchers

explored lack of education and information as a barrier, alluding possibly to the role of distance or other factors as a barrier (Liu et al. 2012). Another prospective randomised trial in rural China explored the relationship between free/discounted surgeries and transport provision. The study found that, even though free surgeries may improve uptake, reimbursing patients for their transport or providing free transport minimises surgical uptake (Zhang et al. 2013). Time and income matter a lot to poor people and their accompanying relatives as they depend on hourly wages or the time needed to work in the fields, which may be disrupted by the long time needed to access surgery. This means that poor people may likely not utilise a service that keeps them away from their source of income for longer than they deem necessary. Complex relationships, therefore, exist between these barriers that need to be explored if we are to improve access to cataract surgeries amongst the poor.

Across various healthcare services, financial and distance barriers are recurring themes and various researchers have discussed ways to address these barriers, especially regarding cataract surgical uptake. Currently, there are no randomised control trials in Nigeria or Africa that attempt to explore the relationships between these barriers and cataract surgical uptake.

Objectives

To what extent does a programme addressing significant healthcare barriers improve access to healthcare services amongst resource-poor communities? Using a randomised control trial on access to cataract surgical uptake in Nigeria as a case study, the study will:

1. Evaluate the relationship between distance from health services and the uptake of cataract surgery.
2. Evaluate the relationship between the cost of surgery and the uptake of cataract surgery.
3. Evaluate the extent to which eliminating one or both of these barriers will affect the uptake of cataract surgery.

Methods

Solutions that may prove helpful in improving access to cataract surgery amongst the poor will have to consider factors like distance from health services, time, cost or need for accompanying relatives. In order to find such a solution, I propose a randomised control trial to answer the question: To what extent does a programme addressing significant healthcare barriers (health services, time, cost or need for accompanying relatives) improve access using cataract surgery uptake?

Two hypotheses will be tested to determine which solution works best:

1. ***H_{01}: No relationship exists between distance from the hospital and cataract surgical uptake.***

If finance is the only significant barrier, we assume that eliminating finance should increase surgical uptake.

1.   **H_{02}: There is no relationship between the cost of surgery and cataract surgical uptake.**

If both the distance to healthcare facilities and finance are significant factors limiting access to healthcare, two scenarios are assumed here:

• Reducing costs while eliminating distance as a barrier will improve cataract surgery uptake.

OR

• Eliminating both of these barriers should significantly improve cataract surgery uptake.

GROUP DESIGN:

To test these hypotheses, three groups will suffice. Each group will test one of the assumptions and can be used to control another assumption.

1.   GROUP 1: This group will comprise the regional hospital in an area with high cataract prevalence and the catchment it usually services. Cataract surgery costs will be eliminated and people in this catchment area must travel to access cataract surgery. This group will serve to control for distance as a barrier in the absence of surgical cost barriers.
2.   GROUP 2: This group will comprise a hospital within 1 km walking distance in a community with a high cataract prevalence. Costs will be eliminated for the first eye and the second eye will be discounted at 50%. This will serve as a treatment group for surgical cost barriers to second eye surgeries and control regarding the programme's cost-effectiveness.
3.   GROUP 3: This group will comprise a 1 km walking distance hospital in a community with a high prevalence of cataracts. Costs will be eliminated for both eyes. This will control for surgical cost barriers to second eye surgeries and serve as a treatment group for the effect of distance in the absence of costs and the programme's cost-effectiveness.

The RCT(Randomised Control Trial) will randomise an appropriately powered age and sex-matched sample size of residents above 50 years with bilateral cataracts from each community. The communities in the groups are randomised, based on cataract surgical prevalence and distance from the regional hospital and are the same distance from the regional hospital and have good access eliminating external factors like bad roads and variable distances as sources of confounders. Randomising the communities will also prevent the cross-over of participants. They will be followed up through the trial to assess the uptake of surgery after a structured talk on cataracts and their treatment. The structured talk eliminates the risk of a lack of information as a confounder.

Baseline demographic details will be collected to determine equitability. Data regarding the cost of running the separate programmes in real terms will also be collected to determine cost-effectiveness.

The outcome variables measured will be the volume of cataract surgeries. The rate of second eye surgeries across the three groups will measure access to cataract surgery. The cost of surgeries incurred/eye/patient by the government/programme funding post-intervention will measure each programme's cost-effectiveness. Secondary outcome variables will be the volume of cataract surgeries provided to vulnerable groups in the community post-intervention as a measure of equity. OLS regression statistics will access intervention effects amongst the groups after endogeneity tests show no differences.

The Local Regional eye care team will lead this study with assistance from the Community health extension workers.

Limitations of this design will include the inability to stop other people from communities outside the study communities from accessing surgical care, mainly due to ethical reasons. Related to this is the problem of inter-community migration, which may make follow-up difficult. Furthermore, this proposed RCT focuses on cost and distance as significant barriers. It does not address other barriers like the lack of felt need, lack of accompanying persons, fear of outcome or surgery or poor surgical techniques.

Conclusion

This paper proposes a randomised control trial that compares three modes of reducing the barriers to accessing cataract surgery in Nigeria. By evaluating the relationship between distance from health services and the uptake of cataract surgery on the one hand, the relationship between the cost of surgery and the uptake of cataract surgery on the other hand and the extent to which eliminating one or both of these barriers will affect the uptake of cataract surgery, it attempts to find an equitable, iterative, sustainable and efficient solution to cataract surgical access in a heath care system funded mainly out of pocket.

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Ethics and security

This study is expected to comply with all Helsinki declarations on research involving human subjects. Since this study involves human subjects, ethical issues regarding consent, participation and data protection exist. The research team will obtain informed consent for all participating adults and all participants will have a signed one-page project outline. The consent forms will be in English and the participating communities' predominant language

and translators will be employed where necessary. There will be no discrimination against any member of the participating communities, based on gender, sex, age, disability, ethnicity or race. All data captured on paper registers will be stored in facilities within the hospitals in areas with physical security. All computers that transfer data will have passwords to prevent the unintentional dissemination of data and no personal devices handle or process data. Analysis of data will use only de-identified data.

Conflicts of interest

The authors have declared that no competing interests exist.

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