Understanding the dynamics of sexual and reproductive health outcomes in sub-Saharan Africa using the Demographic and Health Survey: the need for longitudinal studies

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Abstract

Sub-Saharan Africa has considerable obstacles in sexual and reproductive health, encompassing unwanted pregnancies, unsafe abortions, sexually transmitted illnesses, and sexual assault. Although cross-sectional data, like the Demographic and Health Survey, offer useful insights, they are constrained in their ability to capture the dynamic aspects of sexual and reproductive health issues. This perspective contends that a thorough comprehension of sexual and reproductive health necessitates the incorporation of longitudinal studies to guide evidence-based practices. Longitudinal studies can monitor temporal changes, identify risk factors, assess intervention efficacy, and offer a more nuanced comprehension of sexual and reproductive health dynamics in sub-Saharan Africa. Notwithstanding the difficulties inherent in longitudinal research, commitment to this methodology is crucial for formulating effective policies and programmes aimed at enhancing sexual and reproductive health outcomes in the region.

Keywords Sub-Saharan Africa, Sexual and reproductive health (SRH), Cross-sectional data, Longitudinal studies, Demographic and Health Survey (DHS), Evidence-based interventions

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Introduction

Sub-Saharan Africa (SSA) confronts numerous complex sexual and reproductive health (SRH) challenges, including unwanted pregnancies, unsafe abortions, sexually transmitted infections (STIs), such as HIV/AIDS, and various forms of sexual assault and coercion [1, 2]. To address these pressing issues, policymakers and academics have increasingly utilised nationally representative cross-sectional data sources, such as the Demographic and Health Survey (DHS) [3]. While this data has been crucial in elucidating trends and disparities in the frequency of various SRH issues, its limitations in reflecting the fluid and dynamic characteristics of these conditions necessitate a more comprehensive and nuanced approach [4]. This perspective contends that

Osborne *et al. Reproductive Health*   (2025) 22:51

Page 2 of 5

although cross-sectional data provide significant insights, a comprehensive understanding of SRH in sub-Saharan Africa requires the effective incorporation of longitudinal studies to guide evidence-based interventions [5].

Nationally representative cross-sectional datasets, such as those collected by the DHS, offer critical insights into sexual and reproductive health indicators, trends, and disparities in sub-Saharan Africa [2]. The DHS initiative, initiated by ICF International, has amassed data on demographics, health, and nutrition throughout sub-Saharan Africa for numerous decades, providing a significant resource for comprehending sexual and reproductive health outcomes [3]. DHS data has recorded decreases in fertility rates across numerous sub-Saharan African nations, attributed to enhanced access to education and contraception [6]. It has also been crucial in monitoring advancements in family planning initiatives, maternity and child health, and HIV prevention strategies [7]. Critical measures, including maternal mortality ratios, prenatal care coverage, child mortality, and vaccination rates, have been systematically studied over time to inform focused interventions [3]. DHS data further underscores differences in sexual and reproductive health outcomes between urban and rural regions, as well as within other socioeconomic categories, highlighting inequities in treatment access and health results [8]. Gender gaps, such as inequalities in access to reproductive healthcare, decision-making power, and vulnerability to violence, are also apparent in the data [9]. DHS data facilitates comparisons among demographic groups and geographic regions, thereby informing policies and programmes that address sexual and reproductive health issues and monitor progress towards national and global targets, including the Sustainable Development Goals (SDGs) [10].

Key limitations of DHS data

Although DHS data offers essential insights into sexual and reproductive health trends in sub-Saharan Africa, it is crucial to recognise its significant limitations. These constraints underscore the necessity for supplementary methodologies, such as longitudinal studies, to bridge gaps in the comprehension of SRH outcomes.

Recall and reporting bias

Survey respondents may find it challenging to accurately remember past occurrences, such as the age of first sexual intercourse, number of pregnancies, or contraceptive usage, resulting in either underreporting or over-reporting of behaviours [11]. Moreover, social desirability bias may lead respondents to provide answers that conform to society norms instead of accurately disclosing sensitive behaviours, such as abortion or extramarital affairs [12].

Sampling and representation issues

Despite the objective of DHS surveys to achieve national representation, specific high-risk populations and marginalised groups, including men who have sex with men, sex workers, and transgender individuals, are frequently under-represented [13]. This constrains the capacity to meet the distinct sexual and reproductive health requirements of these groups. There exists a danger of disproportionately representing or under-representing particular demographic groups due to biases in the sampling frame [14].

Limited scope of SRH indicators

The DHS encompasses numerous SRH variables but may exclude essential elements such as sexual orientation, gender identity, or particular reproductive health concerns [3]. Divergences in measurement standards among nations and survey iterations exacerbate the challenges of cross-national and temporal comparisons. Data on other indicators such as births are also collected from the past 5 years, hence the data may not represent the current conditions in the countries.

Cross-sectional design

The cross-sectional design of DHS data limits the capacity to monitor individual-level variations in sexual and reproductive health across time [15]. This complicates the evaluation of the long-term effects of interventions or policy modifications and the establishment of causal links among variables. Relatedly, the time gaps in the survey data collection limits the recency of some of the indicators. For example, while most of the surveys are supposed to be collected within five year intervals some countries have not been able to keep up to this time frame.

Contextual and aggregate-level gaps

DHS data predominantly emphasises individual-level characteristics, offering scant understanding of the wider social, economic, and cultural circumstances that influence sexual and reproductive health habits [8]. Moreover, aggregate-level statistics, such as contraceptive prevalence, may obscure disparities in availability and utilisation among certain subpopulations [16].

The case for longitudinal studies in SRH research

Although cross-sectional studies such as the DHS offer essential insights into sexual and reproductive health trends in sub-Saharan Africa, they are fundamentally constrained in their ability to capture the dynamic and evolving nature of these issues [17]. Longitudinal studies,

which monitor the same individuals over time, provide a more comprehensive comprehension of self-rated health by revealing causal linkages, following life-course events, and assessing the long-term effects of interventions.

Tracking changes in SRH behaviours and outcomes

Longitudinal studies enable researchers to examine the progression of sexual and reproductive health habits, attitudes, and results throughout time. For instance, the Rakai Community Cohort Study (RCCS) in Uganda has been pivotal in monitoring the evolution of HIV incidence and risk behaviours over several decades [18]. In contrast to DHS data, which offers a snapshot overview, the RCCS has demonstrated how alterations in sexual conduct, including condom utilisation and partner reduction, have affected HIV transmission dynamics in the region [18].

Evaluating the long-term impact of interventions

Longitudinal studies can evaluate the lasting impacts of interventions by tracking individuals over prolonged durations. For example, the HIV Prevention Trials Network (HPTN) 052 study revealed the sustained efficacy of antiretroviral treatment in reducing HIV transmission among serodiscordant couples [19]. In addition, longitudinal data has been essential in assessing the enduring effects of family planning programs on contraceptive use and fertility rates, insights that are challenging to obtain through cross-sectional surveys alone [20].

Uncovering causal relationships

A primary advantage of longitudinal studies is their capacity to establish causal relationships between variables. The Malawi Longitudinal Study of Families and Health (MLSFH) has yielded significant insights into the impact of socioeconomic factors, including education and income, on reproductive decisions and contraceptive utilisation over time [21]. Longitudinal studies can illustrate how certain interventions or life events result in alterations in self-rated health outcomes by considering confounding variables.

Understanding life-course transitions

Longitudinal studies are particularly effective in examining the impact of significant life events, such as marriage, childbirth, or the transition to adulthood, on self-rated health. For instance, the Cape Area Panel Study (CAPS) in South Africa has investigated the effects of the time of sexual debut and early pregnancy on educational achievement and subsequent economic prospects [22]. These findings underscore the interrelation of sexual and reproductive health with wider social and economic issues, frequently neglected in cross-sectional investigations.

Addressing gaps in cross-sectional data

Specific demographics, like adolescents (below 15 years) and sex workers, are frequently under-represented in DHS surveys [3]. Longitudinal studies can address these shortcomings by concentrating on particular cohorts across time. For example, the ALPHA Network, which aggregates longitudinal data from various African cohorts, has proven essential in comprehending the sexual and reproductive health needs of high-risk populations and the advancement of HIV among these groups [23].

Monitoring gender-based violence and its consequences

Longitudinal research can yield essential insights into the frequency and effects of gender-based violence (GBV). The Nairobi Urban Health and Demographic Surveillance System (NUHDSS) has monitored the prolonged impacts of GBV on women's physical and mental health, along with their access to healthcare services [24]. This evidence is essential for formulating successful prevention and response initiatives.

Challenges of conducting longitudinal studies in SRH research

Longitudinal studies provide essential insights into the dynamics of SRH, although their execution in sub-Saharan Africa is beset with difficulties. The challenges encompass financial and logistical limitations, participant retention, ethical problems, and the necessity for flexibility in study design. Resolving these difficulties necessitates meticulous planning, strategic resource allocation, and inventive solutions.

Financial and logistical constraints

High-quality longitudinal research necessitates substantial financial investment, considerable human resources, and effective data management methods. The Rakai Community Cohort Study (RCCS) in Uganda has necessitated continuous financing over several decades to monitor HIV incidence and sexual practices [18]. Securing sustainable funding poses a significant challenge, as several research grants are of limited duration, resulting in disruptions to data collection and processing. To surmount these limitations, the RCCS, for instance, collaborated with several funding organisations and utilised local research universities to diminish operational expenses. Moreover, the utilisation of mobile technologies for data collection has optimised logistics, reduced expenses, and enhanced data precision.

Osborne *et al. Reproductive Health*   (2025) 22:51

Page 4 of 5

Participant retention

Ensuring sustained participant involvement across longitudinal investigations presents a significant hurdle. Factors include migration, mortality, and diminished interest might result in high attrition rates, hence compromising the validity and reliability of study outcomes. In the Nairobi Urban Health and Demographic Surveillance System (NUHDSS), researchers encountered considerable participant attrition attributed to urban migration [24]. To address this, they instituted regular follow-ups via phone calls, community outreach initiatives, and incentives like complimentary health check-ups to maintain participant engagement.

Ethical considerations

Longitudinal studies necessitate continuous ethical supervision to protect participants' rights and welfare. Concerns include informed consent, privacy, and the risk of study weariness require meticulous management. In the Malawi Longitudinal Study of Families and Health (MLSFH), researchers faced difficulties in preserving anonymity within tiny, close-knit groups [21]. They mitigated this by instructing field personnel on ethical norms, implementing secure data storage systems, and underscoring the voluntary nature of involvement with each follow-up.

Adaptability in study design

Longitudinal studies must exhibit sufficient flexibility to adapt to evolving research objectives, methodology, pandemics, and funding throughout time without compromising rigour. The ALPHA Network, which aggregates data from many African cohorts, has had to shift its focus to developing concerns such as the confluence of sexual and reproductive health and non-communicable diseases [23]. This necessitated the revision of data collection instruments and the acquisition of new funding sources to support the broadened research focus.

Conclusion: integrating cross-sectional and longitudinal approaches

To comprehensively grasp the intricacies of sexual and reproductive health in sub-Saharan Africa and inform effective interventions, it is crucial to understand the advantages of both cross-sectional and longitudinal research methodologies. Cross-sectional datasets, such as the DHS, furnish essential baseline information on trends and disparities, but longitudinal studies enhance understanding by documenting individual-level changes, revealing causal pathways, and assessing long-term program effects. Collectively, these synergistic methodologies can yield a more sophisticated and comprehensive understanding of SRH, empowering policymakers and researchers to tackle the region's concerns with greater efficacy.

Declarations

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