

Women's Health and Wellbeing post COVID: A Case Study From Sub-Saharan Africa

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by the members of my committee.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

The COVID-19 pandemic swept across the globe causing hundreds of thousands of deaths, shutting down economies, closing borders and wreaking havoc on an unparalleled level. Countries around the world responded by enforcing nonpharmaceutical interventions in an attempt to flatten the curve and control transmission, morbidity and mortality as well as help ease pressure on healthcare systems. These interventions, though effective in flattening the transmission curve and easing pressure on healthcare systems, came with a heavy social and economic toll globally. Women and girls suffered greater impacts compared to men and boys. Loss of employment, economic distress, school dropout rates, intimate partner violence, as well as domestic violence were overexpressed among women and girls compared to men and boys. Low- and Middle-Income Countries, not being structurally resilient, are unable to quickly recover from such negative shocks. Little is still known as to how vulnerable populations such as women are recovering post pandemic regarding health and wellbeing. Drawing from Sen's capability approach this thesis aimed to evaluate the differences in health and wellbeing among women in Kenya and Uganda post-pandemic compared to during the pandemic, and the determining factors. Health and wellbeing were operationalized using a wellbeing scale that measures the standard of living, General Health Questionnaire-12 that measures probable emotional distress, and perceived state of health relative to others of own age. 1:1 optimal pair propensity score matching was used to identify socio-demographically comparable participants from two cross-sectional surveys – done in 2021 and in 2023 in Kisumu, Western Kenya as well as in Mukono district, Central Uganda; hence producing two samples of 405 women in Kenya and 186 women in Uganda for each of the two timepoints. McNemar test was then used to compare health and wellbeing between the two timepoints while generalized estimating equations regression with exchangeable correlation structure was used to

explore the factors associated with differences in health and wellbeing outcomes. The results show that probable emotional distress levels increased from 21.5% to 52.6% in Kenya but reduced from 88.2% to 61.8% in Uganda, and the proportion that reported poor/fair relative health increased from 25.7% to 35.6% in Kenya and from 25.7% to 35.6% in Uganda. Moreover, the proportion of women that perceived the quality of healthcare services in their community as poor/fair increased from 33.3% to 40.2% in Kenya and from 28.5% to 62.4% in Uganda. The accessibility of healthcare services was also increasingly being perceived as poor/fair in Kenya (23.2% to 29.4%) as well as in Uganda (29.0% to 67.7%). This research also found no significant differences in the proportion of women with health insurance post pandemic relative to during pandemic in both countries – Kenya (23.2% - 27.4%; $p=0.196$) and Uganda (2.7% - 3.8%; $p=0.771$). Wellbeing improved in Kenya but worsened in Uganda between the two timepoints – a worrying trend considering Ugandan women were much older, hence heightening their vulnerability. During the pandemic as well as post pandemic, women who were older, who lived in rental houses, who experienced high levels of water/Water Sanitation and Hygiene insecurity, and who lacked health insurance were likely to report poor health and wellbeing outcomes. Women in these categories were also more likely to report worsening health and wellbeing outcomes post pandemic relative to during the pandemic. Thus, recovering better from COVID-19 should involve ambitious plans that rebuild health, social and economic systems with a stronger focus on marginalized populations such as women and older persons. This research proposes that propensity score matching can be used to compare outcomes for samples from two repeated cross-sectional studies to help eliminate or reduce bias associated with differences in sample selection. To inform policy this research proposes that interventions should be focused on improving economic conditions, healthcare

infrastructure, and water, sanitation and hygiene access with priority on the structurally vulnerable populations such as elderly women.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This research examines three interrelated objectives that together work to identify key intervention areas that could be addressed to catalyze the recovery for women following the effects of COVID-19 in peri-urban areas of Sub-Saharan Africa (SSA) using Kenya and Uganda as a case study. This chapter reviews the background of the research and highlights current themes within the discipline of health geography, while situating this research within the discipline.

1.2 Research Background

Coronavirus disease 2019 (COVID-19) was first reported in Wuhan, China, in December 2019, and rapidly spread worldwide resulting in changes in the *modus operandi* in all segments of society (Almeida et al. 2020). The pandemic swept across the globe causing hundreds of thousands of deaths, shutting down economies, closing borders and wreaking havoc on an unparalleled pitch. Countries around the world responded by enforcing nonpharmaceutical interventions in an attempt to flatten the curve and control transmission, morbidity and mortality as well as help ease pressure on healthcare systems (Mehtar et al. 2020, Pinchoff et al. 2021). These interventions were aimed at minimizing social contact and included school closures, gathering restrictions, ban on public events, public transportation closures, stay-at-home rules, restrictions on internal movement, international travel bans, public information campaigns; as well as personal care including wearing masks, and frequent washing and sanitizing of hands (Sintema 2020, de Palma et al. 2022).

The nonpharmaceutical interventions though effective in flattening the transmission curve and easing pressure on healthcare systems came with a heavy social and economic tolls on most, if not all populations globally (Harris 2020, Mehtar et al. 2020, Pinchoff et al. 2021). Mobility,

social and economic spaces were drastically modified by high risk of disease transmission and concurrent shocks of devastating impacts from these measures leading to adverse impacts on health and wellbeing (Flaxman et al. 2020). Mobility (the potential of physical movements and the ability to travel between two separated locations) changed to virtual mobility via the internet as online activities such as teleconferences, online learning, teleworking, telehealth and teleshopping significantly increased (Mouratidis & Papagiannakis 2021, Bin et al. 2021). As a result, increases in body weight attributable to either reduction in physical exercises, leisure-related activities or increases in food consumption and sugary drinks intake were observed during the lockdown increasing the risk of cardiovascular diseases (He et al. 2021; Chopra et al. 2020; Pietrobelli et al. 2020). Moreover, there was an increase in screen time (time spent in front of a computer, TV, tablet, and/or phone's screen) during working or non-working days (Górnicka et al. 2020). Increased screen time has been associated with reduced quality of life as well as mental health distress and anxiety in the long run. Anxiety not only affects health but also the economic situation (Fetzer et al. 2021).

The pandemic also resulted in economic impacts as various sectors were simultaneously affected. For instance, within air transportation, there was a dramatic decline in global departures - 95% globally, 56% in North America and 76% in Asia (Nhamo et al. 2020). This brought about further ripple effects with aircraft being grounded, raising airport parking challenges among other economic and employment concerns following the COVID-19 travel restrictions (de Palma & Vosough 2021). The collapse of air transportation demand further implied a sharp decline in the volume of fuel used by the airlines which necessitated cost-cutting measures within petroleum industry such as laying off employees in order to match loss of revenue (de Palma et al. 2022). Tourism was one of the worst hit industries as countries witnessed a significant drop in tourist

arrivals during the pandemic, costing the world almost US\$80 Billion in export revenue in the first quarter of 2020 potentially leading to job losses to individuals and to the loss of revenue to the country (Nhamo et al. 2020). Lockdowns also had a significant adverse effect on job postings while at the same time magnifying precarity to existing jobs, hence pushing millions to extreme poverty.

During the pandemic, women and girls suffered greater impacts compared to men and boys. Loss of employment, economic distress, school dropout rates, intimate partner violence, as well as domestic violence were overexpressed among women and girls compared to men and boys (Bundervoet et al. 2022, Laura & David, 2022, Kumar & Kumar 2020, Kwobah et al. 2021). Victims of intimate partner violence, typically women, experienced greater exposure to perpetrators of violence following strict and prolonged shelter-in-place mandates at the height of the pandemic. This time was also characterized by unprecedented psychological and economic stress with limited access to safe havens. The World Health Organization terms domestic violence “the most widespread but among the least reported human rights abuses” as the victims are normally either deprived of any outside contact or are fearful of retaliation (Almeida et al. 2020). Moreover, victims of domestic and intimate partner violence at times found it challenging to file a protective order while still not seeking medical care, fearing the risk of COVID-19 exposure at health facilities.

Among children and youth, the largest disruption beyond direct impacts on health and wellbeing may have been the prolonged school closures (Jain and Dupas 2022). It is estimated that there was complete closure of schools in 19 out of every 20 countries around the world, for a medium of 17 weeks which in turn resulted in between 10 percent to 16 percent additional schooling years in some countries such as Chad and South Sudan (UNESCO 2021, Evans et al.

2021). This led to considerable learning loss as well as dropout rates (Moscoviz & Evans 2022). Learning loss could be defined as the difference between how much students know versus how much they would have known in the absence of school shutdowns, thereby including two elements – forgotten learning and foregone learning (Angrist et al. 2021). Studies across high, low and middle-income countries consistently reported learning loss to be concentrated among poorer students although no differences were observed between girls and boys (Moscoviz & Evans 2022). Moreover, higher dropout rates were reported in Sub-Saharan Africa among girls compared to boys majorly attributed to adolescent pregnancies resulting from increased undesired sexual encounters and early marriages during school disruptions (Zulaika et al. 2022, Dessy et al. 2021).

The economic repercussions of COVID-19 on service-related jobs and exploitation of women's labor relative to men historically, in the domestic sphere as well as in the formal and informal sectors resulted in women being exposed to a higher risk of acquiring the virus following the nature of their work thereby exposing their families to the virus, losing work and losing ground to any past gains made in the name of gender equity (Mawani et al. 2021). The pandemic did exacerbate many inequities, heightening the challenges in achieving the Sustainable Development Goal (SDG) targets by 2030. For instance, gender equity, as COVID-19 increased unpaid domestic and care work for women who were already spending 3 times as many hours as men doing such kind of work (SDG 5); economic inequality – particularly income inequality involving vulnerable populations such as women, older subpopulations and persons with disabilities among other groups (SDG 10); commitment to eliminating poverty as people were pushed to extreme poverty (SDG 13); and Decent work and economic growth as the world was significantly pushed to an economic recession almost comparable to the Great Depression (SDG 8) (SDGs 2020). The poor were less likely to comply with the restrictions, so a faster spread occurred among the poorer regions

(Bargain & Aminjonov 2021) whereas skilled workers were less impacted by work from home directives compared to unskilled workers, raising income inequality (Behrens et al. 2024).

Economies tend to recover at different velocities following negative shocks similar to that experienced during the COVID-19 pandemic, a concept referred to as “shock geometry” (Carlsson-Szlezak et al., 2020). These scenarios could assume varying shapes including “V-shape” – whereby the aggregate output is displaced and quickly recovers to its pre-crisis path; “U-shape” – whereby the output swiftly drops but delays to return to its pre-crisis path, although there is recovery eventually; “L-shape” – whereby output drops and reaches a trough, but subsequent growth remains very low as the gap between the pre- and post-crisis continues to widen; and “K-shape” – whereby different parts of the economy recover at varying rates, times and magnitudes. Low- and Middle-Income Countries are unlikely to have structurally resilient economies and so may only at best have a U-shaped recovery with L-shaped recovery being most probable.

The *United Nations Research Roadmap for COVID-19 Recovery* highlights that recovering better from COVID-19 will involve ambitious plans that reimagine and rebuild health, social and economic systems while involving populations experiencing the highest degree of marginalization such as women, older persons, children, persons with disability among other groups (*UN Research Roadmap for the COVID-19 Recovery* 2020). This thesis therefore set out to explore how women and girls are recovering post pandemic and explore plausible ways to catalyse that recovery in Kenya and Uganda, which fall in the LMIC category of countries situated in Sub-Saharan Africa. This research comes at a time when individuals and communities are trying to live past the pandemic. In that process, it is easy to forget the group that suffered most following the measures that were put in place to control transmission. The results generated by this research give a clear

picture of the current situation of women as well as provide recommendations as to what could be done to improve their health and wellbeing now and in the face of future global shocks.

This research involved combining two datasets from two cross-sectional surveys done in Kenya and Uganda: at the peak of COVID-19 between October and December 2021 and again in June 2023. The two surveys could be described as repeated cross-sectional in two phases as each involved sampling from the same population. In Kenya, the first survey was done with 405 women while the post-pandemic survey was with 1135 women; whereas in Uganda, the pandemic survey involved 186 women while the post-pandemic survey involved 1027 women. Data from each of the countries were made comparable using propensity score matching before analysis was done to evaluate progress made towards recovery from the pandemic impacts.

1.3 Research Objectives

This research aimed to assess the following specific objectives:

1. To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda during the COVID-19 pandemic
2. To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda post COVID-19; and,
3. To investigate the contribution of the sociodemographic and household characteristics, on health and wellbeing in Kenya and Uganda pre- and post-COVID-19 in a combined sample.

1.4 Geographies of health and wellbeing

The 1980's saw the rebranding of the sub-discipline of medical geography into health geography in an attempt to incorporate a dual 'place-sensitive', 'post-medical' perspective into

geography scholarship (Kearns 1993). This also brought about a renewed focus of the concept of place—highlighting the relationship between an individual’s place-in-the-world and the experience of place; a departure from medical geographer’s view of place as a region or container of characteristics to an abstract space (Johnston 1991). The orthodoxy of spatial analysis was challenged by humanist and structural geographers as they refocused attention on the social context of health and disease. Humanist geographers observed that particular experiences of place are built up through the situated nature of the behavior of individual actors whereas the structuralist geographers argued that social and political structures operate within regions to constrain opportunities and shape the experience (Buttimer 1980).

The World Health Organization (WHO) defines health broadly as ‘a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity (Chisholm 1950). This definition explicitly shifts discussions from being limited to biomedicine and healthcare towards the intersectorality central to the experiences of health. Contemporary research encompasses identification of spatial inequalities in health, importance of particular spaces and places such as neighborhoods and therapeutic landscapes, the impacts of different health experiences in the construction of places, the contextualized analyses of policy responses among others (Fleuret and Atkinson 2007). According to the *relative standards theory*, wellbeing varies by both individuals’ environments and how individuals position themselves on the scale of relative standards that enables them to compare and value themselves relative to their neighborhood. These standards being potentially subject to major variations related to the effects of place. For instance, cultural differences as shaped by education, values and norms lead to very different subjective perceptions of wellbeing from society to society by people otherwise seen as having comparable

social positions. This highlights why the WHO definition of health cannot be universal but subject to the effects of place (Diener & Lucas 2000, Fleuret & Atkinson 2007).

From participants' standpoints, wellbeing can include good physical health, autonomy and independence, a sense of good mental health, emotional stability, social relations, and a continuity of self-identity (Ziegler & Schwanen 2011). Wellbeing has been viewed as sitting in that space between expectation and reality (Searle et al. 2021). In this concept, the experience of wellbeing is relative. The expectations are set by how the state of one's health compares to that of his/her neighbor (Kangmennaang et al. 2019). A purist approach to being in the moment could deny acknowledgement of those aspects of living and being developed in one's past, potentially feeding the negative stereotypes within outdated narratives about 'loss of self' (Ward et al. 2024). Since biography, practice, time, settings and other people, combine to sustain the experience of being in the moment ... as part of the complex processes by which spatial moments are created, sustained, ended and again relived, wellbeing cannot exhaustively rely on immediacy (Keady et al. 2022). This ultimately leads to the conclusion that wellbeing is a multifaceted situation encompassing aspects from the past, interrelated with the present and the potentials in the future rather than being a collection of achieved and stable components (Ward et al. 2024).

Population health in Sub-Saharan Africa is characterized by multiple and intersecting determinants and associated outcomes. The region is home to some of the highest incidences of poverty and low standards of living. Poverty-related conditions such as limited access to healthcare, food insecurity, famine and malnutrition alongside high burdens of infectious diseases (e.g., HIV/AIDS, cholera) continue to afflict millions across the region. Simultaneously, the sub-continent is witnessing rapid urbanization rates, growth of the middle class, and associated lifestyle modifications, attributed to globalization. Consequentially, although infectious diseases continue

to be the most important cause of morbidity and mortality, increasing life expectancy and growing incidences of non-communicable diseases (NCDs) are gaining prominence (Defo 2014, Braimah et al. 2023). Whereas economic growth since this century began has lifted millions out of poverty in the region, income inequalities continue to dominate this growth, with 10 out of the 19 most unequal counties globally located in SSA (Dossou et al. 2025). The situation is further worsened by climate change which exerts pressure on pre-existing challenges regarding access to water, agriculture - extending to food insecurity. All these spatial features of SSA have been known to have either direct or indirect effects on health and wellbeing.

Research in health geography in SSA has been influential in tackling questions regarding disparities in health, the gender-health nexus and climate change among others. The sub-discipline continues to gain prominence in the region, with broadening scope and breadth of topics in response to the complex, evolving health challenges while at the same time there has been an expansion in methodological and theoretical approaches employed in conducting research (Braimah et al. 2023). Some of the dominant themes within health geography in SSA include health inequality, and health service use, marginalized and structurally exposed populations and Water, Sanitation and Hygiene (WaSH). Research on health inequalities have recently expanded to include socioeconomic and environmental factors such as health systems and health service use, food security among others; and their impacts on health and wellbeing (Braimah et al. 2019; Woods et al. 2019). There has also been a shift towards marginalized and structurally exposed populations such as older people, persons with disabilities, children, and women. This research area is particularly important in realizing SDG 10 and fits well in SSA with the prevailing thematic areas as it aims to assess health and wellbeing among women.

1.5 Outline of the thesis

Using the monograph format, this dissertation is organized into five progressive chapters. The first chapter (Chapter 1) provides the background information for this research, the research objectives as well as placing the research within the field of health geography. The second chapter (Chapter 2) discusses the theoretical underpinnings of the thesis, state of health and wellbeing in SSA, impact of COVID-19 in Kenya and Uganda as well as a description of the study sites. Chapter 3 describes how the studies were designed and implemented during data collection. The chapter also outlines how the variables were processed and analyzed; and ends by discussing the research methodology used and how reliability and validity was ensured. Chapter 4 presents the results according to the objectives while the last chapter (Chapter 5) provides a summary of the key findings placing them in the existing body of relevant literature. The final chapter also outlines the contribution of the work to knowledge as well as the implications for policy and practice.

CHAPTER TWO: RESEARCH CONTEXT

2.1 Introduction

This chapter reviews literature on the impacts of COVID-19 pandemic on sectors such as economy and health with specific contexts in Western Kenya and Central Uganda. As such it describes the situation that prevailed before the pandemic and during the pandemic while highlighting how certain structural inequalities were exacerbated by the pandemic. In examining the impact of the pandemic on health and wellbeing, this research draws on the theoretical framework of Sen's theory of capability.

2.2 Sen's capability approach

The capability approach as developed by Amartya Sen, a 1998 Nobel-prize winner in economics, is a proposition that social arrangements must be evaluated according to the extent of freedom people have to promote or achieve the functionings they value (Kuhumba 2017). It then follows that if equality in social arrangements is to be achieved, as in most theories of justice, it must be demanded in the space of capabilities (Sen 1996). Capabilities then involve a range of attainable and valuable functionings such as sets of skills and power (Fleuret & Atkinson 2007). The assessments of the wellbeing or quality of life of a person and judgments relating to equality or justice, or the level of development of a community or country, should go beyond resources and mental states of individuals to accommodate effective opportunities that people have to lead the lives they have reason to value. The geographical interest in this approach lies in describing the settings that enable the translation of potential capabilities into attained functionings. This capability approach has been integrated in various fields including economics, political science, philosophy to theology, medicine, public healthcare, developmental studies, studies on poverty and famine among others (Kuhumba 2017).

The capability approach has been used to evaluate human development by envisioning the human being as a communal being driven by the virtues of cooperation and solidarity – fostering the collective wellbeing of the entire community (Kuhumba 2017). The approach therefore advocates for development policies in areas such as education, healthcare, social freedom, economic freedom and political freedom in order to empower collective groups and improve their wellbeing. Human development in this context goes beyond gross national product (GNP), income rise, or industrialization and technological advancements to include enhancement of life lived as well as freedoms enjoyed. Human development could then be defined as a move to expand freedom (or capabilities) by elimination of hindrances such as poverty, tyranny, poor economic opportunities (SEN 2000). Institutional and societal arrangements are of much significance in promoting the freedom of individuals by removing barriers associated with social, political, and economic opportunities of value to the individuals. This could be realized by improving institutional frameworks such as markets, public services, judicial systems and public discussions; and at the same time investing in social sectors and public infrastructures to improve health, education and social capabilities (Alexander 2007).

In evaluating human development, Sen identifies two dominant themes – capabilities and functionings. He defines capability as the ability to engage in valuable acts or to reach valuable states of being; hence representing the alternative combination of things a person is able to do or be (Nussbaum & Sen 1993). Capability could also be defined as a set of vectors of functionings, reflecting a person's freedom to choose one type of life over another (Sen 1995). The basic capabilities refer to the freedom to do some of the fundamental things either crucial for survival or to keep one out of poverty. For the achieved functionings to constitute the wellbeing of a person, the capabilities must take into consideration the socio-cultural aspects that curtail the flourishing

as well as the functioning of humanity within society. Flourishing here means the possession of real opportunities such as safety nets, social facilities and economic opportunities; in order to achieve a certain type of life (Palatty 2009).

On the other hand, Sen defines functioning as an achievement, that is, what people manage or succeed to be or to do. This could otherwise be expressed as the achievement(s) in the effort to do something or to be somebody (Sen 1999). Hence, functionings alludes to either physical or mental states (*beings*) and activities (*doings*) that enable people to participate in the life of the society they belong to. These ‘beings’ and ‘doings’ are referred to as ‘achieved functionings’ and together they constitute what makes life valuable or worth living (Sen 2000). Functioning in this aspect is broad in scope, ranging from elementary physical states like proper nourishment, good health, clothing and shelter, avoiding escapable morbidity and premature mortality, literacy; to the most complex social achievements such as being happy, taking part in community affairs, having self-respect, having confidence while appearing in public as well as participating in social and political life (Sen 1995).

Sen’s capability approach is sensitive to structural and psychological injustices such as group stigmas and stereotypes, oppressive discursive norms, and group segregation caused by shunning interference with individual abilities to advocate for equity within society. Since certain social norms tend to affect the ability of individuals to convert their resources into functionings; merely availing resources or opportunities including safety nets, free education and economic entitlements may not be enough to enhance the state of being and doing, of marginalized populations (Palatty 2016). Both regional and national inequality levels with regard to access to basic services have been persistently high in SSA countries over the years (Shifa & Leibbrandt 2024). These high levels of inequalities in access to basic services poses a significant challenge in

promoting inclusive growth in the African continent as well as making progress towards achieving the SDGs (United 2019b). While access to education and basic services are important in providing equality of opportunities, inequalities in access to basic services in a country could increase a country's vulnerability to health-related crises such as the COVID-19 pandemic (Brewer et al. 2021; Shifa et al. 2021).

Income inequality has also been shown to rise with increasing urbanization (Sulemana et al. 2019). This could be explained by the fact that economic growth causes a population shift from agriculture to industrialization. Moreover, rural people are usually less educated and vastly unskilled relative to their urban counterparts, hence they get trapped in persistent poverty as a result of limited economic opportunities as well as other barriers they encounter as they migrate to urban areas (Wood 2023; Popescu et al. 2022). However, this migration only serves to increase income inequality as the rural migrants risk underemployment in the informal sector; with the prospects of formal sector wages being higher relative to the informal sector (Chen et al. 2016; Wan et al. 2022).

One of the most important inequality drivers in SSA is discrimination which results in unequal access to opportunities for marginalized segments of the population. These discriminations are often the result of social and cultural norms internalized by individuals and thus resulting in behavioral changes reproducing inequalities such as gender inequality (Zizzamia et al. 2021). For instance, there exist large gender disparities in the ownership and use of assets in SSA. In most cases, women do not typically inherit land and the *de facto* operation of land markets make it very hard for women to acquire property (Oduro 2018). Women's economic empowerment levels also remain generally low in SSA and this is mainly driven by low educational attainment, limited employment opportunities, and land ownership mainly among women but sometimes in

combination with men (Williams et al. 2022). Moreover, women tend to experience more employment volatility than men, more highly educated individuals experience less employment volatility than less educated individuals, while youth experience very high levels of employment volatility in these region (Zizzamia et al. 2021). These situations produced and reproduced by social norms result in women undertaking substantial amount of unpaid work.

Women across the world undertake the vast majority of unpaid care and domestic work – spending approximately three times more hours per day compared to men according to a UN Economic and Social Council Report (United 2019a). These kinds of work range from cooking and cleaning to collecting water and firewood or caring for children. Before the COVID-19 pandemic, in parts of Kenya, women were already 20% more likely to have responsibility of looking after a child compared to men whereas in Uganda, women were spending 30 hours more than men every week on unpaid care and domestic work (Lucy et al. 2019; Guloba et al. 2018). The amount of time spent on these kinds of work only increased during COVID-19 pandemic following government restrictions (Ogando et al. 2022). The disproportionate responsibility of women and girls relative to men and boys in providing unpaid care and domestic work is deep rooted in societal beliefs and norms that define gender roles. As a result of this imbalance women and girls experience time poverty, reducing their opportunities to participate in education, decent paid work, public life and leisure; further reinforcing gender-based socioeconomic drawbacks (Mugehera & Parkes 2020).

Sen's capability approach has enormous potential for addressing feminist concerns and questions including reproductive health, voting rights, political power, domestic violence, education, women's social status and gender inequality (Robeyns 2003). For instance, regarding gender inequality, Sen claims that the question of gender inequality can be understood much better

by comparing those things that intrinsically matter (such as functionings and capabilities), rather than just the means to achieve them such as resources (Sen 1992). However, the focus on capabilities does not disqualify the important contribution that resources make on people's wellbeing. A complete analysis of gender inequality should both map the gender inequalities in capabilities and functionings as well as analyze the inequalities in resources which cause gender inequalities in capabilities and functionings (Robeyns 2003). This helps with assessing the policies that can reduce gender inequalities, since an intervention towards distribution of resources will be crucial in distribution of capability wellbeing. One important strength of the capability approach when it comes to gender inequality analysis is that the approach does not assume that all people have the same utility functions or are influenced in the same manner and to the same extent by the personal, social, and environmental characteristics (Sen 1992). The approach rather explicitly acknowledges human diversity, such as age, ethnicity, gender, sexuality, and geographical location as well as whether people are handicapped, pregnant, or have caring responsibilities.

In this research, Sen's capability approach was used to guide the statistical analysis process. The independent variables added to the statistical models were those that were perceived to be reflecting availability of resources as well as those that were perceived to influence a person's capability and/or functioning. The approach also provided the lens through which the interpretation of the findings was done, thereby adding depth to the analysis and discussion of the findings.

2.3 Health and Wellbeing

Countries in Sub-Saharan Africa, like most low- and middle-income countries across the globe are undergoing a rapid epidemiological transition characterized by a shift from disease-burden profiles dominated by communicable diseases and childhood illnesses to profiles of rising predominance of chronic non-communicable diseases (NCDs) (Gouda et al. 2019). For a long

time, communicable diseases such as malaria, tuberculosis, and HIV have been among the most prominent contributors to disease burden. However, the recent past has witnessed a growing burden of NCDs such as diabetes, chronic kidney disease, cardiovascular diseases, cancers, and mental and substance use disorders (Dalal et al. 2011; Gouda et al. 2019). This transition could be explained by improvements in prevention strategies and health-care interventions on one hand as well as ageing and population growth on the other (Roth et al. 2018). Moreover, NCD risk factor surveillance indicates that most adults are exposed to at least one risk factor for NCDs, including tobacco consumption, harmful alcohol use, unhealthy diet, reduced physical activity, obesity, or high blood pressure (NCD 2025). In 2015, the world having acknowledged this burden was therefore committed to reducing premature deaths caused by major NCDs by 30% by 2030 and promote health and general wellbeing (Izutsu et al. 2015). A decade later, a progress monitor report indicates that cases of obesity and diabetes continue to rise, and premature NCD deaths continue to persist, especially in low- and middle-income countries (NCD 2025).

Even as prevalence of these NCDs increases, in many SSA countries, health systems remain fragile, fragmented, under-resourced, and limited in terms of infrastructure and capacity to address the increasing burden (Peck et al. 2014; Agyei & Kumah 2024). Healthcare systems in this setting, have over time suffered from structural issues which cut across institutional, human resources, financial, technical and political developments (Oleribe et al. 2019). The leading challenges include inadequate human resource for health, inadequate budgetary allocations to healthcare, and poor leadership and management in healthcare (African Development Bank Group 2022). Inadequate human resources is primarily attributed to overt reasons such as inadequate output from training institutions, brain drain to Europe, America and Asia, unfavorable government policies mitigating employment into civil services as well as covert reasons such as

poor availability of engaged healthcare workers to deliver services as a result of staff strikes, attendance at private practice (instead of public hospitals), internal migration to major cities, and poor attitude to work (Oleribe et al. 2019). All these concerns have been pointed out over the years and continue to be a quintessential depiction of the state of healthcare in Kenya and Uganda, two Anglophone countries in East Africa with somehow identical healthcare systems.

Health and poverty are twin sisters that reinforce one another. Poor people will most likely live unhealthy lives since health requires access to resources, a considerable level of literacy, and awareness of disease prevention in particular (Deaton 2024). Conversely, an unhealthy person is unlikely to function properly in society and might spend all their meager resources and energies trying to get well, which might in turn perpetuate their state of poverty or compel them to lead an unfulfilling life. A report by World Bank states, “*the poorest almost always experience higher mortality levels, die younger on average, and experience higher levels of child and maternal mortality*” (World Bank 2003). There exists a plethora of studies that have demonstrated that poverty could cause poor health by limiting nutrition (Hoynes et al. 2016) and healthcare access (Miller & Wherry 2019; Goodman-Bacon 2021). Yet some have demonstrated that ill health causes poverty by lowering productivity and labor supply, thereby negatively affecting family income and savings to a great extent (Dillon et al. 2021; Lleras-Muney et al. 2025). This emphasizes that causality between poverty and ill health is bi-directional, as demonstrated in both macro-level (national and trans-national) as well as micro-level (individual, household, and community).

Poverty, although largely a global social issue, is a more pressing and difficult policy concern in developing countries, especially in Sub-Saharan Africa where urbanization is stirring, subjecting a significant proportion of citizens living in abject poverty (Alkire et al. 2024). For instance, in 2019, 35.03% of the Kenyan population were living below the poverty line of \$2.15

and thereby regarded as multidimensionally poor (Maket 2024). According to a report by Kenya National Bureau of Statistics (KNBS), poverty affects over 21.2 million people in Kenya in spite of being the country with the biggest economy in East Africa (KNBS 2021). Over the past decade, Kenya has experienced unequal economic progress with rural populations lacking access to essential amenities such as healthcare and education (Oxfam 2025). Although official statistics in Uganda show overall economic growth, the benefits of this growth have been shared unequally across regions. Moreover, a closer look at the numbers indicated that relatively few households are escaping poverty, and relatively more households are falling into poverty (Herbert Robert 2021).

There has been a substantial global commitment towards Universal Health Coverage (UHC), the possibility for all individuals to access the comprehensive array of necessary health services at the time and place they require, without experiencing financial hurdles (WHO-UHC 2025). However, actual progress towards UHC has been slow especially in some regions in Africa and Asia, in which the coverage of essential health services remains low (Cashin & Dossou 2021). Although other tools exist, many countries apply health insurance as a means of achieving UHC. Health insurance programs aim to increase timely access to health care services and to minimize the financial burden on individuals and families (Habib et al. 2016; Cashin & Dossou 2021). A well designed insurance program can help reduce delays in seeking care, induce early detection and treatment of illnesses, as well as contribute to improved management of chronic conditions, user experiences, and above all, health outcomes (Tefera et al. 2021; Mbau et al. 2018).

Kenya's UHC index has consistently remained low despite its National Health Insurance Fund. A multi-national survey conducted between 2022 and 2023 reported health insurance coverage in Kenya to be 22%. The coverage was even lower among marginalized populations such as the elderly – aged 60+ years (45%) and females (27%). This low coverage had an adverse effect

on the access and use of essential healthcare services (Odipo et al. 2024). In Uganda, the penetration of health insurance remains extremely low, with only about 4% having health insurance. This low coverage is possibly attributed to gaps in awareness about existing health insurance schemes in addition to lack of affordability. The repercussion has been that most people are then forced to forego treatment or medicines due to high costs with heightening fear of not being able to obtain or afford care whenever need arises (Afrobarometer 2025).

Food insecurity is important for economic and foreign policy decisions; and is strongly associated with diverse health outcomes including subjective wellbeing, depression, as well as the transmission and progression of HIV (Frongillo et al. 2017; Miller et al. 2021). Food insecurity has been associated with low education levels and low levels of access to information, health and other basic capabilities that translate into people's wellbeing (Burchi & De Muro 2016). In Kenya, food insecurity was already at worrying levels before COVID-19. The number of people in the country who were food-insecure significantly increased from 1.3 million to 2.2 million between 2007 and 2017 with more than 10 million lacking access to sufficient food in terms of quality and quantity, being forced to rely on food aid at any given time of the year (Sibhatu et al. 2015; Korir et al. 2020). More recently, the Kenya Food Security Steering Group (KFSSG) reported that the number of food insecure people in pastoral and marginal agricultural zones arose from 3.1 million to over 4.1 million between February and May 2022 (Net 2022). This was reportedly driven by the impacts of late onset below average rainfall, resource-based conflict and rising staple food prices. Moreover, persistent drought and little rainfall have led to crop failure and loss of livestock, the principal sources of livelihood (John 2024). The situation in Uganda was not any better before the pandemic with nearly half of the population being food insecure predominantly due to decline in food production (Whitney et al. 2018). Well after the pandemic, food insecurity continues to persist

in Uganda (Hübler et al. 2025). This situation has been further worsened by weather shocks that have unequivocally contributed to reduction in food security at the household level. Furthermore, severe food shortages have been reported in large households, female-headed households and resource-deprived households (Hübler et al. 2025).

Water security, the ability to benefit from affordable, adequate, reliable and safe water for wellbeing and healthy life remains an important determinant of physical and mental health (Jepson et al. 2017). Women in LMICs suffer depression and anxiety associated with water insecurity since they bear the burden of ensuring household access to water for drinking and other purposes (Bisung & Elliott 2016; Nunbogu & Elliott 2022). Universal access to safe water has been a long-standing challenge in Kenya. In 2018, a study reported that 27% of the Kenyan population obtained water from unimproved sources such as surface water; water scarcity being further exacerbated by disproportionate geographical distribution of water resources as well as fluctuations in rainfall (Boateng et al. 2018). A report by United Nations Children's Fund (UNICEF) in 2023 found that 23% of the Kenyan population lacked water supply points, the third highest in Sub-Saharan Africa. Moreover, approximately 49% of the population lacked access to safe water (WHO-UNICEF 2023). With simultaneous population growth and economic development, demand for water only tends to further increase amidst effects of climate fluxes on water availability. This further complicates the water insecurity problem, making it increasingly difficult to address (Mulwa et al. 2021). Similarly, in Uganda, access to safe drinking water remains one of the most pressing challenges facing rural communities. Approximately 60% of the population lacks reliable access to clean water sources (Water Action Hub 2024).

In the face of fragile healthcare systems, high prevalence and incidence of communicable and non-communicable diseases, poverty, food insecurity and water insecurity - all of which have an adverse effect on health and wellbeing; came COVID-19 and the situation was worsened.

2.4 COVID-19 in Kenya

In Kenya, the COVID-19 index case was confirmed on 13th March 2020 after which the government began exploring how best transmission could be contained. Being cognizant of the fact that the existing healthcare system was ill-equipped in terms of oxygen availability, essential devices for oxygen therapy, intensive care unit beds and ventilators among other facilities; epidemiologists recommended containment measures such as case isolation, social distancing, lockdowns and curfews (Barasa et al. 2020; Brand et al. 2020). The government then responded by: closing schools on 15 March 2020; implementing a partial lockdown on 23 March 2020 after the country had recorded 158 cases and 6 deaths; suspending international flights including mandatory quarantine of incoming residents; closing bars and restricting restaurant opening hours; imposing bans on large gatherings on 25 March 2020; enacting nationwide curfew from 7 pm to 5 am; declaring wearing of face masks mandatory in public places; and imposing cessation of movement to selected cities (Quaife et al. 2020).

Apparently, these measures were effective as Kenya among other African countries recorded much lower cases and deaths than were predicted although there are other explanations to this such as population age distribution and climate among others (Diop et al. 2020; O'Reilly et al. 2020). However, the pandemic which initially manifested as a health hazard, fast mutated to a twin menace that would threaten both lives and livelihoods. The closure of learning institutions brought about a profound disruption to learning among students. Most students were not able to

access online learning due to lack of electricity, lack of learning materials and some were forced to move back to their rural homes (Kathula 2020).

Sexual violence and gender-based violence also increased significantly in the months following the introduction of COVID-19 restrictions, specifically the stay-at-home directive. A nationally representative survey reported a 37%, 29% and 22% increase in domestic violence against women, men and children respectively following the enforcement dusk to dawn curfew in Kenya (Barasa et al. 2021). Moreover, a national sexual and gender based violence hotline recorded high number of gender based violence reports relative to the period before the containment measures were put into place – from 86 in February 2020 to 1108 in June 2020 (Bhalla 2020).

The pandemic and the non-pharmaceutical measures also had a profound effect on the economy. The country's GDP growth rate projection for the year 2020 was revised downward from the initial 5-6% to 1% as approximately 1.7 million Kenyans lost their job between April and June 2020 (KNBS 2020; World Bank 2024). As a result, the rate of unemployment for populations aged 15-64 years doubled – from 5.2% between January and March 2020 to 10.4% between April and June 2020 with youths aged 20-29 accounting for the lion's share of the unemployed (KNBS 2020). The latent effects of the pandemic were compounded by the fact that the economy was operating below the projection of 5.35% annual growth. Furthermore, the country had been hit by desert locust invasions as well as long rains which led to floods, causing mass destruction to crops and livestock (Ogega 2020). Hence, the pandemic posed additional challenges to a downward spiraling economic performance.

The COVID-19 pandemic presented a disproportionate social and economic risk to women and girls, significantly reversing the tenuous advances made with regard to gender equality

(Decker et al. 2021). The emergency measures served to exacerbate the vulnerability of children and women to sexual gender-based violence. Female children were at higher risk of sexual violence committed by non-strangers at their private residences, owing to the closure of schools and lack of alternative safe venues. Women on the other hand experienced heightened vulnerability to both domestic and intimate partner violence owing to social isolation and staying indoors with abusers (Flowe et al. 2020). The night curfews also restricted the movement of pregnant women, forcing them to seek services from traditional birth attendants or even untrained relatives to give birth, risking their life as well as that for the unborn child. Consequently, some lost their lives due to postpartum hemorrhage (Wangamati & Sundby 2020). These factors coupled with loss of income through layoffs, among other consequences describe the impact the pandemic and the control measures had on health and wellbeing of this vulnerable section of the population in Kenya (Mwanga et al. 2024).

2.5 COVID-19 in Uganda

The first case of COVID-19 in Uganda was reported 21 March 2020, exactly ten days after the World Health Organization (WHO) declared it a pandemic. Days later, the Ugandan government implemented measures such as closure of international borders, closure of schools and worship places, suspension of mass gatherings, suspension of public transportation and restriction of private transportation to at most three passengers, who had to be from the same family (Ajari et al. 2020). A nationwide lockdown was then declared on 24 March 2020 while a national 7.00 pm to 6.00 am curfew was instigated on 30 March 2020 (Kawuki et al. 2020; Sserwanja et al. 2021; Kitara et al. 2020). The threat of further community transmission prompted the president to introduce more stringent preventive measures including prohibition of movement of people by all forms of transportation, closure of all businesses and shops as well as suspension of all their

activities (except established food markets and stores, hospitals and pharmacies) and the instruction of all workers (except healthcare workers) to stay at home (Bhuckory & Ojambo 2020). Throughout the pandemic, Uganda consistently reported relatively fewer cases compared to their neighbors such as Kenya, Tanzania and Rwanda and this could possibly be attributed to the strict containment measures that were put in place by the government (Kitara et al. 2020).

However, the restrictive measures were being issued in quick intervals, barely few hours apart; attracting mixed feelings with people fearing that without working they would die faster from hunger than from the virus itself given that they lived a hand-to-mouth lifestyle (Ssegawa 2020). Like in Kenya, the pandemic had a direct effect on poverty levels, through ill health and death in addition to the indirect effects because of economic contraction. The economic contraction could be traced to the declining demand and disruption of supply chains at the international level. Moreover, the travel restrictions imposed brought international tourism to a standstill, significantly reducing the export earnings. The closure of business operations led to loss of revenue and income to both firms and individuals (Younger et al. 2020). Dwindling incomes due to prolonged lockdowns meant that households were unable to meet the basic requirements such as food and shelter. Families had to deal with accumulated rent arrears that led to evictions from their houses and shops; with levels of food insecurity also increasing (Nuwematsiko et al. 2022).

The closure of the learning institutions in Uganda meant that more than 73000 institutions had to send more than 15 million learners out of their premises (Independent 2020). This in turn meant a reversal of the progress that had been realized as the country struggled to find an amicable solution to key education challenges associated with regard to access, quality and relevance (Tumwesige 2020). In addition, the exacerbated socio-economic hardships imposed on households by the pandemic had ripple effects as families had to rethink the financial and opportunity cost of

education over meeting other more demanding needs such as food. Remote learning was almost not an option with 80% of Uganda's school-aged population living in rural areas characterized by lack of basic living resources and underdeveloped educational and supporting infrastructure (Tumwesige 2020). This meant that the children had to stay out of school and also suspend learning exposing them to child marriages, child labor, prostitution among other criminal activities (UNESCO 2020).

Uganda's COVID-19 response measures failed to take into consideration the economic and livelihood needs of women and girls. In the face of gendered segregation in the formal sector, many women are forced to resort to client-facing roles, leisure, travel and hospitality businesses; which were worst hit by the pandemic containment measures (Mwenyango 2023). These women therefore had the fragility of their livelihoods exacerbated as they suffered major job losses, hence losses in income (Bukuluki et al. 2020). The restriction of movement, closure of markets, loss of jobs and curtailed opportunities to earn livelihood further exposed them to the risk of falling back to poverty (Burki 2020).

The non-pharmaceutical measures were apparently effective in ensuring that most African countries, Kenya and Uganda included, recorded much lower COVID-19 cases and deaths than predicted. However, this may not be entirely true for a couple of reasons, especially after adjusting for local conditions and capacities (Chitungo et al. 2020). To begin with, the number of COVID-19 tests conducted per million population was much lower among African countries compared to countries in Asia, Europe and America (COVID-Testing 2024). This could be attributed to inadequate health systems, limited testing capacity and poor reporting systems. Secondly, most African countries were unable to use diagnostic tests with high sensitivity and specificity such as nucleic acid-based real time quantitative PCR. These tests are mostly available in high-income

countries as they are expensive and require high level of expertise (Esbin et al. 2020; Kumleben et al. 2020). Thirdly, Africa had a lower risk of importation of the virus considering the data on the volume of air travel from China to Africa (Gilbert et al. 2020).

2.6 Study context

This research was conducted in three sub-counties (Kisumu West, Kisumu East and Kisumu Central) of Kisumu County located in Western Kenya as well as Nabbaale, Nama and Nakisunga locations within Mukono district in Central Uganda (Figure 1).

Kisumu county is one of the 47 semiautonomous counties stipulated under the constitution that was promulgated in 2010. Kenya transitioned to a devolved system government in 2013 – comprising the national government and the county governments (Masaba et al. 2020). Kisumu county is situated within longitudes 33° 20' E - 35° 20'E and latitudes 0° 20'S - 0° 50'S. The county is located on the shores of Lake Victoria, the third largest freshwater lake in the world. The climate in Kisumu is generally warm with temperatures ranging from 23°C to 33°C throughout the year while the rainfall pattern could be described as a modified equatorial climate characterized by long rains (March to May) and short rains (September to November); with the average annual rainfall varying from 1000-1800 during the long rains and 450-600mm during the short rains (Kanoti et al. 2019).

The main sources of water in Kisumu include Lake Victoria, shallow wells, unprotected springs, boreholes and roof catchment systems. Majority of the county's residents get water from numerous self-supply wells given that piped water is often either intermittent or completely unavailable (Trémolet et al. 2014; Adams et al. 2019; Ocholla et al. 2022). Some of the water sources run dry during the dry season, forcing people to take longer to fetch water. Women and

children specially spend more time to fetch water compared to men and boys. This consumes a lot of productive time and schooling hours leading to poor education for girls as well as reduced family income (Kanoti et al. 2019).

Healthcare service in Kenya is provided by public health facilities, private facilities as well as non-governmental organizations (Tama et al. 2017). The public health system is organized into four hierarchical levels: (1) community health services, (2) primary health services, (3) county health services and (4) national referral services. While county governments are mandated to provide services in levels one to three, the national government is responsible for providing national referral services (McCollum et al. 2018). The private facilities being more expensive are mostly only accessible to wealthier individuals while the poorer households have to rely on the public facilities (Ilinca et al. 2019). The healthcare facilities in Kisumu have a capacity of 1.42 beds per 1000 people and 0.98 healthcare providers per 1000 people; slightly higher than the national figures of 0.72 and 0.79 respectively (Moses et al. 2021).

Most food consumed in Kisumu city is bought and sold in the city's many markets, which provide employment for approximately 60% of the city's labour force. Wholesale and retail markets cluster along busy city centre streets as well as in the peri-urban areas. Moreover, the city is a transport hub, majorly impacting its food supplies which are sourced both regionally and internationally. The city is positioned along the highway from Busia (a prominent Uganda-Kenya border town) to Nairobi (Kenya's capital city); while Jomo Kenyatta highway serves as another main artery connecting Kisumu to Tanzania and surrounding towns and countries (Battersby & Watson 2018).

Mukono district on the other hand is located between latitudes 0° 0' N and 1° 30' N and longitudes 32° 35' E and 33° 05' E, approximately 20km East from the capital Kampala; being

one of the 116 districts in Uganda (Mukono UBoS 2017). Temperatures range from 16°C to 28°C throughout the year with an annual rainfall mean of 1100mm; April and May having the highest precipitation throughout the year (Climate Data 2025). The main source of income in the district includes both small scale cropping and small-scale livestock keeping (Agriculture) - this includes paid labor at the farms as well as income from sale of Agricultural produce. Wage rates for men tend to be higher compared to that for women and this could be attributed partially to the fact that men work longer hours compared to women (Lukuyu et al. 2021). Being one of the most forested districts in Uganda, with the highest water resource, residents also practice fishing as well as wood harvesting. Stone quarries are also common in Nama, Nakisunga and Nabbale (Petty et al. 2021).

The healthcare system in Uganda is organized hierarchically from top as general hospital (one per district), referral health center IVs, health center IIIs, health center IIs (dispensaries) and community health system where Village Health Teams provide day-to-day referral of patients from the community in addition to private hospitals. In this respect, Mukono district has two level IV health centers, 13 level III health centers, 26 level II health centers and 845 village health team members serving an estimated population of 800,000 (Nannozi et al. 2017).

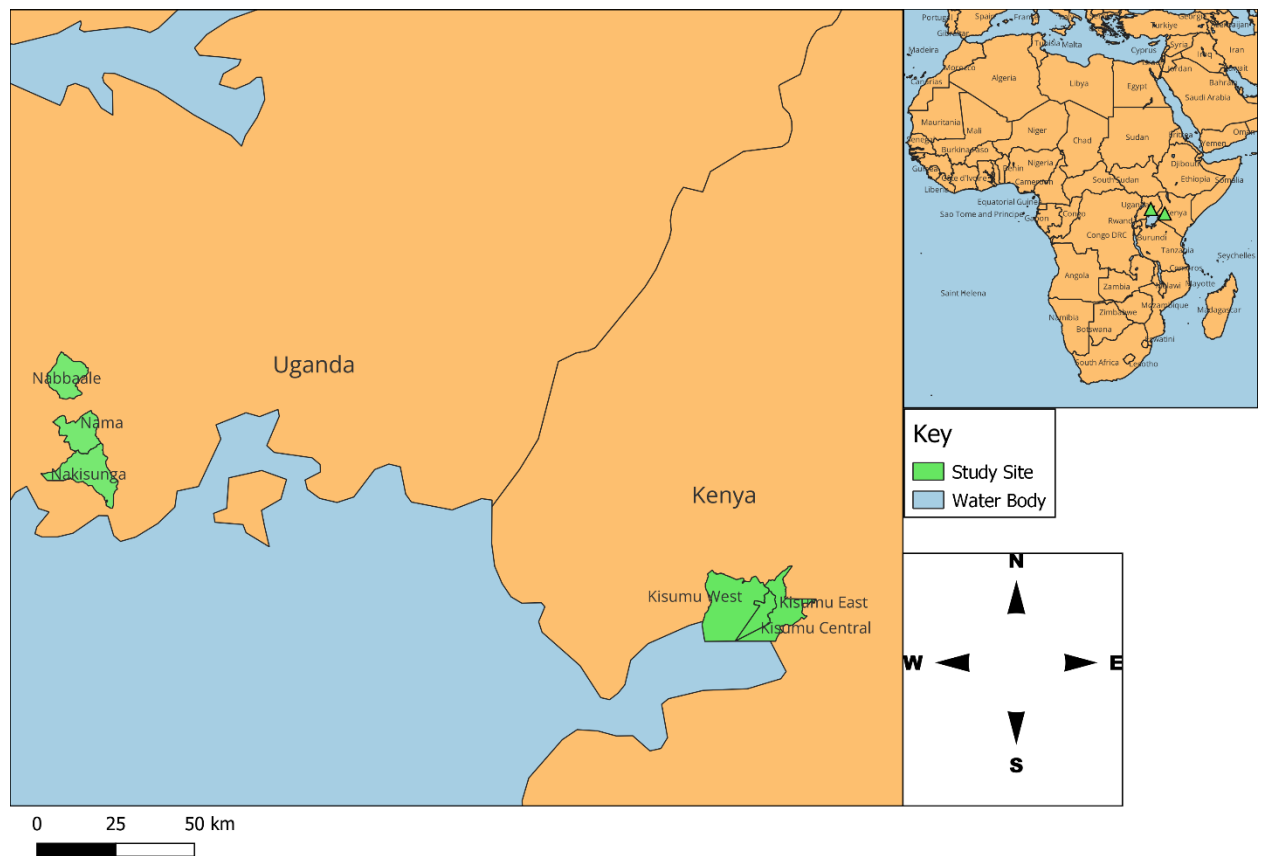


Figure 1: Study sites in Kenya; Kisumu Central, Kisumu East and Kisumu West sub counties and Uganda: Nabbaale, Nama and Nakisunga (Generated using Q-GIS' 3.28.3)

2.7 Summary

Sen's capability approach advocates for development policies in social, economic and political spheres in order to empower collective groups and improve their wellbeing. This approach becomes appropriate in describing the nature of COVID-19 recovery measures that should be enacted in settings of LMICs. Such measures should take into considerations inequalities in capabilities and opportunities between countries as well as the disparities exemplified among groups within a country. Simply stated, human developments have to involve expansion of capabilities as well as elimination of hindrances such as poverty, tyranny and poor economic

opportunities among other barriers for all groups. The situation in Kenya and Uganda prior to COVID-19 pandemic involved high prevalences and incidences of both communicable and non-communicable diseases in the face of an ill-equipped and understaffed healthcare system. The countries' populations also faced high levels of unemployment which translated to high poverty levels and further leading to food insecurity and water insecurity among other negative outcomes.

Then came COVID-19 and the situation worsened. Governments enacted measures around social distancing, curfews and lockdowns to reduce community transmission and ease strain on the weak healthcare system. The measures were similar in both Kenya and Uganda although Ugandans had to deal with stricter interventions. As a result, certain sectors of the economy such as tourism industry, transport industry, education, and trade almost came to a standstill, implying loss of revenue at the macro-economic level as well as loss of livelihood for individuals, further elevating poverty levels. The impacts were deeply felt by marginalized populations including women and girls as they had also to deal with increased incidences of intimate partner and domestic violence alongside the tough economic situations. All these would have negative effects on the health and wellbeing of any population. With this background, this research sought to assess how women were recovering from the effects of the pandemic and the control intervention measures that followed.

CHAPTER THREE: METHODS

3.1 Introduction

This chapter describes the research design and methodology employed to address the research objectives: (1) to describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda during COVID-19 pandemic; (2) to describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda post COVID-19; and (3) to investigate the contribution of sociodemographic and household characteristics to health and wellbeing in Kenya and Uganda pre- and post-COVID-19 in a combined sample. In the process, the research methods (i.e. how the data was collected in the field, how the data was processed and how the data was analyzed) are presented in order to clarify to the reader the connection between the epistemology, theory and methodology behind this dissertation, and how these fit into larger trends within health geography.

3.2 Study Design

This research makes use of two repeated cross-sectional surveys done during the COVID-19 pandemic and again post pandemic. These surveys were simultaneously done in Kenya and Uganda. The initial survey was conducted between October and December 2021. The study site in Kenya was Usoma in Kisumu East while in Uganda it was in Mukono in Central Uganda. Villages for inclusion were purposively selected based on the documented water and sanitation challenges. As a result, five villages in Kenya and four villages in Uganda were identified, which also comprised the sampling units for the surveys. Participants enrolled must have fulfilled these criteria:

1. Individuals aged above 18 years for Kenya and above 55 years for Uganda

2. Members of the community who had stayed in either Usoma for Kenya or Mukono for Uganda for a period of 6 months
3. Individuals who had written consent to participate in the study

In both countries, the sample size, n , for each village, was determined using Daniel's formula:

$$n = \frac{(Z\alpha)^2 \cdot p(1-p)}{d^2}$$

Where:

- Z_α = Z-statistic taken to be 1.96 corresponding to 95% Confidence level
- p = Prevalence i.e proportion of the population with access to clean water; taken to be 93% or 0.93
- d = Error margin, taken to be 5% or 0.05

Therefore, in each village the target sample size was:

$$n = \frac{(1.96)^2 \cdot 0.93(1-0.93)}{0.05^2}$$

$$n \approx 100;$$

As a result, approximately 400 participants in Uganda and 500 participants in Kenya were targeted. An oversampling margin of upto 10% was allowed for both countries to account for non-

response; hence the survey in Uganda could involve upto 440 while that in Kenya could involve upto 550. Although, the sample target was reached in Kenya, as 535 successful surveys were conducted, there were challenges reaching the potential participants in Uganda hence only 288 successful surveys were conducted. These challenges included having to access participants at a time when there were travel restrictions – the measures put in place by the government were more stringent compared to those in Kenya. This corresponded to a response rate of 65.5% and 97.3% in Uganda and Kenya respectively. Out of the 535 participants in Kenya, 405 (75.7%) were females while in Uganda, 186(64.6%) were females. Data collection was done by two Village Health Teams (VHTs) in Uganda, and each survey took approximately 30 minutes. In Kenya, data collection was done by five Community Health Volunteers (CHVs) who were later renamed Community Health Promoters (CHPs) by the Kenyan Ministry of Health in 2022, and each survey took approximately 45 minutes to complete. Since the surveys were done through face-to-face interviews, the data collection team were equipped with face masks as well as sanitizers in order to minimize the risk of infection to participants. It was a challenging time to collect data in face-to-face surveys, and this had to be considered at all stages of design, measurement and evaluation. Existing partnerships in the two countries facilitated data collection and while not perfect, results provide substantial insights into the issues under investigation. All ethical approvals were sought and secured; all public mandates were followed; local data collection teams were trained and executed the surveys to the best of their abilities under challenging circumstances. The data are robust and the results informative. Data was collected using Kobo Collect installed in smartphones and transmitted real-time to the central server for quality and progress monitoring by the project data manager. Moreover, to ensure data quality and completeness, the electronic data collection tool had internal

consistency checks in place, for example most fields were ‘required’ and skip patterns were put in place.

In 2023, post the COVID-19 pandemic period, two other surveys were again conducted simultaneously in Uganda and Kenya between June and August in the same sites where data was collected during the pandemic period. The sample size was stratified by age group (years): 16-20, 21-25, 26-30, 31-35, 36-40, 41-45, 46-50, 50-60, 60-70, 70+, in both countries. Participants enrolled must have fulfilled these criteria:

1. Women
2. Individuals aged 16 years and above
3. Members of the community who had stayed in the study sites for a period of atleast 6 months
4. Individuals who have written consent to participate in the study

In each age stratum, the sample size, n , was determined using Daniel’s formula:

Where:

- Z_{α} = Z-statistic taken to be 1.96 corresponding to 95% Confidence level
- p = Prevalence i.e proportion of the population with engaged in unpaid work; taken arbitrarily to be 93% or 0.93
- d = Error margin, taken to be 5% or 0.05

Therefore, in each age stratum, the target sample size was:

$$n = \frac{(1.96)^2 \cdot 0.93(1-0.93)}{0.05^2}$$

$$n \approx 100;$$

As a result, approximately 1000 participants in both Kenya and Uganda were targeted while 1135 participants and 1027 participants in Kenya and Uganda, respectively, were interviewed successfully. Data collection was done by 10 Village Health Teams (VHTs) in Uganda and each survey took approximately 30 minutes. In Kenya, data collection was done by ten Community Health Promoters (CHPs) and each survey also took approximately 30 minutes to complete. Under the guidance of the research officer from COHESU and ROTOM, the data collection team identified participants purposively with an intention of achieving maximum variation in the final sample. Data was collected using Kobo Collect installed in smartphones and transmitted real-time to the central server for quality and progress monitoring by the data manager. Moreover, to ensure data quality and completeness, the electronic data collection tool had internal consistency checks in place, for example most fields were ‘required’ and skip patterns were put in place. The CHPs were supervised by Senior Research Officers at Community Health Support (COHESU) in Kenya while VHTs in Uganda were supervised by Senior Research Officers at Reach One Touch One Ministries (ROTOM).

Figure 2 describes the process through which data flowed for both countries until the final sample size used in this research was arrived at. The initial survey included 405 females in Kenya and 186 females in Uganda whereas the second survey (post-pandemic) enrolled 1135 females in Kenya and 1027 females in Uganda. Data for objective three was generated by subjecting the during- and the post-pandemic datasets in both countries to propensity score matching. Propensity

score matching (PSM) was used to match participants in the pandemic survey to those in the post-pandemic survey to generate a combined sample mimicking a two-point longitudinal study. As a result, a sample of 405 pairs in Kenya and 186 pairs in Uganda was reached, all women. Further details on PSM: how it was applied and its appropriateness will be discussed later.

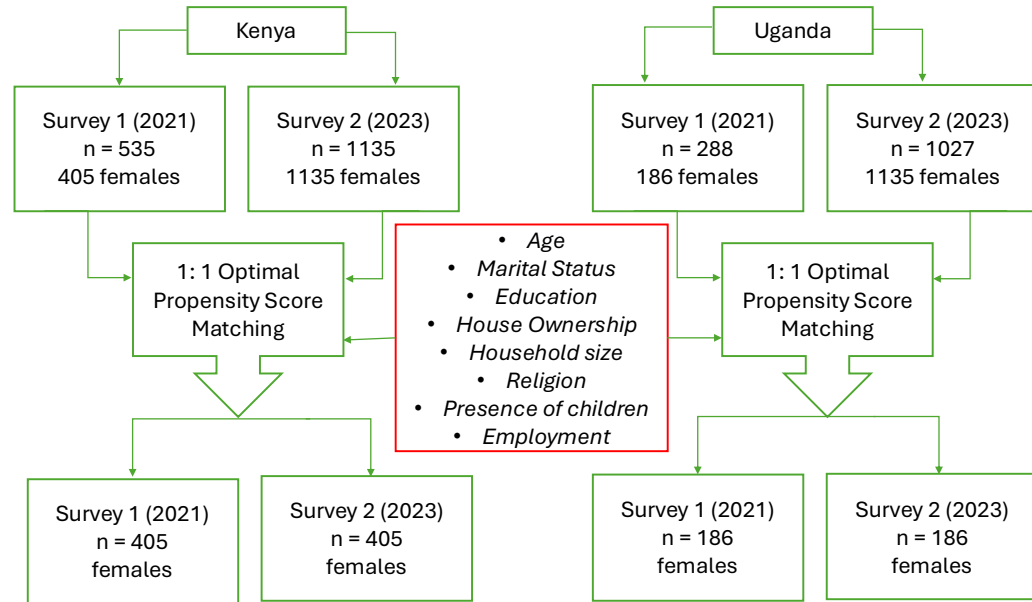


Figure 2: Data Flow

3.3 Processing of outcome and independent variables

Appendix A presents the independent and outcome variables considered in this research including the variable type as well as the categories that were adopted for reference in the regression analyses. Independent variables included: 1) Sociodemographic and socioeconomic variables- (Age (yrs), Marital status (Partnered, Unpartnered), Religion (Christian, Muslim), Household head (Yes, No), House Ownership (Owned by self or family member, Rent), Highest education level (Primary and Below, Above Primary), Household size (Number of people in the

household), Currently Employed (Yes, No), Wealth index; 2) WaSH and Water access - Presence of piped water into compound or dwelling (Yes, No), Presence of handwashing facility (Yes, No), Spend money on water (Yes, No), Water Insecurity index, WaSH insecurity index, Empowerment in WaSH access (e.g. water collection, managing toilets, water use,); 3) Health - whether one had health insurance (Yes, No). (Appendix A)

For the data collected during the pandemic, wealth index was generated based on self-reported assets such as motorized vehicles and bicycles, household amenities (e.g. fridge, radio, television, computer, cellphone etc.), and materials used to make the wall and floor of the house according to Demographic Health Survey (DHS) guidelines (Uganda 2016; Kenya 2023). Each of these assets was standardized before principal component analysis was used to calculate a wealth score, which was then divided into five classes (quintiles). The quintiles were dichotomized by combining the first 3 classes into ‘Poor’ category and the last 2 classes into ‘Less Poor’ category. The binary variable was then used in the regression analyses. The index showed an acceptable reliability with a Cronbach’s alpha of 0.73 in Kenya and 0.78 in Uganda. For the data collected post pandemic, there were only six questions probing ownership of household assets. Therefore, principal component analysis was not used to calculate the wealth index. Instead, the variables were assigned numerical values (1= Present and 0 = Absent) and summed up to generate an interval scale variable. The internal consistency in this case wasn’t good either as the Cronbach’s alpha was 0.62 for Kenya and 0.57 for Uganda.

Water and WaSH insecurity scales were measured using the Household Water Insecurity Experiences (HWISE) scale over the past 30 days (Young et al. 2019). Water insecurity was measured using a set of eight questions while WaSH insecurity was measured using the eight questions reflecting water insecurity plus an additional four questions specific to sanitation and

hygiene. Each question was scored on a five-point Likert scale of severity/frequency of occurrence ‘never’, ‘rarely’, ‘sometimes’, ‘often’, ‘very often’. Numeric values were assigned to the responses as 0=Never/Rarely, 1=Sometimes, 2=Often, 3=Very often; the values corresponding to respective questions relating to both scales were summed up to generate two interval scales that were considered for our analyses. Water insecurity scale showed an excellent internal consistency for the during pandemic data (Cronbach’s alpha: Kenya (0.95), Uganda (0.95)) as well as after the pandemic (Cronbach’s alpha: Kenya (0.94), Uganda (0.93)). WaSH insecurity scale on the other hand showed either good or excellent internal consistency for the during-pandemic data (Cronbach’s alpha: Kenya (0.93), Uganda (0.88)) as well as the after-pandemic data (Cronbach’s alpha: Kenya (0.94), Uganda (0.94)). Higher values for both scales were indicative of higher levels of water and WaSH insecurity.

The outcome or dependent variables included Wellbeing index. Emotional distress (GHQ-12 scale score >4), Perceived health relative to others (Poor/Fair, Good/Very good/Excellent), Perceived accessibility of healthcare services (Poor/Fair, Good/Very good/Excellent), Perceived quality of healthcare services (Poor/Fair, Good/Very good/Excellent). These variables were used to describe health and well-being in general as well as in association with other independent variables. However, for univariable and multivariable regression analysis, only wellbeing, emotional distress and perceived health relative to others own age were used. Perceived accessibility and quality of healthcare services as well as health insurance were helpful to provide context for the findings.

Wellbeing was measured using a set of seven questions scored in a five-point Likert scale (Never, Rarely, Sometimes, Often, Very often) reflecting the frequency with which the participants were unable to: *pay bills on time, pay health insurance premiums on time, pay rent on time, fix*

their houses, buy enough food, buy the thing they needed and the things they wanted; not having enough money over the past year (Kangmennaang & Elliott 2023). This scale was adopted from the Canadian community wellbeing index but was modified to incorporate salient factors that potentially determine the standard of living in an African context. A numerical scale was generated by assigning numerical values to the responses such as: Never (0), Rarely (1), Sometimes (2), Often/Very often (3) and summing them up. Higher values were indicative of poor wellbeing. The index showed a good internal consistency with a Cronbach's alpha of 0.94 in Kenya and 0.83 in Uganda for the during-pandemic data as well as for the post-pandemic data which had a Cronbach's alpha of 0.86 in Kenya and 0.86 in Uganda.

Emotional distress was measured using a set of twelve questions of the General Health Questionnaire (GHQ-12) (Goldberg 1972). The 12 scale items documenting how respondents had been feeling lately (e.g., lost much sleep over worry, and felt that they had been handling things well); and how the responses were dichotomized are illustrated in Table 3.2. (Appendix B). Individual scores were added and all instances with a total score of ≥ 4 were considered as probable cases of emotional distress, which was assigned 1 for the regression analyses. The emotional distress index showed an acceptable internal consistency with a Cronbach's alpha of 0.76 in Kenya and a good internal consistency with a Cronbach's alpha of 0.83 in Uganda for the during-pandemic data. In the post-pandemic data, the index showed a good reliability with a Cronbach's alpha of 0.80 in Kenya and 0.83 in Uganda.

Other outcome variables included: perceived health relative to others own age, perceived healthcare accessibility in the community and perceived community healthcare services' quality. All these were measured on a five-point Likert scale ranging from poor, fair, good, very good and

excellent. For the regression analyses, the variables were dichotomized into 0 (Good/Very Good/Excellent) and 1 (Poor/Fair).

3.4 Propensity Score Matching

Propensity Score Matching (PSM) was first introduced by Rosenbaum and Rubin to enable investigators to measure the effect of an intervention without necessitating the randomization of subjects to that intervention. (Rosenbaum and Rubin 1983). The concept has been widely applied to clinical trials to remove the bias of confounders from influencing whether or not subjects receive a given intervention, thereby purifying the outcomes as a consequence of only the intervention and not from any other preexisting factors (Kane et al. 2020). Unless randomization is performed, it's impossible to assume that the treated group is similar to the control group; and often times, the treatment group differs characteristically from the control group as a result of other variables that increase the likelihood of subjects being selected for treatment. In these scenarios, the observed outcome could be considered a function of the group confounders as well as the treatment effect. However, there is a need to estimate the specific effects of the interventions in populations where randomization is not or cannot be performed, for instance in retrospective observational studies. Hence the need for investigators to account for programmed covariate characteristics to statistically isolate the effect of the intervention in the same way randomization does. PSM is a statistical tool that helps accomplish this task.

PSM therefore works by removing imbalances of covariates in a cohort and thereby approximating a randomized experiment in an observational study. For PSM to work, data must be available on the characteristics that influenced the subjects' propensity to enrollment in a given

cohort. The two cohorts, normally treatment and control, are assigned 0 and 1, 1 being the treatment group. The characteristic data are then regressed onto the cohort indicator variable using a binary logistic or probit regression in order to estimate the correlation of each variable with the selected treatment. The coefficient estimates obtained from this regression are then retroactively used to calculate a predicted probability, bounded at 0 and 1, of treatment of each subject based on the individual's specific characteristics. Each subject from the treatment group is then matched with one or multiple subjects from the control group based on the closest probability of treatment and the size of the available control cohort. Once each treatment participant is matched, the unused control subjects are removed and analysis to compare intervention outcomes proceed with the new control group.

There exists several matching method but the most effective ones are nearest neighbor matching and optimal matching (Benedetto et al. 2018). Nearest neighbor employs a greedy algorithm which randomly selects a treated subject and sequentially moves through the list of subjects in the control group until it identifies the closest match. The optimal matching algorithm, on the other hand minimizes the overall distance across matched groups. To increase the quality of matches, several options could be considered. These include matching with replacement and matching with caliper adjustment. For matching with replacement, a control participant could be paired with multiple treatment participants, incase the control participant's propensity score provides the closest match to multiple treatment participants. Caliper matching uses a prespecified distance within which possible participant matches could be obtained. In this case, if the best match is without the caliper distance, the matches are not included in the final set. The designated distance is normally a fraction of a standard deviation of the logit of the propensity score (e.g. 0.20 SD) (Brookhart et al. 2006).

Having laid the groundwork for the conventional application of PSM, I'll proceed to describe why and how I used the method. The two cross-sectional studies hereby considered were conducted in the same geographical location. This could be interpreted as that the samples for the two surveys were drawn from the same population at the country level, although the samples had some notable differences, as we'll see in the results. The objective of this study was to investigate the differences in health and wellbeing of women post COVID-19 pandemic period relative to during the pandemic. This could best be achieved by selecting comparable participants in the two surveys to mimic a two-timepoint longitudinal study. PSM helps to achieve this while eliminating bias that could result from differences in sample composition.

The PSM process is hereby illustrated Mathematically as to how appropriate it was in this research.

Consider a binary outcome variable Y , with possible values 0 (no observed outcome) and 1 (outcome observed)

Let Y_{0i} and Y_{1i} be the possible outcomes for participant i

Also let $D_i = 1$ and $D_i = 0$ denote the data collected for participant i at time 1(post-pandemic) and 0 (during pandemic) respectively

The individual Causal Effect (ICE) will then be given by:

$$d_i = Y_{1i} - Y_{0i}$$

The Average Causal Effect (ACE) will then be given by:

$$E[d_i | D_i = 1] \\ = E[Y_{1i} - Y_{0i} | D_i = 1] \dots \dots \dots (1)$$

By using the law of iterated expectation, with $P(x_i)$ as the Propensity score for individual i , expression 1 becomes:

$$E[E[Y_{1i} - Y_{0i} | D_i = 1, P(x_i)] | D_i = 1] \dots\dots\dots (2)$$

$$= E[E[Y_{1i} | D_i = 1, P(x_i)] - E[Y_{0i} | D_i = 1, P(x_i)] | D_i = 1] \dots\dots\dots (3)$$

The left-hand side (LHS) of the minus (-) in expression 3 corresponds to the observed ACE while the right-hand side (RHS) corresponds to the counterfactual ACE

From the Propensity Score Theory (PST), we establish that Y_{0i} and Y_{1i} are conditionally independent of D_i when conditioned on the propensity score of a given individual; expressible as:

$$Y_{1i}, Y_{0i} \perp\!\!\!\perp D_i | P(x_i)$$

Hence the value of D_i used in the counterfactual expression does not matter, so we could use $D_i = 0$ instead of $D_i = 1$, to obtain:

$$E[E[Y_{1i} | D_i = 1, P(x_i)] - E[Y_{0i} | D_i = 0, P(x_i)] | D_i = 1] \dots\dots\dots (4)$$

The LHS of the minus (-) sign in expression 4 now represents the average level of observed outcome for the participants included in the post-pandemic survey given a particular level of propensity score. The RHS represents the average level of the outcome variable for the participants in the during the pandemic survey with a similar propensity score.

Hence, this analysis seeks to evaluate the average differences in health and wellbeing measures for the groups with the same level of propensity score across all potential scores in the during and the post-pandemic surveys.

Expression 4 could be arranged into

$$E[E[Y_{1i} | D_i = 1] - E[Y_{0i} | D_i = 0] P(x_i) | D_i = 1] \dots\dots\dots(5)$$

By substituting for $\Delta\mu$, the population difference in mean in expression 5,

$$E[\Delta\mu P(x_i) | D_i = 1] \dots\dots\dots (6)$$

And expression 6 can be re-written as the summation of the product of mean differences, propensity scores and weights for the participants in the two surveys (denoted by s).

$$\sum_s \Delta\mu P(x_i) \omega_s$$

ω represents the sampling weight, i.e., the weight by the number of individuals in each survey. For a 1:1 pair matching, $\omega = 1$.

Two PSM approaches were considered here: 1:1 Nearest Neighbor Matching without replacement, starting from the largest propensity score and 1:1 Optimal Pair Matching. The two methods are the most common approaches that yield the best results. The matching was done based on age, marital status, house ownership, education level, number of people in the household (household size), presence of children in the house, religion and employment status. (Figure 2). After examining the love plots of the standardized differences, optimal pair matching was settled upon. Love plots show changes in standardized mean difference before (red) and after (blue) the matching exercise. A successful match will have the most if not all the blue dots within the dotted error bounds. Optimal pair matching love plots are presented in Figure 4 (Kenya) and Figure 6 (Uganda).

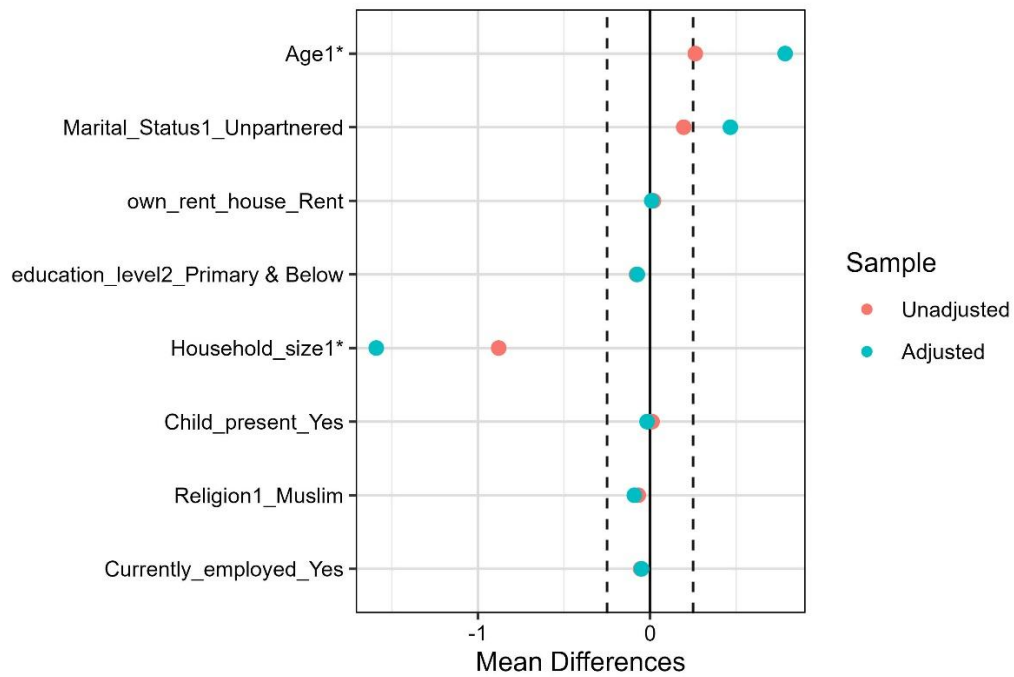


Figure 3: Love plot for Nearest Neighbor Matching (Kenya)

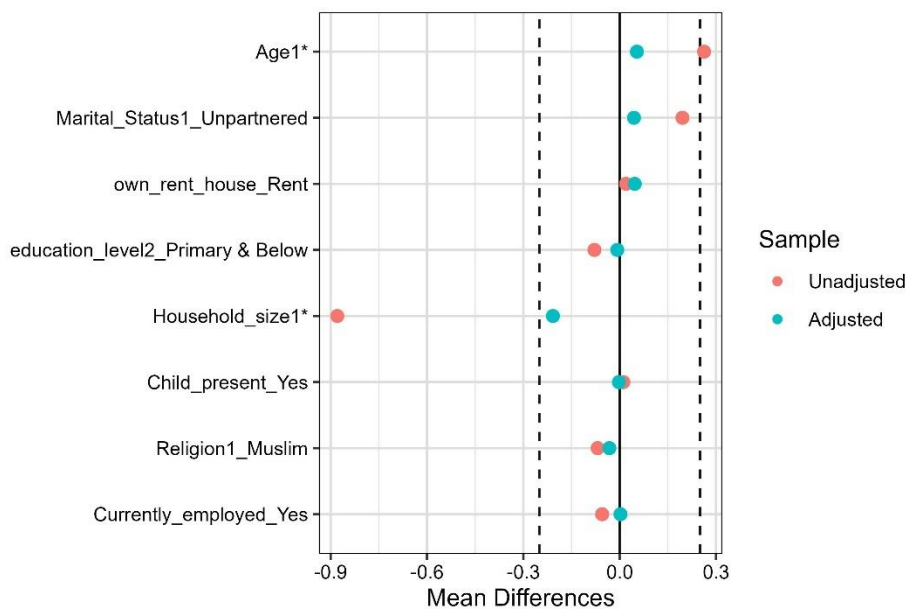


Figure 4: Love plot for Optimal Pair Matching (Kenya)

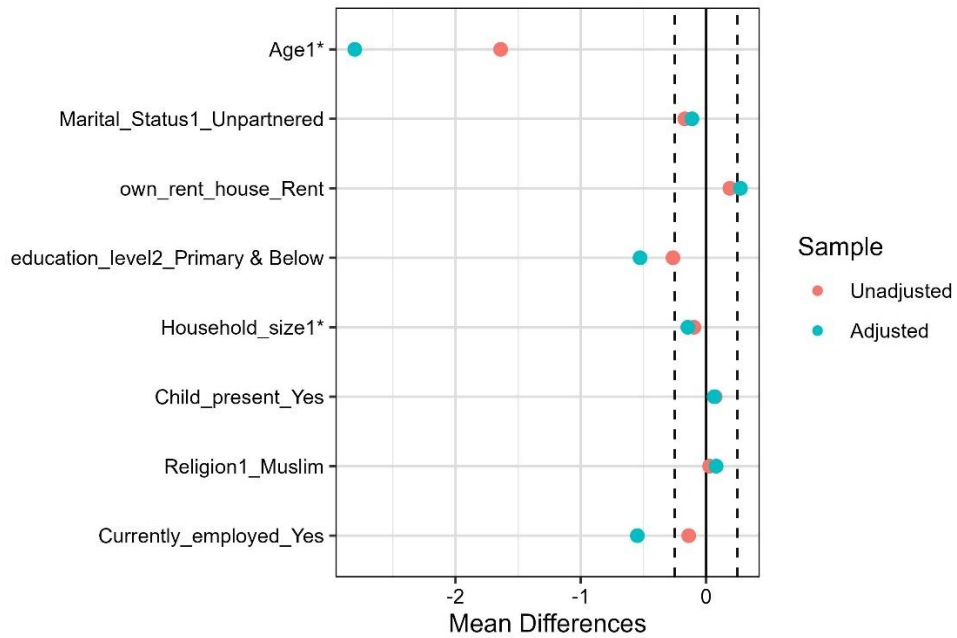


Figure 5: Love plot for Nearest Neighbor Matching (Uganda)

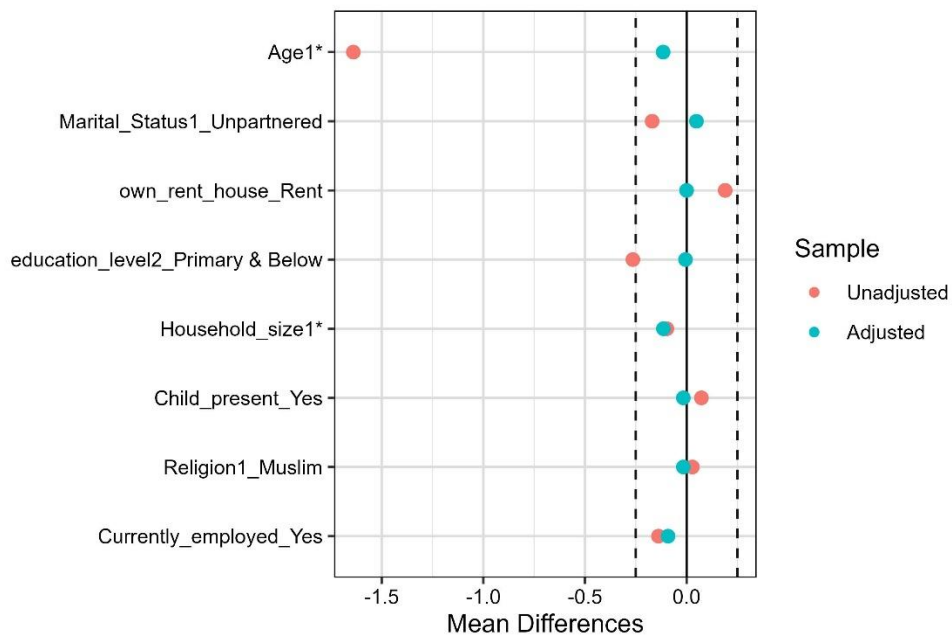


Figure 6: Love plot for Optimal Pair Matching (Uganda)

3.5 Statistical Analysis

The statistical analysis was done in three stages: starting with descriptive statistics, univariable regression and followed by multivariable regression. For all the three objectives, continuous and interval variables are described using means, standard deviations, medians and ranges while categorical variables are described using frequencies and percentages. Univariable and multivariable binary generalized linear model (GLM) regression was used to assess the association between the independent variables and the outcomes (emotional distress, perceived health) first independently and thereafter adjusting for other confounders. The GLM adopted complementary log-log link function. Complementary log-log link function, being an asymmetric (or skewed) link, is considered more appropriate than the symmetric links (e.g. probit and logit) when the number of 1's and 0's are much different (unbalanced data) (Chen et al. 1999; Prasetyo et al. 2019). The results following the GLM regression were presented as odds ratios (ORs), 95% Confidence Intervals (95% CI) and p-values. To explore factors associated with wellbeing, univariable and multivariable vector generalized linear model (VGLM) was used, and the results were presented as Coefficient (β), Standard Error, and p-values.

To evaluate changes in health and wellbeing (Objective 3), generalized estimating equations (GEE) from the R package *geepack*, was used on the resultant matched data following propensity score matching. GEE is used for fitting marginal generalized linear models to clustered data. Clustered data arise in diverse applications such as longitudinal data and repeated measures (Højsgaard et al. 2006). The propensity score matching process generated pairs of data with 'similar' demographic features from two sets of data collected from repeated cross-sectional surveys, thereby mimicking a two-timepoint longitudinal study. Participants with the same propensity scores (matched) were then treated as the same participant, studied twice (in 2021 and

2023) in this analysis. Assuming that matched participants should have the same experience, all factors held constant, exchangeable correlation structure was used in the GEE modelling. The outcome variables on which GEE was applied were wellbeing, emotional distress, and perceived health relative to others own age; all of which were binary except wellbeing. Therefore, wellbeing was also dichotomized with the cut-off at the median value (12) for application of the GEE model. Values above 12 were assigned 1, indicative of poor state of wellbeing. The results are reported as ORs, 95% CI and p-value.

In building the multivariable model, backward elimination was used, starting with a model with all predictors as informed by Sen's theory of capability and functioning, and then retrogressively dropping variables that either introduced multicollinearity in the model or prevented the model from converging. Multicollinearity was checked by examining the variance inflation factors (VIFs); variables with $VIF > 5$ were dropped. Multicollinearity potentially distorts the results obtained from regression analysis since the inflation of variances of regression coefficients leads to statistically insignificant model coefficients and widens their confidence intervals (Kim 2019).

The goodness of fit of the final multivariable models were assessed by McFadden's R^2 , Area Under Curve (AUC) and Classification accuracy. For binary outcomes, the common well-fitting models will have McFadden's R^2 between 0.2-0.4, indicating that the model provides between 20%-40% improvement in the log-likelihood over the null model (Belsley et al. 2005; McFadden 1974). AUC, similar to Concordance statistic (C-statistic), measures the predictive power of a model – an AUC = 0.5 implies that the model is simply making random guesses in distinguishing between the 0's and 1's of the outcome variable (Çorbacioğlu & Aksel 2023). Percentage Correctly Classified, or the prediction rate indicates the proportion of correct

predictions the model is able to make; hence higher values are preferable. In all analyses, p-values below 0.05 were considered statistically significant (analyses were done at 95% Confidence level). All analyses were done using R Software for Statistical Computing Vienna, Austria Version 4.4.3.

3.6 Cross-cultural Research

Cross-cultural research requires some degree of translation. This translation does not necessarily involve languages, which could be shared, but rather translation of values and concepts with contextual meanings and associations (Hay & Cope 2021). Conducting this kind of research has brought along some unique scientific as well as ethical challenges independent of discipline or research topic. In recent years, participating scientists have developed a keen interest in how they can be accountable to their participants and colleagues for their research practices. Cross-cultural research ought to be grounded in the recognition of the historical, political, sociological and cultural forces operating within the communities and individuals of focus. Most human geographic research is cross-cultural since the researchers are drawn into thinking about other people's constructions of place, other people's way of reading their cultural landscapes, even if the researchers themselves live in these landscapes in their everyday lives.

The design of the surveys used in this research was done in collaboration with local community research partners: COHESU in Kenya and ROTOM in Uganda. The surveys were part of the product of the longstanding partnership between the institutions, a collaboration spanning decades. COHESU and ROTOM have a good working relationship with the communities that formed the population for these surveys. Through the many years of conducting research with the communities and engaging in community development initiatives, the community has gained trust with these partners. Through this collaboration, the local communities were engaged in all levels of research from development of the proposal, designing data collection tools and data collection.

All results will be shared with the partners who will in turn hold meetings with the communities and local policy makers to disseminate the findings.

Prior to the commencement of the data collection activity, the original data collection tool (questionnaire) was reviewed with the partners from the local organizations. This was very helpful making the tool as sensitive as possible to cultural dynamics for example, by excluding topics that members of the community could not feel comfortable addressing openly. Through this exercise, the researchers were able to learn more about the worlds of this population in a collaborative format driven by the community itself and not solely guided by questions curated by ‘outsiders’. Data collection was done by members of the community themselves as supervised by the community leaders who then reported to the research officers at COHESU and ROTOM. The research officers trained the community leaders to collect data using the tablets with Kobo Collect and the leaders were able to train the data collection team on the same in a separate meeting. Feedback on progress as well as the quality of data would be communicated from the research officers, through the community leaders and to the data collection team. This framework of supervision helped to destabilize research structures of power during the data collection process.

Reflecting upon my positionality, I grew up in the community in which the research was conducted in Kenya. This, however, does not entirely make my position that of an insider. The fact that I have not stayed in this community continuously in the last ten years shifts my position to that of an outsider, since there could be some developments that I have been out of touch with. Moreover, being a man in my early 30’s, fortifies my position as an outsider given that that this research involves women of diverse generations. By also involving data from Uganda, even much more translation would be needed to contextualize the findings. I acknowledge the fact that I may not be attuned to how these obvious differences, in addition to other unobserved differences e.g.

cultural expectations as an academic, could shape the perspectives and experiences of the participants involved. I also acknowledge that knowledge production is deeply a political process that can potentially help reproduce stereotypes in the community. Therefore, I intend to work with the communities through COHESU and ROTOM to understand what the findings mean to them prior to publication or presentation at conferences.

3.7 Methodology

This research made use of quantitative methods to achieve its objectives. Quantitative methods provide a means of both expressing theories in formal language and empirically testing hypotheses. Whereas the expression of theories involves mathematical argumentation and representation (including mathematical modelling), hypothesis testing uses statistical procedures expressing the outcome of empirical research in probabilistic terms (Gregory et al. 2011). Statistical procedures have over the years since the post-1945 quantitative revolution become the predominant means whereby analysts test hypotheses about spatial patterns and processes, with the findings expressed as probability statements. These statements involve the likelihood either that the observed phenomena in a sample of observations (statistics) also hold in the population from which the sample is drawn (parameter) or that the identified relationship could have occurred by chance rather than that the result of some assumed causal sequence. The application of statistical methods could either involve deductive reasoning where formal hypotheses relating to magnitude and direction of relationships among variables are explicitly stated and then tested against empirical data; or inductive reasoning where patterns are identified in datasets that suggest ordered behavior. Analysis in this research involves statistical procedures guided by inductive reasoning as informed by theory.

Quantitative methods remain at the core of the geographical enterprise. Contemporary use of these methods in human geography holds that knowledge production involves observation, measurement, analysis and interpretation thereby generating statements that identify synoptic patterns. These patterns can then be decomposed to see how they are produced and what they mean for the people who live in them. Moreover, these methods allow a whole range of subjects to be aggregated enabling the drawing of valid generalizations to illuminate certain aspects of the human condition (Gregory et al. 2011). Therefore, for any quantitative study, the variables involved should be observable and measurable, the veracity of the conclusions derived should be testable and the entire study process should be replicable.

3.8 Reliability

The surveys made use of many instruments, for example GHQ-12 for emotional distress, that were used to construct indices for the analysis. Efforts were made to ensure that the instruments' observed scores were highly correlated with their true scores. This theoretical concept was operationalized and assessed with test-retest reliability correlations as well as with measures of internal consistency such as Cronbach's alpha (Henson et al. 2020). Prior to inclusion of these instruments in the questionnaire, measurement validity for construct, content, convergent and discriminant validity were ensured. There was sufficient evidence that the measures were good enough to be included in the surveys as informed by score validities from prior scholarly work in similar samples. Yet still this research didn't assume that reliability coefficients from previous samples were psychometrically applicable universally; the internal consistency was tested to ensure reliability.

3.9 Summary

This research aimed to evaluate changes in health and wellbeing as experienced by women in Kenya and Uganda in 2023 (post-pandemic) relative to during the pandemic (2021). The datasets, though collected in a disjointed format, were combined using propensity score matching to filter out differences in outcome attributed to selection bias. The final data comprised of 405 pairs of women in Kenya and 186 pairs of women in Uganda. Although the samples between counties vary to some extent in terms of composition as we will see in the next chapter, the surveys were sufficiently powered to facilitate a robust statistical analysis.

CHAPTER FOUR: RESULTS

4.0 Introduction

The results presented in this chapter are organized around the three research objectives:

1. To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda during the COVID-19 pandemic among women;
2. To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda post COVID-19 among women; and,
3. To investigate the contribution of sociodemographic and household characteristics to health and wellbeing in Kenya and Uganda pre- and post-COVID-19 among women in a combined sample.

Depending on the analytic tool employed, the results of the models are presented in the tables in terms of Odds ratios (ORs), 95% Confidence Interval (95% CI) and p-value; or coefficient (β), standard error and p-value. Model diagnostic results (McFadden's r^2 , area under the curve and percentage correctly classified) are indicated at the bottom of each table.

4.1 Objective One: To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda during the COVID-19 pandemic

4.1.1 Sample characteristics, access to water and sanitation, empowerment, health and wellbeing during the COVID-19 pandemic period

This survey employed varied sampling strategies for each country and data collection was done under difficult circumstances at the height of the pandemic; thus there are differences in the composition for each sample to some extent (Table 4.1). First, the sample size in Uganda was much smaller owing to the restrictions imposed by the government to control transmission. Secondly,

the Ugandan sample comprised older women (mean age 74.3 years, median 74 years) compared to the Kenyan sample (mean age 37.9 years, median 35 years) (Table 4.1). The focus on older women in Uganda reflects the needs and concerns of the community partner (ROTOM). The proportion of Kenyans who were either married or cohabiting (partnered) was significantly higher than that for Ugandans and this aligns with the differences in the age distribution (Table 4.1). Christianity was the dominant religion in both countries with no significant difference observed between Kenya and Uganda. In both countries, except for certain regions such as Coastal Kenya, the dominant religion is Christianity. This has further implications as each religion has distinct beliefs that translate to cultural practices. More Ugandans were household heads compared to Kenyans since Ugandans were much older and unpartnered (Table 4.1). Majority of the participants in both countries lived in houses they owned individually or that were owned by a family member although fewer participants in Uganda than Kenya lived in rental houses (Table 4.1). These numbers possibly reflect the proportion of the samples living in rural areas and also in formal employment. Those in urban settings tend to live in rental houses and tend to be engaged in some form of employment rather than subsistence farming. Hence, a plausible assumption is that more Kenyans were living in ‘urban’ areas compared to Ugandans. Although Kenyan women were significantly more educated than Ugandans (more than half of the Ugandan women had no formal education compared to 4.2% in Kenya), the take home message is the same: low levels of education across both samples (only 4.7% of the Kenyans and 2.2% of the Ugandans were educated beyond secondary school) (Table 4.1). While Kenyan households comprised significantly more people compared to Ugandan households, approximately 80% of the households in both countries had children living in them (Table 4.1). Both these situations are expected in these settings. In Kenya, since the sample comprised majorly of partnered and younger people, they

were more likely to have children of their own with whom they lived. In Uganda, the older women are more likely to be taking care of their grandchildren as a result of the loss of a middle generation to HIV/AIDs (Rishworth & Elliott 2017). It is also possible that the parents to these children have moved to the urban areas in search of employment, leaving the children behind to support their elderly parents with household chores. Moreover, despite the differences in average age, more Kenyans than Ugandans were unemployed while the proportion of those who were considered poor based on household assets was approximately 62% (Table 4.1). Given that Ugandans were mostly located in rural settings, the kind of employment here is majorly subsistence farming as opposed to Kenyans who mostly lived in urban settings and so had to depend on some form of wage employment, despite the high levels of unemployment in this region.

Table 4.1: Sample characteristics

	Kenya (n=405)	Uganda (n=186)	Sig.
Age (years) - Mean (SD); Median [Min, Max]	37.9 (13.3); 35.0 [18.0, 77.0]	74.3 (10.3); 74.0 [55.0, 100]	***
Marital Status - Partnered	75.1%	22.6%	***
Religion - Christian	89.9%	88.7%	NS
Household Head	37.3%	76.3%	***
Own House (personally or by a household member)	66.9%	84.4%	***
Education level			***
No schooling	4.2%	52.2%	
Primary	56.8%	36.0%	
Secondary	34.3%	9.7%	
Above Secondary	4.7%	2.2%	
Household size - Mean (SD); Median [Min, Max]	6.37 (2.05); 6.00 [3.00, 12.0]	5.92 (2.68); 6.00 [2.00, 12.0]	*
Household has a child	80.0%	79.6%	NS
Currently engaged in employment	41.2%	57.0%	***
Wealth Status - Poor	62.2%	62.9%	NS
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>			

The main sources of water for drinking and for other purposes in Kenya was piped water and water kiosk while in Uganda it was borehole and water from spring (Table 4.2). Getting water from boreholes meant they had to spend a considerable amount of time each day to and from these sources which are mostly located further from home. However, the piped water was mainly obtained from the neighbors in Kenya unlike in Uganda where it was mainly obtained within compound, yard or plot (Table 4.2). Hence in both countries, participants had to deal with water as well as WaSH insecurities. Also, in these settings, having access to piped water does not mean the water is safe or consistently available, communities still have to come up with other means to ensure they have the water they need. Such means include harvesting rainwater, storing water in cans and purifying unclean or even unsafe water among others. Toilet facilities were dominantly dry pit latrines in both countries with 5.7% in Kenya and 3.2% reporting no facility or to be defecating in the bush or field (Table 4.2). Looking at the distributions of these facilities, we can only conclude that the participants in both countries are resource poor, with less than 2% in both countries having flush toilets. The dry pit latrines are normally not well maintained and shared by multiple families. Even though this research took place during the COVID-19 pandemic period when a lot of washing of hands had to be done to reduce transmission probability, 16.5% of the women from Kenya and 65.1% of the women in Uganda reported no handwashing facility in their households (Table 4.2). High levels of both water and WASH insecurity were observed in Kenya compared to Uganda, a situation also reflected by the proportion that spent money to acquire water (90.4% in Kenya compared to 20.4% in Uganda) (Table 4.2). A plausible conclusion to make at this point would be that the situation of both water and WaSH insecurity was worse in Kenya compared to Uganda. The effect of water and WaSH insecurity on health and wellbeing has been

well documented. Some pathways through which this occurs include increased risk of violence including sexual violence while going to water sources, exposure to waterborne diseases such as diarrhea, absenteeism of children from schools, and risk of physical injuries while carrying water over long distances among others (Rhue et al. 2023).

Table 4.2: Water, Sanitation and Hygiene variables descriptive statistics

	Kenya (n=405)	Uganda (n=186)	Sig.
Main Source of drinking water			***
Delivered water	1 (0.2%)	2 (1.1%)	
Dug well	9 (2.2%)	24 (12.9%)	
Piped water	187 (46.2%)	27 (14.5%)	
Protected spring	1 (0.2%)	0 (0%)	
Rainwater collection	11 (2.7%)	20 (10.8%)	
Surface water	11 (2.7%)	7 (3.8%)	
Water kiosk	185 (45.7%)	1 (0.5%)	
Borehole	0 (0%)	52 (28.0%)	
Water from spring	0 (0%)	53 (28.5%)	
Main source of water for other purposes			***
Delivered water	1 (0.2%)	2 (1.1%)	
Dug well	11 (2.7%)	32 (17.2%)	
Piped water	190 (46.9%)	26 (14.0%)	
Rainwater collection	12 (3.0%)	17 (9.1%)	
Surface water	29 (7.2%)	12 (6.5%)	
Water from spring	1 (0.2%)	53 (28.5%)	
Water kiosk	161 (39.8%)	1 (0.5%)	
Borehole	0 (0%)	43 (23.1%)	
Form of piped water for drinking			***
Piped into compound, yard or plot	56 (29.9%)	18 (75.0%)	
Piped into dwelling	5 (2.7%)	2 (8.3%)	
Piped to neighbour	126 (67.4%)	4 (16.7%)	
Form of piped water for other purposes			***
Piped into compound, yard or plot	69 (36.5%)	19 (79.4%)	
Piped into dwelling	3 (1.6%)	2 (8.3%)	
Piped to neighbour	117 (61.9%)	3 (12.5%)	
Piped water in compound or dwelling			*
No	327 (80.7%)	165 (88.7%)	
Yes	78 (19.3%)	21 (11.3%)	
Type of toilet facility			***

	Kenya (n=405)	Uganda (n=186)	Sig.
Composting toilets	1 (0.2%)	13 (7.0%)	
Dry pit latrines	377 (93.1%)	145 (78.0%)	
Flush or pour flush	3 (0.7%)	2 (1.1%)	
Hanging toilet or hanging latrine	1 (0.2%)	19 (10.2%)	
No facility or bush or field	23 (5.7%)	6 (3.2%)	
Bucket	0 (0%)	1 (0.5%)	
Handwashing facility present			***
No	67 (16.5%)	121 (65.1%)	
Yes	338 (83.5%)	65 (34.9%)	
Spend money on water			***
No	39 (9.6%)	148 (79.6%)	
Yes	366 (90.4%)	38 (20.4%)	
WaSH insecurity index			***
Mean (SD)	19.0 (8.81)	6.12 (7.43)	
Median [Min, Max]	22.0 [0, 33.0]	2.00 [0, 31.0]	
Water Insecurity index			***
Mean (SD)	12.4 (6.29)	5.34 (6.74)	
Median [Min, Max]	14.0 [0, 21.0]	0 [0, 21.0]	
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>			

Table 4.3 describes women's empowerment among those who were partnered at the time of the survey. Women in Uganda were more empowered with regard to water collection, managing toilets, attending WASH meetings, household expenditures and sanitation and hygiene. Moreover, more women in Kenya reported being responsible for making most or all the decisions relating to water collection and attending WaSH meetings whereas more women in Uganda reported being responsible for making the majority of the decisions relating to managing toilets, household expenditures, and sanitation and hygiene (Table 4.3). Despite these differences, it is still safe to conclude that in these settings, women are less empowered since in all situations, women could only make less than two-thirds of the decisions at the household level in all samples across the countries. Men are the principal decision makers in these households due to societal norms. This

is likely to affect the perceived health of these women relative to others their age. On the other hand, they are unlikely to play useful parts in things, less capable of making decisions about things and likely to feel worthless; all of which contributes to emotional distress according to the GHQ-12 tool used in this research.

Table 4.3: Empowerment in WaSH variables descriptive statistics

	Kenya (n=304)	Uganda (n=42)	Sig.
Responsible for making decisions relating to water collection			*
No	201 (66.1%)	19 (45.2%)	
Yes	103 (33.9%)	23 (54.8%)	
Level of input on decisions relating to water collection			***
Input in few decisions	24 (23.8%)	4 (17.4%)	
Input Into some decisions	27 (26.7%)	9 (39.1%)	
Input into most or all decisions	50 (49.5%)	10 (43.5%)	
Responsible for making decisions relating to managing toilets			NS
No	200 (65.8%)	21 (50.0%)	
Yes	104 (34.2%)	21 (50.0%)	
Level of input on decisions relating to managing toilets			***
Input in few decisions	27 (26.0%)	3 (14.3%)	
Input Into some decisions	31 (29.8%)	8 (38.1%)	
Input into most or all decisions	46 (44.2%)	10 (47.6%)	
Responsible for making decisions relating to attending WASH meetings			NS
No	196 (64.5%)	25 (59.5%)	
Yes	108 (35.5%)	17 (40.5%)	
Level of input on decisions relating to attending WASH meetings			***
Input in few decisions	34 (31.5%)	0 (0%)	
Input Into some decisions	30 (27.8%)	11 (64.7%)	
Input into most or all decisions	44 (40.7%)	6 (35.3%)	
Responsible for making decisions relating to household expenditures			NS
No	196 (64.5%)	21 (50.0%)	
Yes	108 (35.5%)	21 (50.0%)	

	Kenya (n=304)	Uganda (n=42)	Sig.
Level of input on decisions relating to household expenditures			***
Input in few decisions	36 (33.3%)	2 (9.5%)	
Input Into some decisions	27 (25.0%)	9 (42.9%)	
Input into most or all decisions	45 (41.7%)	10 (47.6%)	
Responsible for making decisions relating to sanitation and hygiene			NS
No	188 (61.8%)	19 (45.2%)	
Yes	116 (38.2%)	23 (54.8%)	
Level of input on decisions relating to sanitation and hygiene			***
Input in few decisions	39 (36.8%)	0 (0%)	
Input Into some decisions	29 (25.0%)	11 (47.8%)	
Input into most or all decisions	48 (41.4%)	12 (52.2%)	
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda;</i> <i>Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>			

Emotional distress as indicated with scores of 4 or more in the GHQ-12 scale was much higher among Ugandan women compared to Kenyan women (88.2% vs 21.5%) (Table 4.4). The high prevalence in Uganda exceeds those reported during the same period by studies in the United States (48%), Saudi Arabia (44%), China (35%), and Spain (79.6%) (Keeter 2022; Qattan 2022; Qiu et al. 2020; Gómez-Salgado et al. 2020). The difference observed between Kenya and Uganda could be attributed partly to the differences in age in the two samples and partly to more strict COVID-19 restrictions imposed in Uganda. However, despite the differences in age, the state of wellbeing in Kenya was significantly worse compared to Uganda (Table 4.4). This is not surprising as we have already seen in Table 4.1 that women in Uganda were more likely to be employed and the households in Uganda had fewer people. This automatically places them at a better state to provide for the needs of their families such as food as well as meet their recurrent expenditures e.g. rent. Moreover, most women in Uganda were living in houses they owned themselves or by

members of their family hence they did not have to pay rent. Similarly, when asked about the state of their health relative to others their own age, 62.9% in Uganda compared to 25.7% in Kenya responded with either poor or fair (Table 4.4). This is partly attributed to differences in insurance coverage and partly to differences in age. Older people as in Uganda are more likely to suffer from many diseases owing to declining immunity compared to younger people. Although the proportion of the sample with health insurance in both countries was generally low, the situation was worse in Uganda as only 2.7% reported having health insurance. No significant differences were observed regarding the perception on healthcare accessibility and quality between Kenya and Uganda (Table 4.4). The take home message here is that samples in both countries were generally in a poor state of health and wellbeing arising from poverty and weak healthcare systems. These two factors were exacerbated by the COVID-19 burden as well as the restrictions put in place to control its transmission; restrictions which made it impossible to go to work and therefore led to loss of income, especially among people who lived from hand to mouth. Tables 4.5, 4.6 and 4.7 below provide a deeper insight into these associations.

Table 4.4: Health and wellbeing measures descriptive statistics

	Kenya (n=405)	Uganda (n=186)	Sig.
Emotional distress			***
Below cut-point (<4)	318 (78.5%)	22 (11.8%)	
Above cut-point (>=4)	87 (21.5%)	164 (88.2%)	
Has insurance			***
No	311 (76.8%)	181 (97.3%)	
Yes	94 (23.2%)	5 (2.7%)	
Wellbeing (High value= Poor wellbeing)			***
Mean (SD)	17.2 (5.80)	9.59 (4.20)	
Median [Min, Max]	16.0 [6.00, 24.0]	8.00 [6.00, 24.0]	
State of health relative to others own age			***
Good/Very good/Excellent	301 (74.3%)	69 (37.1%)	
Poor/Fair	104 (25.7%)	117 (62.9%)	

	Kenya (n=405)	Uganda (n=186)	Sig.
Healthcare Services Accessibility			NS
Good/Very good/Excellent	311 (76.8%)	132 (71.0%)	
Poor/Fair	94 (23.2%)	54 (29.0%)	
Healthcare Services Quality			NS
Good/Very good/Excellent	270 (66.7%)	133 (71.5%)	
Poor/Fair	135 (33.3%)	53 (28.5%)	
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>			

4.1.2 Associations between sociodemographic and household variables with health and wellbeing

In this subsection, this thesis explore the associations between a range of factors (sociodemographic, water and WaSH access, empowerment and health insurance) with wellbeing, emotional distress and perceived health relative to others own age in both Kenya and Uganda during the pandemic. As already noticed in the foregoing discussion, these samples are different in composition and so the associations will be interpreted in the light of these differences as well as other structural differences. While the univariable model contains all the independent variables, the multivariable models exclude variables that present multicollinearity.

Increasing age appeared to be associated with improving state of wellbeing in both countries except for the univariable model in Kenya (Table 4.5). While marital status was not associated with wellbeing, religion only indicated a significant association in the univariable models although in opposite directions in Kenya as in Uganda (Table 4.5). Being the head of a household was associated with better state of wellbeing but again in opposite directions. In Kenya, household heads were likely to be in a worse state of wellbeing while in Uganda they were associated with better state of wellbeing, although only in the multivariable model (Table 4.5). Living in a house owned by self or by other family members was associated with worse state of

wellbeing in Kenya in both models while there was no association in Uganda (Table 4.5). This is quite surprising since people who live in their own houses are normally exempted from some recurrent expenditures such as rent although they have to incur the cost of home maintenance. Higher educational attainment was associated with better state of wellbeing but significant association were only observed for the univariable model in Kenya and multivariable model in Uganda, even though the direction of association was maintained throughout the models (Table 4.5). Women living in larger households as well as households with children were more likely to experience better states of wellbeing yet only in the univariable model in Kenya (Table 4.5). Employment and wealth were associated with wellbeing in the multivariable models for both countries although in opposite directions (Table 4.5).

When it comes to WaSH access variables, some patterns begin to appear clearer. Those who had access to piped water were more likely to report a better state of wellbeing in Kenya (Table 4.5). In Uganda, an association in an opposite direction is depicted in the univariable model but the significance is lost in the multivariable model. While having handwashing facility was associated with worse state of wellbeing in Kenya for the univariable model, no association is observed in the multivariable model as well as in both models in Uganda (Table 4.5). Spending money to acquire water as well as water insecurity were both associated with worse state of wellbeing in Uganda although Kenya did not indicate any significant association (Table 4.5).

Being responsible for making decisions regarding water collection as well as managing household toilets were both associated with better states of wellbeing although only in the univariable model in Kenya (Table 4.5). Women who were responsible for making decisions regarding attending WaSH meetings were more likely to report better states of wellbeing. Although the direction of association was maintained all through the models, significance was depicted only

in the univariable model in Kenya and the multivariable model in Uganda (Table 4.5). Making decisions relating to household expenditures as well as regarding sanitation and hygiene were associated with wellbeing in Kenya and Uganda although in opposite directions. In Kenya these responsibilities were associated with better wellbeing unlike in Uganda (Table 4.5). To conclude, an interesting pattern emerges in the association between empowerment and wellbeing: empowered women were more likely to report better states of wellbeing in Kenya but more likely to report worse states of wellbeing in Uganda. It is then only safe to assume that being empowered is a positive thing for younger women who would prefer to enjoy autonomy but a negative thing to older women who may not be comfortable with decision making responsibility. Other reasons could be because Kenyans were more educated and therefore had greater expectations.

Having health insurance was also associated with increased likelihood of reporting better states of wellbeing in both countries, atleast with regard to the direction of association depicted (Table 4.5). However, Uganda presented only a marginally significant association in the univariable model but no significant association in the multivariable model. Generally speaking, several variables in Uganda did not show significance likely due to small sample size. This situation is also visible with the low McFadden's r^2 of 0.077 which shows a weaker model compared to Kenya (Table 4.5).

Table 4.5: Factors associated with wellbeing during COVID-19 pandemic

	Univariable Model		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	-0.020 (0.033); 0.549	-0.090(0.029); 0.002**	-0.064(0.029); 0.028*	-0.094(0.030); 0.002**
Marital Status (Ref: Unpartnered)				
Partnered	1.180(1.017); 0.246	-0.703(0.736); 0.340	0.487(0.896); 0.587	-1.471(0.820); 0.073

	Univariable Model		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
Religion (Ref: Muslim)				
Christian	-4.521(1.521); 0.003**	2.492(0.959); 0.009**	-1.426(1.212); 0.239	1.147(0.853); 0.179
Household Head (Ref: No)				
Yes	2.950(0.913); 0.001***	-0.356(0.725); 0.620	3.305(0.878); <0.001***	-1.796(0.838); 0.032*
Own House (Ref: No)				
Yes	4.480(0.909); <0.001***	0.619(0.850); 0.466	5.149(0.917); <0.001***	1.019(0.751); 0.175
Education level (Ref: Primary & Below)				
Above Primary	-2.425(0.896); 0.007**	-1.341(0.951); 0.158	-0.452(0.809); 0.576	-1.751(0.829); 0.035*
Household size	-0.718(0.212); 0.001***	0.036(0.115); 0.755	-0.258(0.193); 0.180	-0.028(0.121); 0.818
Household has a child (Ref: No)				
Yes	-5.533(1.121); <0.001***	0.742(0.763); 0.331	-2.062(1.079); 0.056	0.311(0.813); 0.702
Currently engaged in employment (Ref: No)				
Yes	1.549(0.896); 0.084	0.051(0.623); 0.934	2.799(0.758); <0.001***	-1.245(0.613); 0.042*
Wealth Status (Ref: Less Poor)				
Poor	6.167(0.859); <0.001***	-0.718(0.636); 0.259	3.920(0.718); <0.001***	-1.419(0.601); 0.018*
Piped water in compound or dwelling (Ref: No)				
Yes	-4.795(1.082); <0.001***	2.071(0.963); 0.032*	-2.070(0.946); 0.029*	0.990(1.050); 0.346
Handwashing facility present (Ref: No)				
Yes	2.544(1.172); 0.030*	-0.744(0.645); 0.249	0.632(0.949); 0.506	-0.399(0.578); 0.490

	Univariable Model		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
Spend money on water (Ref: No)				
Yes	-0.543(1.505); 0.718	2.895(0.735); <0.001***	0.227(1.209); 0.851	2.472(0.800); 0.002**
WaSH insecurity index	0.046(0.050); 0.357	0.119(0.041); 0.004**	N/A	N/A
Water Insecurity index	0.024(0.070); 0.729	0.169(0.044); <0.001***	0.010(0.055); 0.855	0.141(0.040); <0.001***
Responsible for making decisions relating to water collection (Ref: No)				
Yes	-5.606(0.855); <0.001***	1.132(0.655); 0.084	-2.581(1.399); 0.065	0.762(0.868); 0.380
Responsible for making decisions relating to managing toilets (Ref: No)				
Yes	-5.713(0.852); <0.001***	0.902(0.685); 0.188	0.164(1.465); 0.911	0.462(0.891); 0.604
Responsible for making decisions relating to attending WASH meetings (Ref: No)				
Yes	-5.834(0.849); <0.001***	-0.365(0.617); 0.554	-0.542(1.324); 0.683	-2.131(0.694); 0.002**
Responsible for making decisions relating to household expenditures (Ref: No)				
Yes	-6.200(0.838); <0.001***	1.245(0.625); 0.047*	-1.793(1.416); 0.205	N/A
Responsible for making decisions relating to sanitation and hygiene (Ref: No)				
Yes	-6.271(0.834); <0.001***	1.714(0.635); 0.007**	-3.373(1.464); 0.021*	2.233(0.795); 0.005**

	Univariable Model		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
Has health insurance (Ref: No)				
Yes	-5.427(0.987); <0.001***	-3.691(1.898); 0.052	-5.757(0.794); <0.001***	-1.288(1.764); 0.465
Model Statistics				
McFadden's R ²			0.120	0.077
Note: Results from tobit regression on wellbeing, presented as coefficients (standard errors); p-values; N/A – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **; $\alpha = 0.05$ *				

Table 4.6 presents the results of the association between emotional distress and several independent variables. Among the sociodemographic variables, there were some significant associations although no clear patterns were maintained between countries and from univariable to the multivariable regression. Older women were more likely to report emotional distress in both Kenya and Uganda (Table 4.6). Although this association was only significant in the multivariable model in Kenya, the association can still hold based on the consistent pattern and narrow confidence intervals. Women who were partnered were more likely to be emotionally distressed in both univariable and multivariable models, although only in Uganda (Table 4.6). Being household head was associated with reduced emotional distress in Kenya but increased emotional distress among Ugandan women who were much older (Table 4.6). Households with many members were associated with reduced levels of emotional distress although this association was only significant after adjusting for other confounding factors in Kenya (Table 4.6). Women who were engaged in some employment in Uganda were less likely to report emotional distress (Table 4.6). This association is significant in the univariable model and marginally significant in the multivariable model although no significance was observed in Kenya. Other sociodemographic factors (religion,

house ownership, presence of children and wealth) did not show significant association with emotional distress in both countries (Table 4.6).

Among water, sanitation and hygiene variables, the only significant association was between emotional distress and having a handwashing facility. In Kenya, women who had handwashing facilities were less likely report emotional distress, a relationship that did not exist in Uganda (Table 4.6). Having piped water into compound or dwelling, spending money on water, water and WaSH insecurity were all not associated with emotional distress (Table 4.6).

Women who were responsible for making decisions regarding water collection as well as those who were responsible for managing toilets in their households were less likely to report emotional distress. These relationships are however only significant in the univariable model in Uganda. No significant associations were seen in Kenya for both models (Table 4.6). Being responsible for making decisions relating to WaSH meetings was not associated with emotional distress in both countries (Table 4.6). In Uganda, women who were responsible for making decisions regarding household expenditures were more likely to report being emotionally distressed, after adjusting for other confounders. This association did not hold in Kenya as well as in the univariable model in Uganda (Table 4.6). Whereas there were no association between being responsible for making decisions pertaining to sanitation and hygiene in Kenya, women in Uganda who made such decisions were less likely to report emotional distress (Table 4.6).

Regarding health insurance, surprisingly, women in Kenya who had health insurance were more likely to report emotional distress although this relationship vanishes in the multivariable model (Table 4.6). No point or confidence estimates were available in Uganda due to failed convergence as a result of low numbers of women who had health insurance in Uganda (Table 4.6). From the model diagnostics, the multivariable models are relatively strong. The Kenyan

model was able to make 70.2% correct predictions while the Ugandan model was able to make 82.7% correct predictions - judging from the percentage correctly classified. The Ugandan multivariable model performed better than the Kenyan one as also reflected by the McFadden's r^2 of 0.243 compared to 0.111 (Table 4.6).

Table 4.6: Factors associated with Emotional distress during COVID-19 pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	1.01 (0.99-1.02); 0.469	1.01 (0.99-1.03); 0.262	1.02(1.00-1.04); 0.016*	1.01(0.98-1.04); 0.584
Marital Status (Ref: Unpartnered)				
Partnered	1.05 (0.65-1.76); 0.846	1.94 (1.14-3.54); 0.020*	0.85(0.48-1.58); 0.604	7.11(2.10-42.65); 0.005**
Religion (Ref: Muslim)				
Christian	0.97 (0.51-2.09); 0.938	1.11 (0.64-2.01); 0.719	0.79(0.39-1.75); 0.521	1.38(0.61-3.18); 0.422
Household Head (Ref: No)				
Yes	0.57 (0.35-0.90); 0.021*	0.86(0.55-1.34); 0.508	0.46(0.25-0.83); 0.011*	3.02(1.25-8.96); 0.019*
Own House (Ref: No)				
Yes	0.74 (0.49-1.15); 0.179	0.93 (0.56-1.57); 0.784	0.58(0.32-1.08); 0.087	0.77(0.35-1.59); 0.472
Education level (Ref: Primary & Below)				
Above Primary	1.46 (0.95-2.22); 0.080	0.88 (0.49-1.59); 0.661	1.40(0.82-2.39); 0.221	1.11(0.48-2.61); 0.801
Household size	0.93 (0.83-1.03); 0.191	1.00 (0.94-1.07); 0.917	0.85(0.74-0.98); 0.021*	1.09(0.98-1.23); 0.112
Household has a child (Ref: No)				
Yes	1.23 (0.72-2.23); 0.472	0.68 (0.41-1.12); 0.131	1.51(0.75-3.15); 0.252	0.45(0.18-1.04); 0.069
Currently engaged in employment (Ref: No)				
Yes	0.81 (0.52-1.24); 0.343	0.66 (0.45-0.97); 0.036*	0.70(0.42-1.15); 0.154	0.58(0.31-1.04); 0.059
Wealth Status (Ref: Less Poor)				

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Poor	0.72 (0.47-1.10); 0.126	0.90 (0.61-1.32); 0.581	0.82(0.51-1.33); 0.432	0.86(0.45-1.62); 0.614
Piped water in compound or dwelling (Ref: No)				
Yes	0.86 (0.47-1.46); 0.592	0.90 (0.50-1.57); 0.719	0.62(0.31-1.19); 0.155	1.69(0.69-4.16); 0.259
Handwashing facility present (Ref: No)				
Yes	0.43 (0.28-0.70); <0.001***	0.97 (0.66-1.42); 0.882	0.29(0.17-0.51); <0.001***	1.02(0.59-1.77); 0.948
Spend money on water (Ref: No)				
Yes	1.06 (0.54-2.38); 0.877	0.66 (0.42-1.02); 0.070	0.92(0.44-2.19); 0.843	0.52(0.26-0.96); 0.056
WaSH insecurity index	1.01 (0.98-1.03); 0.567	1.01 (0.98-1.03); 0.672	N/A	N/A
Water Insecurity index	1.02 (0.99-1.06); 0.248	1.00 (0.97-1.03); 0.925	1.00(0.96-1.04); 0.850	1.01(0.97-1.05); 0.759
Responsible for making decisions relating to water collection (Ref: No)				
Yes	0.74 (0.47-1.15); 0.187	0.62 (0.40-0.95); 0.030*	1.43(0.59-3.37); 0.399	0.84(0.32-2.30); 0.691
Responsible for making decisions relating to managing toilets (Ref: No)				
Yes	0.69 (0.43-1.07); 0.107	0.58 (0.36-0.92); 0.024*	0.64(0.24-1.63); 0.339	0.79(0.25-2.28); 0.648
Responsible for making decisions relating to attending WASH meetings (Ref: No)				
Yes	0.71 (0.45-1.11); 0.141	0.81 (0.56-1.18); 0.271	0.64(0.30-1.36); 0.248	N/A
Responsible for making decisions relating to household expenditures (Ref: No)				

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Yes	0.76 (0.48-1.17); 0.214	0.78 (0.53-1.15); 0.211	N/A	2.84(1.10-8.95); 0.041*
Responsible for making decisions relating to sanitation and hygiene (Ref: No)				
Yes	0.71 (0.45-1.09); 0.122	0.60 (0.39-0.91); 0.019*	N/A	0.25(0.06-0.78); 0.019*
Has health insurance (Ref: No)				
Yes	1.79 (1.13-2.77); 0.011*	N/A	1.53(0.94-2.43); 0.083	N/A
Model Statistics				
McFadden's R ²			0.111	0.243
Percentage Correctly Classified			0.702	0.827
Note: Results from logistic regression (complementary log-log link function) on emotional distress, presented as Odds Ratios (95% Confidence Interval); p-values; N/A – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **; $\alpha = 0.05$ *				

Table 4.7 presents the results of the association between perceived health relative to others own age with a number of independent variables. Most significant associations were observed in Kenya unlike Uganda. This could still be attributed to sample inadequacy as the goodness of fit measures for the multivariable model did not show a good model as indicated by McFadden's r^2 of 0.092 and percentage correctly classified of 0.589. Despite this, some meaningful results can still be found from point estimates that had narrow confidence intervals or were marginally significant. The Kenyan model however was good as it was able to make 84.4% correct predictions (Table 4.7).

Except for the univariable model in Kenya which was marginally significant, older women were more likely to report the state of their health relative to others their own age as poor/fair

compared to younger women (Table 4.7). Being partnered was associated with reduced odds of reporting poor/fair health in both Kenya and Uganda (Table 4.7). Although significant results were only observed in the univariable model in Uganda and the multivariable model in Kenya, this conclusion could still hold as the direction of association was maintained and the confidence intervals are not too wide. Women of Christian faith were more likely to report poor/fair health in the univariable model in Kenya, but this finding may not be reliable due to three reasons. First, the confidence intervals are quite wide (1.31-10.22) relative to the point estimate (3.13). Secondly, the significance is lost in the multivariable model. Thirdly, the direction of association also changes in the multivariable model. Again, no significant associations were observed in Uganda between religion and relative perceived state of health (Table 4.7). In both models in Kenya, women who were household heads were less likely to perceive their health as poor/fair relative to others their own age. However, no significant associations were found in both univariable and multivariable models in Uganda (Table 4.7). The association between house ownership and perceived health appears to be consistent across all models in both countries. Although for Uganda the association was only marginally significant in the univariable model and non-significant in the multivariable model, it is still possible to conclude that in both countries, those who lived in their own houses rather than rental houses were less likely to perceive their health as poor/fair since the confidence intervals are not too wide (Table 4.7). No clear pattern was observed in the relationship between education and perceived health in both countries. Moreover, the results were not significant in the multivariable models (Table 4.7). The number of people in a household was also not associated with perceived relative health in both countries (Table 4.7). However, from the narrow confidence intervals, we could glean some interesting results given that the direction of association was maintained throughout the models and in both countries. Hence, we could conclude that women

from households with many members were less likely to report their health as being poor/fair relative to others their own age (Table 4.7). This is quite a meaningful relationship in the face of lockdowns and curfews during the pandemic. Apparently, there were no differences in perceived health between households that had children and those that did not. The only significant association was in the univariable model in Kenya but this significance was lost in the multivariable model (Table 4.7). Surprisingly, in both models in Kenya unlike Uganda, those who were engaged in some employment were more likely to report poor/fair perceived health (Table 4.7). Again, surprisingly in Kenya, women who were poor in terms of household assets were less likely to report being poor/fair health relative to others their own age. No significant association was found between wealth status and perceived relative health in Uganda (Table 4.7).

Among the water, sanitation and hygiene variables, significant associations were only found in Kenya. For instance, women who had piped water into their compound or dwelling were more likely to report poor/fair health relative to others their own age in both models in Kenya. This is somehow surprising but could be indicative of the intermittent nature of the water supply or even of the quality of the water. No associations were seen in Uganda (Table 4.7). It was again surprising that those who had handwashing facilities in their households were more likely to report being of poor/fair health relative to others their own age, although this only held for the univariable model in Kenya (Table 4.7). Moreover, women who spent money to acquire water were more likely to perceive their health as poor/fair relative to others their own age. Again, this only applied to the univariable model in Kenya; in the multivariable model, the direction of association changes and the significance is also lost (Table 4.7). One interesting finding under water and sanitation access was the association between water insecurity and perceived relative health. Although only the univariable model in Kenya showed a significant association, the direction of association was

maintained in both countries and the confidence intervals were fairly narrow. Hence, it would still be safe to conclude that water insecurity was associated with increased odds of reporting poor/fair health relative to other own age in both Kenya and Uganda (Table 4.7).

For women's empowerment variables, again significant findings were only observed in Kenya and especially in the univariable model. However, looking at the confidence intervals, we can conclude that in both countries, women who were responsible for making decisions relating to water collection were less likely to report that their health was poor/fair relative to others their own age (Table 4.7). A similar observation was made with regard to decision making relating to managing toilets, attending WaSH meetings, household expenditures and sanitation and hygiene, although this only applied to the univariable models in Kenya (Table 4.7)

Having health insurance was not associated with the likelihood of reporting poor/fair health relative to others own age (Table 4.7). This applied to both the univariable and multivariable models in Kenya. No estimates were found due to low numbers of those with health insurance in the Ugandan sample (Table 4.7).

Table 4.7: Factors associated with Perceived State of health relative to others own age during COVID-19 pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	0.99(0.97-1.00); 0.074	1.02(1.00-1.04); 0.017*	1.03(1.01-1.06); 0.007**	1.03(1.00-1.05); 0.029*
Marital Status (Ref: Unpartnered)				
Partnered	0.71(0.47-1.09); 0.108	0.58(0.34-0.92); 0.029*	0.37(0.17-0.80); 0.008**	0.61(0.33-1.08); 0.125
Religion (Ref: Muslim)				
Christian	3.13(1.31-10.22); 0.025*	1.03(0.59-1.96); 0.920	0.98(0.34-3.54); 0.973	0.98(0.51-2.00); 0.953

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Household Head (Ref: No)				
Yes	0.33(0.19-0.53); <0.001***	1.15(0.74-1.83); 0.555	0.29(0.12-0.67); 0.004**	0.98(0.55-1.81); 0.952
Own House (Ref: No)				
Yes	0.09(0.05-0.14); <0.001***	0.65(0.40-1.10); 0.095	0.09(0.04-0.18); <0.001***	0.63(0.35-1.14); 0.106
Education level (Ref: Primary & Below)				
Above Primary	3.40(2.29-5.14); <0.001***	0.49(0.23-0.92); 0.042*	1.10(0.53-2.24); 0.783	0.55(0.25-1.08); 0.108
Household size	0.96(0.87-1.06); 0.412	0.98(0.91-1.05); 0.524	0.99(0.85-1.15); 0.930	0.96(0.88-1.05); 0.438
Household has a child (Ref: No)				
Yes	2.08(1.19-4.01); 0.017*	0.99(0.63-1.61); 0.971	1.05(0.47-2.41); 0.910	1.38(0.74-2.61); 0.313
Currently engaged in employment (Ref: No)				
Yes	2.39(1.62-3.56); <0.001***	0.80(0.55-1.18); 0.257	2.10(1.13-4.02); 0.015*	1.05(0.66-1.67); 0.851
Wealth Status (Ref: Less Poor)				
Poor	0.29(0.19-0.43); <0.001***	0.70(0.48-1.04); 0.073	0.19(0.10-0.34); <0.001***	0.81(0.50-1.31); 0.362
Piped water in compound or dwelling (Ref: No)				
Yes	5.37(3.62-7.96); <0.001***	0.72(0.36-1.30); 0.315	1.97(1.02-3.82); 0.033*	0.76(0.31-1.76); 0.525
Handwashing facility present (Ref: No)				
Yes	2.63(1.36-5.88); 0.009**	0.89(0.59-1.31); 0.551	1.01(0.44-2.61); 0.979	0.92(0.57-1.45); 0.712
Spend money on water (Ref: No)				
Yes	2.95(1.24-9.64); 0.034*	1.01(0.62-1.58); 0.971	0.86(0.32-3.03); 0.794	1.23(0.65-2.29); 0.510
WaSH insecurity index	1.01(0.98-1.03); 0.583	1.00(0.98-1.02); 0.992	N/A	N/A

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Water Insecurity index	1.05(1.02-1.09); 0.005**	1.01(0.98-1.04); 0.488	1.04(0.99-1.09); 0.124	1.02(0.98-1.05); 0.339
Responsible for making decisions relating to water collection (Ref: No)				
Yes	0.28(0.16-0.45); <0.001***	0.97(0.66-1.46); 0.891	0.28(0.09-0.86); 0.024*	0.90(0.51-1.60); 0.711
Responsible for making decisions relating to managing toilets (Ref: No)				
Yes	0.27(0.16-0.44); <0.001***	0.98(0.65-1.51); 0.922	N/A	N/A
Responsible for making decisions relating to attending WaSH meetings (Ref: No)				
Yes	0.33(0.20-0.52); <0.001***	1.02(0.70-1.49); 0.914	0.97(0.38-2.48); 0.951	1.02(0.59-1.78); 0.940
Responsible for making decisions relating to household expenditures (Ref: No)				
Yes	0.33(0.20-0.52); <0.001***	1.06(0.72-1.57); 0.776	0.91(0.30-2.51); 0.859	1.41(0.65-3.21); 0.394
Responsible for making decisions relating to sanitation and hygiene (Ref: No)				
Yes	0.29(0.17-0.46); <0.001***	0.99(0.67-1.49); 0.971	N/A	0.92(0.41-2.07); 0.847
Has health insurance (Ref: No)				
Yes	1.26(0.80-1.93); 0.295	N/A	1.33(0.67-2.59); 0.401	N/A
Model Statistics				
McFadden's R²			0.518	0.092
Percentage Correctly Classified			0.844	0.589

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
<i>Note: Results from logistic regression (complementary log-log link function) on poor/fair health relative to others own age, presented as Odds Ratios (95% Confidence Interval); p-values; N/A – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*</i>				

4.1.3 Summary of objective one findings

Even though this data was collected under difficult circumstances with each country adopting a different sampling strategy, the samples were similar in several aspects. In both countries, majority of the participants were Christians, lived in houses they owned individually or were owned by family members, had low levels of educational attainment, and had children present in their houses. Moreover, women in both countries experienced high levels of both water and WaSH insecurity, were less empowered, and had no health insurance. However, the women still perceived the accessibility and quality of healthcare services in their community as good/very good/excellent.

Some differences were also noted between the samples. Compared to those in Kenya, women in Uganda were more likely to be older, less educated, unpartnered, household heads, live in their own houses, have less children and to be engaged in some form of employment. Also, women in Kenya were more likely to report higher levels of water and WaSH insecurity and were also more likely to have health insurance compared to those in Uganda. These differences, though marginal in some cases, could explain the differences in health and wellbeing observed during this period. Most women in Uganda were reportedly emotionally distressed and regarded their health

as poor/fair relative to other their age but reported better states of wellbeing compared to those in Kenya.

In both countries, better states of wellbeing were associated with being more educated, less water secure and having health insurance. In Kenya, better states of wellbeing were additionally associated with being household head and being more empowered. Whereas emotional distress was associated with being older and being unemployed in both countries, in Uganda, women who were unpartnered and household heads were also likely to report being emotionally distressed. Moreover, perceived poor/fair health relative to others of same age was associated with being older, unpartnered, living in rental houses, having fewer people in a household, being water insecure, and not being responsible for making decisions regarding water collection. The next section explores these associations using data collected post COVID-19 pandemic.

4.2 Objective Two: To describe health and wellbeing across sociodemographic and household characteristics post COVID-19

4.2.1 Sample characteristics, access to water and sanitation, empowerment, health and wellbeing post pandemic period

The data used to achieve this research objective was collected post COVID-19. The COVID-19 restrictions had been lifted and there were significant drops in morbidity and mortality in most places. This gave the research team more time to plan and effectively execute the surveys so that the resultant data could be comparable between countries. This survey included 1135 women in Kenya and 1027 women in Uganda; in both countries aged 16 and above (Table 4.8). Sampling was done across age groups and that explains why there were no differences in the distribution of age between Kenya and Uganda (Table 4.8). However, some differences were still

present in the composition of the two samples. First, Kenyans were more likely to be partnered than Ugandans. Secondly, more Kenyans than Ugandans were of the Christian faith. Third, Kenyans were less likely to be heads of their households, corroborating with the fact that fewer Ugandans were partnered. (Table 4.8). There was, however, no difference in the proportion of samples in both countries that lived in houses they owned or were owned by members of their family. Approximately 60% of participants in both countries were living in houses they owned (Table 4.8). This could be a pointer to the proportion of the sample that lived in rural areas. In these settings, those who live in rural areas are likely to be living in their own houses while those who live in urban areas are likely to be living in rental houses. While the samples in both countries reported low levels of education – only 7.1% in Kenya and 4.4% in Uganda were educated beyond secondary schools and 8.2% in Kenya and 13.4% in Uganda had no formal education, Kenyans were more educated compared to Ugandans (Table 4.8). Households in Uganda had significantly more people than those in Kenya as also reflected in the higher number of households in Uganda that had children (Table 4.8). At this point, we could conclude that the higher number of people who lived in Ugandan households was principally contributed to by children who are legally unlikely to be engaging in income generating activities. The number of women engaged in some kind of employment was significantly lower in Kenya compared to Uganda although Kenyans were relatively wealthier (Table 4.8).

Table 4.8: Sample characteristics post pandemic

	Kenya (n=1135)	Uganda (n=1027)	Sig.
Age (years) - Mean (SD) Median [Min, Max]	42.5 (17.5) 40.0 [16.0, 96.0]	43.2 (19.0) 40.0 [16.0, 105]	NS
Marital Status - Partnered	55.5%	39.6%	***
Religion - Christian	96.3%	85.9%	***
Household Head	36.9%	41.5%	*

	Kenya	Uganda	Sig.
	(n=1135)	(n=1027)	
Own House	59.2%	58.9%	NS
Education level			***
No schooling	8.2%	13.4%	
Primary	44.9%	48.3%	
Secondary	39.7%	33.9%	
Above Secondary	7.1%	4.4%	
Household size - Mean (SD)	4.52 (2.04)	5.68 (2.54)	***
Median [Min, Max]	4.00 [1.00, 12.0]	6.00 [1.00, 12.0]	
Household has a child	81.1%	86.9%	***
Currently engaged in employment	35.8%	43.1%	***
Wealth - Mean (SD)	4.96 (2.73)	4.58 (2.85)	*
Median [Min, Max]	5.00 [0.00, 12.0]	5.00 [0.00, 12.0]	
Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **; $\alpha = 0.05$ *; NS = Non-significant ($p>0.05$)			

Even though the majority in both countries reported that the main source of water for drinking as well as for other purposes was piped water, the communities in both countries still have to deal with water insecurity for a couple of reasons. First, only 25.6% in Kenya and 6.5% in Uganda reported having piped water into their own compound or dwelling (Table 4.9). The only alternative used by the majority would be to obtain such water from their neighbors' compounds which may not be proximately located to them. This means that they still had to cover some considerable distance to obtain water. Also, piped water in these settings mostly flows intermittently. Moreover, the quality and safety of this water is never assured, it may have to go through some purification after collection before it becomes safe for drinking or cooking. The next available alternative is dug well or rainwater (Table 4.9). Dug wells are normally unprotected and therefore unsafe to use in addition to not being located within premises. Rainwater on the other hand is unreliable as it is only available during the rainy season unless people have tanks for long term storage. From comparing the levels of water and WaSH insecurities between the countries,

we find that the situation was worse in Kenya compared to Uganda. This conclusion is derived from the number of people that spend money to acquire water (85.6% in Kenya and 32.7% in Uganda) as well as from the HWISE scale (Table 4.9). From the main type of toilet facility, a number of deductions could be made. The main type of toilet facility in both countries was dry pit latrine. As already mentioned under objective one, these types of toilet facilities are normally poorly maintained and, in most cases, unsafe for use especially by children, the elderly and those with disabilities. The safest facility in these settings, flush or pour flush, are always located in the house and therefore accessible at all times including during the night; were only available for use by 2.9% of the sample in Kenya and 0.8% of the sample in Uganda (Table 4.9). This again shows the extent of poverty in these spaces.

Table 4.9: Water, Sanitation and Hygiene variables descriptive statistics post pandemic

	Kenya (n=1135)	Uganda (n=1027)	Sig.
Main Source of drinking water			***
Delivered water	49 (4.3%)	1 (0.1%)	
Dug well	80 (7.0%)	152 (14.8%)	
Piped Water	737 (64.9%)	596 (58.0%)	
Rainwater collection	126 (11.1%)	110 (10.7%)	
Surface water	6 (0.5%)	5 (0.5%)	
Water from spring	46 (4.1%)	151 (14.7%)	
Water Kiosk	91 (8.0%)	2 (0.2%)	
Other	0 (0%)	10 (1.0%)	
Main source of water for other purposes			***
Delivered water	53 (4.7%)	2 (0.2%)	
Dug well	181 (15.9%)	167 (16.3%)	
Piped Water	559 (49.3%)	601 (58.5%)	
Rainwater collection	88 (7.8%)	94 (9.2%)	
Surface water	84 (7.4%)	6 (0.6%)	
Water from spring	67 (5.9%)	143 (13.9%)	
Water Kiosk	102 (9.0%)	3 (0.3%)	
Other	0 (0%)	11 (1.1%)	

	Kenya (n=1135)	Uganda (n=1027)	Sig.
Have Piped water in compound or dwelling	291 (25.6%)	67 (6.5%)	***
Spend money on water	975 (85.9%)	336 (32.7%)	***
Water Insecurity index - Mean (SD); Median [Min, Max]	7.56 (6.49); 7.00 [0, 21.0]	4.59 (6.03); 2.00 [0, 21.0]	***
WaSH insecurity index - Mean (SD); Median [Min, Max]	11.3 (9.59); 10.0 [0, 33.0]	6.17 (8.46); 2.00 [0, 33.0]	***
Type of toilet facility			***
Bucket	3 (0.3%)	0 (0%)	
Container based sanitation	1 (0.1%)	0 (0%)	
Dry pit latrines	930 (81.9%)	957 (93.2%)	
Flush / pour flush	149 (13.1%)	15 (1.5%)	
No facility / Bush / Field	33 (2.9%)	8 (0.8%)	
Other Specify	19 (1.7%)	20 (1.9%)	
Hanging toilet / hanging latrine	0 (0%)	27 (2.6%)	
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **, $\alpha = 0.05$ *, NS = Non-significant ($p > 0.05$)</i>			

Table 4.10 describes the state of empowerment among women who were partnered. Comparing the two countries, more women in Kenya were responsible for making decisions relating to water collection and running small businesses while Ugandan women were more empowered with respect to making decisions relating to managing water use, purchasing large household items, and working in waged or salaried employment (Table 4.10). There was however no difference in the level of empowerment between Kenya and Uganda regarding responsibility towards household expenditures (Table 4.10). In both countries, the women had very limited say when it came to making economic decisions such as purchasing large household items, running small businesses, household expenditures and working in waged/salaried employment. For instance, only 17.9% and 34.5% of the women in Kenya and Uganda respectively could make decisions relating being engaged in employment, and again just to some extent (Table 4.10). This

level of patriarchy explains why the employment levels were low especially in Kenya as well as why poverty levels were high in both countries (Table 4.8).

Table 4.10: Empowerment in WaSH variables descriptive statistics post pandemic

	Kenya (n=630)	Uganda (n=406)	P-value
Responsible for making decisions regarding water collection	503 (79.8%)	263 (64.8%)	0.017*
Level of input on decisions relating to water collection			0.421
Input into most or all decisions	367 (67.6%)	198 (73.1%)	
Input into some decisions	171 (34.5%)	71 (26.2%)	
No input or input in few decisions	5 (0.9%)	2 (0.7%)	
Responsible for managing water use	559 (88.7%)	381 (93.8%)	0.008**
Level of input regarding managing water use			0.037*
Input into most or all decisions	429 (69.5%)	292 (72.3%)	
Input into some decisions	183 (29.7%)	104 (25.7%)	
No input or input in few decisions	5 (0.8%)	8 (2.0%)	
Responsible for purchasing large household items	223 (35.4%)	208 (51.2%)	<0.001***
Level of input regarding purchasing large household items			0.513
Input into most or all decisions	139 (48.1%)	116 (50.7%)	
Input into some decisions	143 (49.5%)	111 (48.5%)	
No input or input in few decisions	7 (2.4%)	2 (0.9%)	
Responsible for running small businesses	315 (50.0%)	178 (43.8%)	<0.001***
Level of input regarding running small businesses			0.011*
Input into most or all decisions	246 (69.5%)	149 (81.4%)	
Input into some decisions	104 (29.4%)	32 (17.5%)	
No input or input in few decisions	4 (1.1%)	2 (1.1%)	
Responsible for making decisions regarding household expenditures	322 (51.1%)	208 (51.2%)	0.074
Level of input regarding household expenditures			0.360
Input into most or all decisions	227 (56.5%)	126 (51.6%)	
Input into some decisions	172 (42.8%)	117 (48.0%)	
No input or input in few decisions	3 (0.7%)	1 (0.4%)	

	Kenya (n=630)	Uganda (n=406)	P-value
Responsible for decisions regarding working in waged or salaried employment	113 (17.9%)	140 (34.5%)	<0.001***
Level of input regarding working in waged or salaried employment			0.258
Input into most or all decisions	77 (60.2%)	97 (69.3%)	
Input into some decisions	47 (36.7%)	41 (29.3%)	
No input or input in few decisions	4 (3.1%)	2 (1.4%)	
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*</i>			

Probable cases of emotional distress (scores above 4 on the GHQ-12 scale) were again higher in Uganda compared to Kenya as was during the pandemic. However, in both countries, more than half of the samples were probable cases of emotional distress (Table 4.11). Also in both countries, the levels of health insurance coverage were very low. Approximately a third of the women in Kenya had health insurance while in Uganda only 5% reported having health insurance (Table 4.11). This could be attributed to lack of an effective universal health coverage programme provided by the government coupled with high poverty levels. Relatively, the state of wellbeing among Kenyan women was better compared to among Ugandan women (Table 4.11). The differences in wellbeing levels are possibly contributed to by differences in wealth. From table 4.8 we already found that Ugandan women were less wealthy but were more likely to have children in the household in addition to having more family members (Table 4.8). All these factors are likely to contribute to worse state of wellbeing as there are more mouths to feed with so little. Still, a higher proportion of the Ugandans reported that: their health relative to others their age was either fair or poor, the state of healthcare services' accessibility in their community was either fair or poor, and the state of healthcare services' quality in their community was either fair or poor (Table 4.11). The high numbers reporting poor/fair relative health is possibly attributable to low insurance

coverage and poor states of economic wellbeing. Also, the higher numbers of those reporting poor/fair accessibility and quality of healthcare services in Uganda could be indicative of the populations distrust of the existing healthcare systems. This distrust could only translate into turning to alternative medicine such as traditional medicine which are even more harmful to health due to unknown toxicities.

Table 4.11: Health and wellbeing measures descriptive statistics post pandemic

	Kenya (n=1135)	Uganda (n=1027)	P-value
Emotional distress - Above cut-point (≥ 4)	572 (50.4%)	570 (55.5%)	0.020*
Have health insurance	400 (35.2%)	51 (5.0%)	<0.001***
Wellbeing - Mean (SD) Median [Min, Max]	10.9 (4.00) 10.0 [6.00, 24.0]	12.6 (4.94) 12.0 [6.00, 24.0]	<0.001***
Perceived State of health relative to others own age			<0.001***
Good/Very good/Excellent	735 (64.8%)	370 (36.0%)	
Poor/Fair	400 (35.2%)	657 (64.0%)	
Perceived state of healthcare accessibility			<0.001***
Good/Very good/Excellent	810 (71.4%)	343 (33.4%)	
Poor/Fair	325 (28.6%)	684 (66.6%)	
Perceived state of healthcare quality			<0.001***
Good/Very good/Excellent	716 (63.1%)	360 (35.1%)	
Poor/Fair	419 (36.9%)	667 (64.9%)	
<i>Note: P-values arise from comparison of sample characteristics between Kenya and Uganda; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*</i>			

4.2.2 Association between individual and household characteristics with health and wellbeing post pandemic period

Table 4.12 explores the association between post-pandemic wellbeing with sociodemographic variables, water, sanitation and hygiene variables, empowerment variables and health insurance at univariable and multivariable levels. The multivariable models' diagnostics

indicated that the models had acceptable goodness of fit with a McFaddens r^2 of 0.191 in Kenya and 0.394 in Uganda (Table 4.12).

Whereas no association was found between wellbeing and age in Uganda, older women in Kenya were associated with worse states of wellbeing (Table 4.12). This relationship applied to both univariable and multivariable models. In both countries, women who were household heads were associated with worse states of wellbeing whereas women who lived in houses they owned themselves or were owned by members of their family were more likely to report better states of wellbeing (Table 4.12). The number of people in a household (household size) was associated with wellbeing although the direction of association differed in the two countries. While in Kenya large household sizes were associated with poor wellbeing, in Uganda they were associated with better states of wellbeing (Table 4.12). While there was no association between the presence of children in a household and wellbeing in Kenya, women who lived in households with children in Uganda were more likely to report worse states of wellbeing (Table 4.12). Surprisingly, in Kenya, women who were engaged in some employment were more likely to report worse states of wellbeing. In Uganda, these variables showed no association although the direction of association was maintained in all the models (Table 4.12). Wealth was associated with better states of wellbeing in Kenya. This relationship could also apply to Uganda as the direction of association was maintained. Even though there was no statistical significance, the standard errors were quite low (Table 4.12). Other sociodemographic variables such as marital status, religion and education did not show any significant association with wellbeing across the countries (Table 4.12).

Water, sanitation and hygiene variables also showed some important associations with wellbeing with some discrepancies across the countries. Women who had piped water in their compounds or dwellings were more likely to report worse states of wellbeing in Kenya but there

was no association in Uganda (Table 4.12). Spending money to acquire water was associated with increased likelihood of reporting worse states of wellbeing across all models in both countries (Table 4.12). Both water and WaSH insecurity were associated with poor wellbeing in Uganda. In Kenya, there was no association between wellbeing and either water or WaSH insecurity in the univariable models while in the multivariable model, there was statistical significance, but the direction of association was opposite to that observed in Uganda (Table 4.12).

A number of empowerment variables were excluded from the multivariable models due to failed convergence issues as well as multicollinearity as indicated using 'N/A' (Table 4.12). Women who were responsible for making decisions relating to water collection were more likely to report poor states of wellbeing although only in the univariable model in Kenya (Table 4.12). Again, in Kenya, women who were responsible for making decisions relating to managing water use were more likely to report worse states of wellbeing in both models. No significance was observed in both models in Uganda (Table 4.12). Decision making relating to purchasing large household items, running small businesses, household expenditures and working in waged or salaried employment were all not associated with wellbeing in both countries (Table 4.12).

Health insurance coverage indicated statistical significance in both countries but in opposite directions. Women in Kenya with health insurance were more likely to report better states of wellbeing (Table 4.12). In Uganda such women were likely to report worse states of wellbeing. These findings in Uganda may not be reliable for two reasons. First, the standard errors are quite large in both models. Secondly, the multivariable model is only marginally significant (Table 4.12).

Table 4.12: Factors associated with wellbeing post pandemic

	Univariable Models		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	0.019 (0.007); 0.006**	-0.007(0.008); 0.375	0.019(0.009); 0.043*	0.001(0.017); 0.943
Marital Status (Ref: Unpartnered)				
Partnered	-0.427(0.240); 0.076	-0.263(0.325); 0.418	0.325(0.327); 0.320	0.124(0.499); 0.804
Religion (Ref: Muslim)				
Christian	0.174(0.671); 0.796	-0.391(0.457); 0.392	0.851(0.887); 0.337	-0.561(0.541); 0.299
Household Head (Ref: No)				
Yes	1.299(0.245); <0.001***	1.033(0.321); 0.001***	1.656(0.361); <0.001***	1.310(0.587); 0.026*
Own House (Ref: No)				
Yes	-1.056(0.241); <0.001***	-1.788(0.319); <0.001***	-0.652(0.279); 0.019*	-1.308(0.420); 0.002**
Education level (Ref: Primary & Below)				
Above Primary	-0.241(0.240); 0.315	-0.059(0.327); 0.856	0.074(0.273); 0.787	-0.348(0.418); 0.406
Household size	0.043(0.059); 0.465	-0.145(0.062); 0.020*	0.240(0.073); <0.001***	-0.252(0.085); 0.003**
Household has a child (Ref: No)				
Yes	-0.337(0.306); 0.270	1.300(0.469); 0.006**	-0.333(0.388); 0.391	2.344(0.694); 0.001***
Currently engaged in employment (Ref: No)				
Yes	1.232(0.247); <0.001***	0.085(0.321); 0.791	0.880(0.270); 0.001***	0.245(0.403); 0.544
Wealth	-0.182(0.044); <0.001***	-0.045(0.056); 0.426	-0.325(0.051); <0.001***	-0.088(0.078); 0.256
Piped water in compound or				

	Univariable Models		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
dwelling (Ref: No)				
Yes	1.051(0.272); <0.001***	0.764(0.644); 0.236	1.865(0.317); <0.001***	0.550(0.960); 0.567
Spend money on water (Ref: No)				
Yes	1.908(0.339); <0.001***	2.379(0.331); <0.001***	1.068(0.390); 0.006**	2.255(0.419); <0.001***
Water Insecurity index	0.028(0.018); 0.130	0.119(0.026); <0.001***	N/A	N/A
WaSH insecurity index	-0.015(0.012); 0.245	0.085(0.019); <0.001***	-0.032(0.013); 0.015*	0.060(0.022); 0.006**
Responsible for making decisions relating to water collection (Ref: No)				
Yes	1.231(0.396); 0.002**	0.161(0.694); 0.816	0.713(0.515); 0.166	0.507(0.932); 0.587
Responsible for making decisions relating to managing water use (Ref: No)				
Yes	1.466(0.320); <0.001***	0.074(0.455); 0.870	1.077(0.501); 0.032*	-0.366(0.870); 0.674
Responsible for making decisions relating to purchasing large household items (Ref: No)				
Yes	-0.478(0.439); 0.276	-0.673(0.908); 0.459	N/A	N/A
Responsible for making decisions relating to running small				

	Univariable Models		Multivariable Model	
	Coefficient (Standard Error); p-value			
	Kenya	Uganda	Kenya	Uganda
businesses (Ref: No)				
Yes	-0.103(0.614); 0.866	2.152(1.460); 0.140	N/A	N/A
Responsible for making decisions relating to household expenditures (Ref: No)				
Yes	0.469(0.436); 0.282	0.814(0.788); 0.302	N/A	N/A
Responsible for making decisions relating to working in or waged salaried employment (Ref: No)				
Yes	1.070(1.130); 0.344	-0.938(1.608); 0.560	N/A	N/A
Has health insurance (Ref: No)				
Yes	-1.612(0.246); <0.001***	1.841(0.731); 0.012*	-1.009(0.290); <0.001***	1.907(1.001); 0.057
Model Statistics				
McFadden's R ²			0.191	0.394
Note: Results from tobit regression on wellbeing, presented as coefficients (standard errors); p-values; N/A – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **; $\alpha = 0.05$ *				

Table 4.13 presents the results following the univariable and multivariable regression of sociodemographic variables, water, sanitation and hygiene variables, empowerment variables and health insurance on probable emotional distress. The multivariable models' goodness of fit was

acceptable in Kenya (McFadden's $r^2 = 0.356$ with 70.9% correctly classified) but not good enough in Uganda (McFadden's $r^2 = 0.137$ with 59.3% correctly classified) (Table 4.13).

In the univariable models, older women were more likely to report emotional distress in both countries (Table 4.13). This holds for the multivariable model as well which have quite narrow confidence intervals in spite of having non-significant p-values (Table 4.13). Whereas marital status showed no significant association with emotional distress in Uganda, in Kenya women who were partnered were less likely to report emotional distress in the univariable model but more likely to report emotional distress in the multivariable model (Table 4.13). Christians were associated with reduced likelihood of reporting emotional distress although only in the univariable model in Kenya (Table 4.13). In the univariable models in both countries, women who were household heads were more likely to report emotional distress, but this association did not hold in the multivariable models (Table 4.13). Interestingly, women who were more educated were less likely to be emotionally distressed in all the models, even though the results in the multivariable model in Uganda only showed marginal significance (Table 4.13). The number of people in a household was also not associated with emotional distress. Moreover, having a child in a household was not associated with emotional distress save for the univariable model in Kenya where such households were associated with reduced odds of emotional distress. This association lost significance in the multivariable model in addition to changing the direction of association (Table 4.13). Women who were employed were more likely to be emotionally distressed in the univariable model in Kenya, but no significance was observed in the association in both models in Uganda (Table 4.13). Moreover, women who were wealthier were more likely to be emotionally distressed in Kenya but less likely to be distressed in Uganda (Table 4.13). This association was significant in both univariable models but not in the multivariable model although the confidence intervals

were narrow, hence inference can still be made (Table 4.13). House ownership was however not associated with emotional distress throughout the models (Table 4.13).

When it comes to variables linked to WaSH access, we begin to see some interesting patterns that cut across the two countries. Having piped water into the compound or dwelling was associated with reduced emotional distress in both countries (Table 4.13). The direction of association is consistent in all the models, and the confidence intervals are also not large enough to nullify this finding. Also, spending money to acquire water was associated with increased odds of emotional distress across all models (Table 4.13). Moreover, higher levels of water as well as WaSH insecurity were associated with increased odds of emotional distress across all models (Table 4.13).

Empowerment variables also showed some important associations although mostly in the univariable models. Being responsible for making decisions relating to water collection as well as water use were both associated with emotional distress in both countries although only in the univariable models (Table 4.13). In Kenya, being responsible for making decisions relating to purchasing large household items and running small businesses were both associated with increased odds of emotional distress although only in the univariable models. This did not apply to Uganda as there was no significance (Table 4.13). In both models in Kenya, being responsible for making decisions relating to household expenditures was associated with increased odds of emotional distress; again no significant association was observed in Uganda (Table 4.13). Despite significance in the association between responsibility relating to employment and emotional distress, it would be misleading to justify this association; the confidence intervals are too wide (Table 4.13).

In both countries, having health insurance was associated with reduced odds of emotional distress across all models (Table 4.13). The multivariable model for Uganda showed no significance judging from the p-value, but it would still be safe to infer the association since the confidence intervals were narrow enough (Table 4.13).

Table 4.13: Factors associated with Emotional distress post pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	1.01(1.01-1.02); <0.001***	1.01(1.01-1.02); <0.001***	1.01(1.00-1.03); 0.149	1.02(1.00-1.04); 0.134
Marital Status (Ref: Unpartnered)				
Partnered	0.84(0.71-0.99); 0.036*	0.91(0.76-1.08); 0.286	2.25(1.21-4.32); 0.017*	0.57(0.32-1.03); 0.064
Religion (Ref: Muslim)				
Christian	0.61(0.41-0.95); 0.022*	1.16(0.91-1.50); 0.252	1.57(0.24-13.53); 0.629	1.36(0.70-2.83); 0.365
Household Head (Ref: No)				
Yes	1.54(1.30-1.82); <0.001***	1.42(1.20-1.68); <0.001***	1.68(0.93-3.04); 0.093	0.68(0.36-1.26); 0.218
Own House (Ref: No)				
Yes	0.87(0.73-1.03); 0.098	0.94(0.79-1.11); 0.460	1.13(0.66-1.99); 0.657	0.92(0.56-1.51); 0.743
Education level (Ref: Primary & Below)				
Above Primary	0.77(0.65-0.91); 0.002**	0.62(0.52-0.74); <0.001***	0.58(0.35-0.92); 0.023*	0.67(0.43-1.03); 0.070
Household size	1.01(0.97-1.06); 0.506	0.97(0.94-1.00); 0.090	0.96(0.84-1.10); 0.581	0.97(0.88-1.07); 0.517
Household has a child (Ref: No)				
Yes	0.85(0.69-1.05); 0.118	0.77(0.61-0.99); 0.033*	1.53(0.75-3.18); 0.251	1.39(0.67-3.06); 0.407
Currently engaged in employment (Ref: No)				

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Yes	1.55(1.31-1.84); <0.001***	0.99(0.83-1.17); 0.912	1.41(0.91-2.21); 0.120	0.94(0.60-1.47); 0.776
Wealth	1.03(1.00-1.07); 0.030*	0.94(0.92-0.97); <0.001***	1.07(0.99-1.17); 0.086	0.95(0.86-1.04); 0.247
Piped water in compound or dwelling (Ref: No)				
Yes	0.64(0.51-0.78); <0.001***	0.75(0.51-1.07); 0.132	0.86(0.45-1.59); 0.634	0.74(0.25-1.93); 0.530
Spend money on water (Ref: No)				
Yes	2.83(2.07-3.99); <0.001***	1.27(1.06-1.51); 0.008**	2.10(1.08-4.33); 0.025*	2.13(1.34-3.38); 0.001***
Water Insecurity index	1.08(1.06-1.09); <0.001***	1.03(1.01-1.04); <0.001***	N/A	N/A
WaSH insecurity index	1.05(1.04-1.06); <0.001***	1.02(1.01-1.03); <0.001***	1.05(1.03-1.08); <0.001***	1.03(1.00-1.05); 0.030*
Responsible for making decisions relating to water collection (Ref: No)				
Yes	2.88(2.02-4.30); <0.001***	2.17(1.40-3.58); 0.001***	1.22(0.30-6.61); 0.779	0.92(0.22-3.74); 0.901
Responsible for making decisions relating to managing water use (Ref: No)				
Yes	2.06(1.58-2.72); <0.001***	1.38(1.07-1.80); 0.015*	1.93(0.50-10.40); 0.376	2.05(0.53-10.24); 0.307
Responsible for making decisions relating to purchasing large household items (Ref: No)				
Yes	2.55(1.65-4.19); <0.001***	1.06(0.69-1.73); 0.791	0.90(0.44-1.91); 0.781	N/A
Responsible for making decisions relating to running				

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
small businesses (Ref: No)				
Yes	3.78(2.17-7.36); <0.001***	1.03(0.51-2.45); 0.944	N/A	N/A
Responsible for making decisions relating to household expenditures (Ref: No)				
Yes	2.39(1.65-3.60); <0.001***	1.30(0.89-1.97); 0.196	3.72(1.38-11.99); 0.016*	N/A
Responsible for making decisions relating to working in waged or salaried employment (Ref: No)				
Yes	5.70(2.15-23.17); 0.003**	2.85(1.08-11.56); 0.074	N/A	3.37(0.75-24.0); 0.151
Has health insurance (Ref: No)				
Yes	0.45(0.37-0.55); <0.001***	0.64(0.40-0.97); 0.049*	0.39(0.24-0.62); <0.001***	0.45(0.12-1.33); 0.170
Model Statistics				
McFadden's R ²			0.356	0.137
Percentage Correctly Classified			0.709	0.593
Note: Results from logistic regression (complementary log-log link function) on emotional distress, presented as Odds Ratios (95% Confidence Interval); p-values; NA – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **; $\alpha = 0.05$ *				

Table 4.14 presents the results of the association between perceived health relative to others own age and sociodemographic variables, water, sanitation and hygiene variables, empowerment variables as well as health insurance coverage in univariable and multivariable models. The

multivariable models did not perform well although the Kenyan model was better; judging from the McFadden's $r^2 = 0.163$, % classification of 64.8% in Kenya compared to the McFadden's $r^2 = 0.091$, % classification of 59.5% in Uganda (Table 4.14).

As expected, increasing age was associated with increased odds of reporting poor/fair health relative to others own age in both countries (Table 4.14). Women who were partnered were less likely to report poor/fair relative health although this only applied to the univariable model in Kenya (Table 4.14). This association, despite losing significance in the rest of the models, maintained the direction of association. Compared to Muslims, Christians were less likely to report poor/fair relative health in both countries (Table 4.14). Household heads were associated with increased odds of reporting poor/fair relative health, although only in the univariable models (Table 4.14). Unlike in Uganda, both models in Kenya showed that living in ones' owned house was associated with reduced odds of reporting poor/fair relative health (Table 4.14). Also, women who were more educated were less likely to report poor/fair relative health in both countries, but this only applied to the univariable models (Table 4.14). Household size was not associated with perceived relative health. Although the confidence intervals remained narrow, the direction of association changed from the univariable to multivariable models (Table 4.14). Households that had children were associated with reduced odds of reporting poor/fair relative health although this only applied to the univariable model in Kenya (Table 4.14). Again, surprisingly, in Kenya women who were engaged in some form of employment were more likely to report poor/fair relative health. This association was not significant in Uganda in addition to the direction of association being opposite to that observed in Kenya (Table 4.14). Lastly, wealth was associated with reduced odds of reporting poor/fair relative health; a relationship that was consistent across all models (Table 4.14)

Having piped water into compound or dwelling was associated with reduced odds of reporting poor/fair relative health. This association held in all models except in the multivariable model in Uganda (Table 4.14). In both models in Kenya, women who spent money to acquire water were more likely to report poor/fair relative health (Table 4.14). Although the results did not show statistical significance in Uganda, the direction of association was maintained. An important finding here, consistently observed in both countries was that increases in both water as well as WaSH insecurity were associated with increased likelihood of reporting poor/fair health relative to others own age (Table 4.14).

Regarding empowerment, most variables did not show statistically significant association with perceived health relative to others own age. The only significant association was found regarding responsibility towards making decisions relating to running small businesses. Women who were responsible for making these kinds of decision were more likely to report poor/fair relative health, moreso in the univariable model in Kenya (Table 4.14). The rest of the models indicated wide confidence intervals despite some showing significance. The direction of association was however maintained all through. Responsibility relating to making decisions on water collection, managing water use, purchasing large household items, household expenditures and waged or salaried employment were not associated with perceived relative health (Table 4.14).

Having health insurance was associated with reduced odds of reporting poor/fair health relative to others own age. This was consistently observed across all models in both Kenya and Uganda (Table 4.14).

Table 4.14: Factors associated with Perceived State of health relative to others own age post pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	1.02(1.02-1.03); <0.001***	1.01(1.01-1.02); <0.001***	1.02(1.01-1.04); <0.001***	1.01(1.00-1.02); 0.159
Marital Status (Ref: Unpartnered)				
Partnered	0.67(0.55-0.81); <0.001***	0.95(0.80-1.12); 0.530	0.86(0.56-1.33); 0.484	1.15(0.78-1.71); 0.457
Religion (Ref: Muslim)				
Christian	0.47(0.31-0.75); 0.001***	0.93(0.75-1.18); 0.541	0.47(0.25-0.94); 0.022*	0.62(0.42-0.93); 0.018*
Household Head (Ref: No)				
Yes	1.47(1.20-1.79); <0.001***	1.43(1.22-1.68); <0.001***	0.75(0.48-1.17); 0.193	1.25(0.85-1.85); 0.251
Own House (Ref: No)				
Yes	0.83(0.68-1.01); 0.060	1.00(0.85-1.18); 0.996	0.65(0.45-0.93); 0.017*	0.85(0.62-1.17); 0.313
Education level (Ref: Primary & Below)				
Above Primary	0.69(0.56-0.84); <0.001***	0.67(0.57-0.79); <0.001***	1.18(0.84-1.66); 0.343	0.88(0.66-1.17); 0.378
Household size	0.99(0.95-1.05); 0.835	0.99(0.96-1.02); 0.576	1.01(0.93-1.10); 0.716	1.03(0.97-1.09); 0.310
Household has a child (Ref: No)				
Yes	0.74(0.59-0.94); 0.012*	1.06(0.84-1.35); 0.652	0.80(0.51-1.28); 0.339	0.81(0.51-1.34); 0.408
Currently engaged in employment (Ref: No)				
Yes	1.45(1.19-1.77); <0.001***	0.96(0.82-1.13); 0.656	2.01(1.42-2.89); <0.001***	0.85(0.62-1.18); 0.324
Wealth	0.96(0.93-1.00); 0.051	0.95(0.93-0.98); 0.001***	0.89(0.84-0.95); 0.001***	0.93(0.87-0.98); 0.007**
Piped water in compound or dwelling (Ref: No)				
Yes	0.65(0.50-0.83); 0.001***	0.65(0.44-0.91); 0.017*	0.70(0.47-1.02); 0.074	1.57(0.88-2.69); 0.101

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Spend money on water (Ref: No)				
Yes	4.75(2.98-8.17); <0.001***	1.12(0.94-1.32); 0.206	3.87(1.72-11.11); 0.003**	1.21(0.91-1.61); 0.182
Water Insecurity index	1.04(1.02-1.05); <0.001***	1.02(1.01-1.03); 0.002**	1.02(1.00-1.04); 0.111	1.04(1.01-1.06); 0.005**
WaSH insecurity index	1.02(1.01-1.03); <0.001***	1.01(1.00-1.02); 0.015*	N/A	N/A
Responsible for making decisions relating to water collection (Ref: No)				
Yes	1.33(0.95-1.92); 0.112	1.25(0.88-1.85); 0.237	N/A	N/A
Responsible for making decisions relating to managing water use (Ref: No)				
Yes	1.33(1.01-1.80); 0.051	1.15(0.91-1.46); 0.244	1.45(0.75-3.16); 0.305	0.85(0.46-1.67); 0.612
Responsible for making decisions relating to purchasing large household items (Ref: No)				
Yes	1.37(0.82-2.47); 0.260	0.95(0.63-1.50); 0.825	N/A	N/A
Responsible for making decisions relating to running small businesses (Ref: No)				
Yes	2.31(1.26-4.88); 0.014*	1.72(0.82-4.40); 0.197	1.51(0.79-3.27); 0.253	2.70(1.15-7.47); 0.030*
Responsible for making decisions relating to household expenditures (Ref: No)				
Yes	1.15(0.79-1.75); 0.475	1.07(0.75-1.58); 0.724	N/A	N/A

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Responsible for making decisions relating to working in waged or salaried employment (Ref: No)				
Yes	2.27(0.84-9.30); 0.167	0.78(0.39-1.78); 0.517	N/A	N/A
Health Insurance (Ref: No)				
Yes	0.41(0.32-0.52); <0.001***	0.44(0.27-0.68); <0.001***	0.67(0.45-0.98); 0.042*	0.25(0.09-0.55); 0.002**
Model Statistics				
McFadden's R ²			0.163	0.091
Percentage Correctly Classified			0.648	0.595
<i>Note: Results from logistic regression (complementary log-log link function) on poor/fair health relative to others own age, presented as Odds Ratios (95% Confidence Interval); p-values; NA – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*</i>				

4.2.3 Summary of objective two findings

This data collected post pandemic was more comparable between the countries as it adopted similar sampling strategies. The samples were majorly similar in composition in that the ages were not different significantly, majority were Christians, majority were not heads of their households, the proportions that lived in their own houses was also not different, majority reported low levels of education, majority of the households had atleast one child, and majority were not employed. Moreover, generally, women in both countries experienced high levels of water insecurity as well as WaSH insecurity; were less empowered and had no health insurance.

Some of the differences in the composition of samples between the countries could possibly explain the differences observed in the state of health and wellbeing. Compared to Kenyans, Ugandans were more likely to: be unpartnered, household heads, less educated, have more people in their households, have children, be employed and to be less wealthy. Moreover, higher levels of water and WaSH insecurity were reported in Kenya compared to Uganda. Kenyans were also more likely to have health insurance as well as perceive the accessibility and quality of the healthcare services in their community as good/very good/excellent. These differences could partially explain why the reported levels of emotional distress were higher in Uganda, why the reported state of wellbeing was worse in Uganda as well as why more Ugandans perceived their health as poor/fair relative to others their age.

The results following regression analysis showed that health and wellbeing were associated with sociodemographic variables (age, education, being household head, poverty and marital status); WaSH access variables (spending money to acquire water, having piped water into compound or dwelling, water/WaSH insecurity) as well as health insurance. In both countries, worse states of wellbeing were associated with being the household head, being poor, and spending money to acquire water. Emotional distress was associated with being older, being less educated, not having piped water into compound or dwelling, spending money to acquire water, experiencing higher levels of both water/WaSH insecurity and not having health insurance. Moreover, the odds of reporting poor/fair relative health were higher among women who were older, unpartnered, poor, water/WaSH insecure and who had no health insurance.

Having looked into the associations between health and wellbeing during the pandemic and after the pandemic, the next section assesses the differences post pandemic relative to during the pandemic in a combined fashion.

4.3 Objective Three: To investigate the contribution of the sociodemographic and household characteristics on changes in health and wellbeing in Kenya and Uganda pre- and post-COVID-19 in a combined sample.

4.3.1 Sample characteristics, access to water and sanitation, empowerment, health and wellbeing during versus after COVID-19 pandemic period

Having used 1:1 optimal pair propensity score matching based on age, marital status, house ownership, highest attained education, household size, presence of children, religion and employment status to match participants from the surveys conducted before and after COVID-19 pandemic, the resultant data consisted of 405 pairs from Kenya and 186 pairs from Uganda. Table 4.15 compares the distribution between the two timepoints for each country, and most comparisons show no significant differences, an indication that the matching was successful. Compared to Ugandan women in the matched sample, Kenyan women were younger with the majority being partnered. Christianity was the dominant religion in both countries. A higher proportion of Ugandans lived in houses owned by themselves or by family members, with Kenyans being relatively more educated, although the level of education was very low overall with less than 5% having studied beyond secondary school. Moreover, a higher proportion of Ugandans were engaged in some form of employment (Table 4.15). It is important to note that the differences in sample characteristics between Kenya and Uganda in Table 4.15 are similar to those observed in Table 4.1 under objective one. This is because the matching algorithm picked participants with similar demographic characteristics to the participants in the during-pandemic survey from among the participants surveyed post pandemic.

Table 4.15: Sample characteristics

	Kenya			Uganda		
	During (n=405)	After (n=405)	Sig.	During (n=186)	After (n=186)	Sig.
Age (years) - Mean (SD) Median [Min, Max]	37.9 (13.5) 35.0 [18.0, 77.0]	38.9 (14.7) 37.0 [16.0, 82.0]	NS	74.3 (10.3) 74.0 [55.0, 100]	72.1 (11.8) 72.0 [44.0, 105]	NS
Marital Status - Partnered	75.1%	70.6%	NS	22.6%	17.7%	NS
Religion - Christian	89.9%	93.1%	NS	88.7%	90.3%	NS
Own House	66.9%	62.2%	NS	95.7% %	95.7%	NS
Education level			NS			***
No schooling	4.2%	4.2%		52.2%	31.2%	
Primary	56.8%	56.0%		36.0%	56.5%	
Secondary	34.3%	35.3%		9.7%	11.3%	
Above Secondary	4.7%	4.4%		2.2%	1.1%	
Household size - Mean (SD) Median [Min, Max]	6.34 (2.06) 6.00 [3.00, 12.0]	5.92 (2.12) 6.00 [1.00, 12.0]	NS	5.92 (2.68) 6.00 [2.00, 12.0]	5.63 (2.90) 6.00 [1.00, 12.0]	NS
Household has a child	80.0%	79.8%	NS	79.6%	78.0%	NS
Currently engaged in employment	41.2%	41.5%	NS	57.0%	47.8%	NS
<i>Note: P-values arise from comparison of sample characteristics between during and after COVID-pandemic; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>						

In Kenya, the main source of water for drinking as well as for other purposes before the pandemic was piped water and water kiosk whereas after the pandemic, the main source was piped water. In Uganda, participants mainly relied on boreholes and springs before the pandemic but switched to piped water after the pandemic (Table 4.16). Here, we see the number of participants that could access piped water significantly increased post-pandemic. Also, the number of people relying on surface water, which is normally not safe for example due to surface runoff especially during rainy season, reduced. However, surface water was increasingly being used as a source of water for other purposes in Kenya (Table 4.16). While the proportion of participants that had piped water into compound or dwelling increased after the pandemic in Kenya, there was a significant decrease in Uganda (Table 4.16). This implies that the increase in access to piped water observed in Uganda was from other places outside compound such as public standpipes or from neighbors. In most cases, these standpipes are not proximately located to homes and so people have to spend a considerable amount of time to collect water. Moreover, the standpipes as well as water from neighbors cannot be accessed beyond a given time such as late in the evening or at night. Although there were no differences in the percentages that were spending money to acquire water in both countries before versus after the pandemic, a higher percentage of those from Kenya compared to Uganda reported to be spending money to acquire water (Table 4.16). Compared to before the pandemic, there were significant improvements in both WaSH and water insecurity after the pandemic in Kenya although no differences were noted in Uganda. To conclude, a number of improvements relating to access to water, sanitation and hygiene could be observed in Kenya whereas no notable changes occurred in Uganda. Even with the improvements in Kenya, the situation of both water and WaSH security was still worse compared to Uganda. (Table 4.16)

Table 4.16: Water, Sanitation and Hygiene variables descriptive statistics

	Kenya			Uganda		
	During (n=405)	After (n=405)	Sig.	During (n=186)	After (n=186)	Sig.
Main Source of drinking water			***			***
Borehole	0	0		52 (28.0%)	0	
Delivered water	1 (0.2%)	23 (5.7%)		2 (1.1%)	0	
Dug well	9 (2.2%)	28 (6.9%)		24 (12.9%)	21 (11.3%)	
Piped Water	187 (46.2%)	276 (68.1%)		27 (14.5%)	83 (44.6%)	
Rainwater collection	11 (2.7%)	29 (7.2%)		20 (10.8%)	54 (29.0%)	
Surface water	11 (2.7%)	4 (1.0%)		7 (3.8%)	1 (0.5%)	
Water from spring	1 (0.2%)	12 (3.0%)		53 (28.5%)	25 (13.4%)	
Water Kiosk	185 (45.7%)	33 (8.1%)		1 (0.5%)	0	
Main source of water for other purposes			***			***
Borehole	0	0		43 (23.1%)	0	
Delivered water	1 (0.2%)	24 (5.9%)		2 (1.1%)	1 (0.5%)	
Dug well	11 (2.7%)	60 (14.8%)		32 (17.2%)	25 (13.4%)	
Piped Water	190 (46.9%)	210 (51.9%)		26 (14.0%)	88 (47.3%)	
Rainwater collection	12 (3.0%)	20 (4.9%)		17 (9.1%)	41 (22.0%)	
Surface water	29 (7.2%)	40 (9.9%)		12 (6.5%)	1 (0.5%)	
Water from spring	1 (0.2%)	16 (4.0%)		53 (28.5%)	28 (15.1%)	
Water Kiosk	161 (39.8%)	34 (8.4%)		1 (0.5%)	0	
Have Piped water in compound or dwelling	78 (19.3%)	108 (26.7%)	*	21 (11.3%)	9 (4.8%)	*
Spend money on water	366 (90.4%)	363 (89.6%)	NS	38 (20.4%)	39 (21.0%)	NS
WaSH insecurity-Mean (SD)	19.0 (8.81)	11.6 (9.65)	***	6.12 (7.43)	6.49 (9.18)	NS
Median [Min, Max]	22.0 [0, 33.0]	10.0 [0, 33.0]		2.00[0, 31.0]	2.00[0, 33.0]	
Water Insecurity-Mean(SD)	12.4 (6.29)	7.73 (6.56)	<0.001***	5.34(6.74)	4.83 (6.67)	0.650
Median [Min, Max]	14.00 [0, 21.0]	7.00 [0, 21.0]		0[0, 21.0]	0.50[0, 21.0]	
Note: P-values arise from comparison of sample characteristics between during and after COVID-pandemic; Significance at $\alpha = 0.001$ ***; $\alpha = 0.01$ **; $\alpha = 0.05$ *; NS = Non-significant ($p > 0.05$)						

Responsibilities relating to water collection and household expenditures among women who were partnered were the only aspects of empowerment that were commonly captured in both surveys; and therefore, included here to facilitate comparison during and after the pandemic. Significant improvements in responsibility as well as the extent of input were noted in Kenya after the pandemic considering water collection and household expenditures (Table 4.17). In Uganda, although no difference was noted in the proportion that made decisions related to water collection after the pandemic compared to during the pandemic, there was a significant rise in the percentage of women who were responsible for making decisions regarding household expenditures (Table 4.17). Although Kenyans could make more decisions related to water collection while Ugandans could make more decisions relating to household expenditures, women still remained less empowered judging from these two metrics. The highest level of responsibility corresponded to responsibility relating to household expenditures in Uganda (69.6%) and these could be women whose partners were perhaps too old to make the decisions, bearing in mind that the women in Uganda were much older. (Table 4.17)

Table 4.17: Empowerment in WaSH variables descriptive statistics

	Kenya			Uganda		
	During (n=304)	After (n=286)	Sig.	During (n=42)	After (n=33)	Sig.
Responsible for making decisions regarding water collection	103 (25.4%)	232 (57.3%)	***	23 (54.8%)	6 (18.2%)	NS
Level of input on decisions relating to water collection			***			*
Input into most or all decisions	50 (49.5%)	181 (71.0%)		10 (43.5%)	4 (66.7%)	
Input into some decisions	27 (26.7%)	71 (27.8%)		9 (39.1%)	2 (33.3%)	
No input or input in few decisions	24 (23.8%)	3 (1.2%)		4 (17.4%)	0	
Responsible for making decisions regarding household expenditures	108 (26.7%)	149 (36.8%)	***	21 (50.0%)	23 (69.7%)	***
Level of input regarding household expenditures			***			NS
Input into most or all decisions	45 (41.7%)	101 (55.5%)		10 (47.6%)	13 (56.5%)	
Input into some decisions	27 (25.0%)	81 (44.5%)		9 (42.9%)	10 (43.5%)	
No input or input in few decisions	36 (33.3%)	0		2 (9.5%)	0	
<i>Note: P-values arise from comparison of sample characteristics between during and after COVID-pandemic; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>						

Comparing during versus after the pandemic, the level of emotional distress increased in Kenya but decreased in Uganda, although the levels were still higher in Uganda relative to Kenya (Table 4.18). This higher level in Uganda could be attributed to differences in age distribution relative to Kenya. However, the increase in emotional distress levels in Kenya could be attributed to other reasons which will be explored in Table 4.20. Slight increases in health insurance coverage were noted in both countries although the coverage was still very low in Uganda compared to Kenya (Table 4.18). An overwhelming majority in both countries still lack health insurance. This coupled with poverty means that these women, together with their families were unable to seek care when needed. The overall wellbeing significantly improved in Kenya but significantly deteriorated in Uganda (Table 4.18). This could be attributed to the reduction of the number of women in Uganda who are engaged in some employment post-pandemic relative to during pandemic, yet the number of people in the household (mouths to feed) remained the same; as we have seen in Table 4.15. In Kenya, there was a significant increase in the number of women who perceived their health as poor/fair relative to others their own age, but no significant changes were observed in Uganda, although the numbers remained higher in Uganda compared to Kenya (Table 4.18). This is not surprising considering the differences in age distribution as well as differences in health insurance coverage. Regarding healthcare accessibility, there were no significant difference in the proportion that perceived healthcare accessibility in their community as poor/fair in Kenya, but the numbers were significantly increased in Uganda; with more Ugandans than Kenyans rating the accessibility of healthcare services as poor/fair (Table 4.18). In both countries, significant increases were observed in the proportion that rated the quality of healthcare services in their community poor/fair. Again, the proportion of Ugandans who reported the quality of healthcare services as poor/fair in Uganda was much higher compared to Kenya (Table 4.28). The

trend in both countries is that these women are increasingly losing trust in the ability of the healthcare system to cater for their medical needs. They think the existing healthcare services are increasingly becoming inaccessible and their quality also continues to worsen.

Table 4.18: Health and wellbeing measures descriptive statistics

	Kenya			Uganda		
	During (n=405)	After (n=405)	Sig.	During (n=186)	After (n=186)	Sig.
Emotional distress - Above cut-point (≥ 4)	87 (21.5%)	213 (52.6%)	***	164 (88.2%)	115 (61.8%)	*
Have health insurance	94 (23.2%)	111 (27.4%)	NS	5 (2.7%)	7 (3.8%)	NS
Wellbeing - Mean (SD); Median [Min, Max]	17.2(5.80); 16.0[6.00, 24.0]	11.3(4.28); 11.0[6.00, 24.0]	***	9.59(4.20); 8.00[6.0, 24.0]	12.1(4.87); 11.5[6.0, 24.0]	***
Perceived State of health relative to others own age			**			NS
Good/Very good/Excellent	301 (74.3%)	261 (64.4%)		69 (37.1%)	51 (27.4%)	
Poor/Fair	104 (25.7%)	144 (35.6%)		117 (62.9%)	135 (72.6%)	
Perceived state of healthcare accessibility			NS			***
Good/Very good/Excellent	311 (76.8%)	286 (70.6%)		132 (71.0%)	60 (32.3%)	
Poor/Fair	94 (23.2%)	119 (29.4%)		54 (29.0%)	126 (67.7%)	
Perceived state of healthcare quality			*			***
Good/Very good/Excellent	270 (66.7%)	242 (59.8%)		133 (71.5%)	70 (37.6%)	
Poor/Fair	135 (33.3%)	163 (40.2%)		53 (28.5%)	116 (62.4%)	
<i>Note: P-values arise from comparison of sample characteristics between during and after COVID-pandemic; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*; NS = Non-significant ($p > 0.05$)</i>						

4.3.2 Association between individual and household characteristics with health and wellbeing during versus post pandemic period

The results in this subsection should be interpreted bearing in mind the differences in sample characteristics between Kenya and Uganda. For instance, it would be helpful to recall that women in Uganda were older compared to those in Kenya. And this could be used to understand some of the differences in results as revealed in Tables 4.19, 4.20 and 4.21.

Wellbeing was analyzed in this section by dichotomizing considering the median score (12). In Kenya the percentage of participants who scored above 12 (worse state of wellbeing) dropped from 87.2% to 36.0% while in Uganda this percentage increased from 26.3% to 50.0%, from during relative to after the pandemic. Hence there was general improvement in wellbeing in Kenya (OR=0.22) but a general worsening of wellbeing in Uganda (OR=2.27). These trends persisted also in the multivariable models (Table 4.19). The multivariable models had an acceptable goodness of fit as indicated by area under curves of more than 70%. The models were also able to correctly predict 69.6% and 61.2% of the associations in Kenya and Uganda, respectively (Table 4.19).

Whereas older women in Kenya were more likely to report worsening wellbeing, those in Uganda were more likely to report improving wellbeing post-pandemic relative to during the pandemic (Table 4.19). In Kenya, no significant differences were noted in wellbeing post pandemic between partnered and unpartnered women although in Uganda, partnered women were less likely to report worsening wellbeing. The direction of association was, however, similar in both countries (Table 4.19). Women of Christian faith were more likely to report improved wellbeing in Uganda. The direction of association was different in Kenya in addition to being non-significant (Table 4.19). Again, in Kenya, women living in their own houses were more likely to report improvement

in wellbeing (Table 4.19). The association in Uganda showed no significance probably owing to the fact that almost all women in Uganda (95.7%) were living in their own houses. This leaves a very low number under the comparator (those renting), inadequate to detect any statistical effect. Hence, the association in Kenya could as well hold for Uganda, with a more diverse sample. No differences in wellbeing were observed with educational attainment (Table 4.19). In both countries, large households were associated with worsening wellbeing. This is despite the fact that significance in association was only present in the multivariable model in Kenya. The same conclusion could be made of the rest of the models since the confidence intervals remained narrow, and the direction of association was maintained (Table 4.19). Presence of children in a household also could not predict whether wellbeing improved or not (Table 4.19). While employment status was not associated with differences in wellbeing post pandemic in Uganda, employed women in Kenya were associated with worsening wellbeing (Table 4.19).

Having piped water into compounds or dwelling was not associated with changes in wellbeing in both countries (Table 4.19). Moreover, women who spent money to acquire water were less likely to report improvements in wellbeing post-pandemic, although this only showed significance in the univariable models in both countries (Table 4.19). Insecurities relating to both water and WaSH were associated with worsening states of wellbeing across all the models in both countries (Table 4.19).

Having health insurance was only associated with improvements in wellbeing post pandemic in Kenya (Table 4.19). In Uganda no association was observed probably due to low health insurance coverage, inadequate to detect statistical effect, even though the direction of relationship was similar to that observed in Kenya.

Table 4.19: Factors associated with Worse state of wellbeing (Scores ≥ 12) post vs during COVID-19 pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Survey timing (Ref: During)				
After pandemic	0.22(0.18-0.27); <0.001***	2.27(1.60-3.21); <0.001***	0.18(0.14-0.23); <0.001***	2.02(1.40-2.91); <0.001***
Age (years)	1.01(1.00-1.01); 0.022*	0.98(0.96-0.99); 0.002**	1.01(1.00-1.02); 0.027*	0.96(0.94-0.99); 0.001***
Marital Status (Ref: Unpartnered)				
Partnered	0.90(0.73-1.10); 0.289	0.63(0.39-1.00); 0.050	0.86(0.66-1.11); 0.250	0.47(0.27-0.83); 0.009**
Religion (Ref: Muslim)				
Christian	0.86(0.63-1.18); 0.354	2.24(1.10-4.59); 0.027*	0.89(0.60-1.33); 0.573	1.98(1.04-3.75); 0.037*
Own House (Ref: No)				
Yes	0.80(0.66-0.97); 0.020*	1.30(0.53-3.18); 0.571	0.75(0.56-0.99); 0.044*	1.35(0.70-2.63); 0.372
Education level (Ref: Primary & Below)				
Above Primary	0.89(0.74-1.07); 0.210	1.07(0.65-1.77); 0.787	0.80(0.63-1.03); 0.082	1.04(0.61-1.78); 0.880
Household size	1.04(1.00-1.09); 0.046*	1.01(0.95-1.07); 0.839	1.00(0.94-1.07); 0.921	1.01(0.94-1.08); 0.771
Household has a child (Ref: No)				
Yes	0.95(0.76-1.19); 0.639	1.42(0.92-2.21); 0.117	0.82(0.60-1.11); 0.197	1.20(0.71-2.03); 0.499
Currently engaged in employment (Ref: No)				
Yes	1.47(1.22-1.77); <0.001***	0.92(0.66-1.28); 0.603	1.57(1.23-2.00); <0.001***	0.66(0.43-1.01); 0.058
Piped water in compound or dwelling (Ref: No)				
Yes	1.01(0.81-1.25); 0.943	1.07(0.59-1.94); 0.829	1.06(0.73-1.56); 0.753	1.07(0.47-2.44); 0.864
Spend money on water (Ref: No)				
Yes	1.46(1.05-2.03); 0.025*	1.56(1.07-2.28); 0.020*	1.08(0.78-1.50); 0.629	1.48(0.96-2.30); 0.079
Water Insecurity index	1.03(1.02-1.05); <0.001***	1.06(1.03-1.08); <0.001***	N/A	N/A
WaSH insecurity index	1.03(1.01-1.04); <0.001***	1.04(1.02-1.06); <0.001***	1.00(0.99-1.02); 0.994	1.04(1.01-1.07); 0.003**

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Has health insurance (Ref: No)				
Yes	0.46(0.37-0.59); <0.001***	0.37(0.09-1.50); 0.164	0.42(0.31-0.55); <0.001***	0.42(0.09-1.95); 0.268
Model Statistics				
Area under curve			0.850	0.765
Percentage Correctly Classified			0.696	0.612
<i>Note: Results from generalized estimating equations (complementary log-log link function) with exchangeable correlation structure regression on wellbeing, presented as Odds Ratios (95% Confidence Interval); p-values; NA – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001$***; $\alpha = 0.01$**; $\alpha = 0.05$*</i>				

Table 4.20 explores changes in probable emotional distress (GHQ-12 scores above 4) and the associated factors post COVID-19 pandemic in Kenya and Uganda. In general, compared to during the pandemic, emotional distress levels increased significantly in Kenya (OR = 4.05) but decreased significantly in Uganda (OR = 0.45) post pandemic (Table 4.20). Following model diagnostics, the models performed well as indicated by areas under curve above 70% in both countries. The models were also able to correctly predict 62.5% of the associations in Kenya and 69.3% of the associations in Uganda (Table 4.20).

Among sociodemographic characteristics, changes in emotional distress levels were associated with age, house ownership and presence of children in a house. In both countries, older women were likely to be more distressed post pandemic than they were during the pandemic (Table 4.20). Although no significant association was observed in Uganda, Kenyan women who lived in their own houses were associated with less emotional distress post pandemic (Table 4.20). Also, women in Uganda in whose households there were children were likely to be less emotionally distressed post pandemic (Table 4.20). There was however no association between presence of children in a house and changes in emotional distress levels in Kenya. Other sociodemographic

variables (marital status, religion, education, household size and employment) were not associated with changes in emotional distress levels post pandemic (Table 4.20).

Access to water, sanitation and hygiene had a significant influence in changes in emotional distress post pandemic. For instance, though not significant in Uganda, having piped water into compound or dwelling was associated with less emotional distress post pandemic (Table 4.20). Spending money to acquire water was associated with increases in the levels of emotional distress post pandemic although this was only significant in the univariable model in Kenya (Table 4.20). Moreover, water and WaSH insecurity were associated with increases in emotional distress levels post pandemic in both countries (Table 4.20).

Having health insurance was associated with reduction in emotional distress post pandemic especially in Kenya (Table 4.20). This relationship was however not significant in Uganda, again due to low levels of health insurance coverage, not enough to detect statistical effect. The direction of association was however similar in both countries (Table 4.20).

Table 4.20: Factors associated with Emotional distress post vs during COVID-19 pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Survey timing (Ref: During)				
After pandemic	4.05(2.98-5.51); <0.001***	0.45(0.35-0.59); <0.001***	6.59(4.42-9.83); <0.001***	0.44(0.32-0.59); <0.001***
Age (years)	1.01(1.00-1.02); 0.008**	1.02(1.01-1.03); 0.001***	1.03(1.01-1.04); <0.001***	1.01(0.99-1.03); 0.192
Marital Status (Ref: Unpartnered)				
Partnered	0.99(0.72-1.36); 0.937	1.09(0.79-1.49); 0.596	1.19(0.82-1.71); 0.361	1.36(1.00-1.86); 0.050
Religion (Ref: Muslim)				
Christian	0.91(0.55-1.51); 0.707	0.86(0.57-1.30); 0.480	0.72(0.41-1.26); 0.253	0.91(0.56-1.48); 0.696

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Own House (Ref: No)				
Yes	0.65(0.48-0.88); 0.005**	0.66(0.35-1.24); 0.194	0.49(0.33-0.71); <0.001***	0.62(0.30-1.28); 0.197
Education level (Ref: Primary & Below)				
Above Primary	1.04(0.78-1.39); 0.783	0.95(0.64-1.40); 0.785	1.26(0.86-1.85); 0.232	1.21(0.78-1.89); 0.401
Household size	1.01(0.95-1.08); 0.684	0.99(0.95-1.04); 0.800	0.99(0.90-1.09); 0.914	1.06(1.00-1.13); 0.062
Household has a child (Ref: No)				
Yes	1.37(0.95-1.98); 0.090	0.51(0.37-0.70); <0.001***	1.53(0.90-2.62); 0.120	0.44(0.29-0.68); <0.001***
Currently engaged in employment (Ref: No)				
Yes	1.30(0.97-1.73); 0.070	0.90(0.70-1.17); 0.435	1.08(0.76-1.53); 0.664	0.84(0.58-1.23); 0.370
Piped water in compound or dwelling (Ref: No)				
Yes	0.69(0.49-0.98); 0.040*	0.95(0.59-1.52); 0.828	0.49(0.32-0.75); 0.001***	0.99(0.57-1.72); 0.958
Spend money on water (Ref: No)				
Yes	1.77(1.05-2.98); 0.031*	0.77(0.56-1.06); 0.103	1.19(0.65-2.16); 0.570	0.83(0.56-1.22); 0.342
WaSH insecurity index	1.01(0.99-1.02); 0.228	1.02(1.01-1.04); 0.007**	1.05(1.02-1.07); <0.001***	1.03(1.01-1.04); 0.002**
Water Insecurity index	1.02(1.00-1.04); 0.057	1.03(1.01-1.05); 0.002**	N/A	N/A
Has health insurance (Ref: No)				
Yes	0.69(0.49-0.97); 0.031*	0.62(0.29-1.35); 0.229	0.61(0.40-0.93); 0.021*	0.71(0.38-1.32); 0.276
Model Statistics				
Area under curve			0.751	0.780
Percentage Correctly Classified			0.625	0.693
Note: Results from generalized estimating equations (complementary log-log link function) with exchangeable correlation structure regression on emotional distress, presented as Odds Ratios (95% Confidence Interval); p-values; NA – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001^{***}$; $\alpha = 0.01^{**}$; $\alpha = 0.05^{*}$				

Table 4.21 presents the results of the association between changes in perceived health relative to others own age with sociodemographic variables, water, sanitation and hygiene access variables as well as health insurance coverage in Kenya and Uganda. Compared to during the pandemic, women were more likely to perceive their health relative to others own age as poor/fair in Kenya as well as in Uganda post pandemic (Table 4.21). The multivariable models were quite reliable in terms of goodness of fit measures, although the Kenyan model performed much better compared to the Ugandan model. The Kenyan model had an area under curve of 78.6% while the Ugandan model had an area under curve of 65.5%. Moreover, 67.2% of the predictions made by the Kenyan model 59.6% of the predictions made by the Ugandan model were correctly specified (Table 4.21).

Significant associations were found between changes in perceived health and age, marital status, house ownership, education, having a child in a household and employment. Older women were more likely to report poor/fair relative health post pandemic compared to during pandemic in both countries (Table 4.21). Partnered women were less likely to report poor/fair relative health post pandemic in both countries (Table 4.21). Although this was only significant in the univariable model in Uganda, the same could be inferred of the rest of the models since the direction of association was maintained and the confidence intervals were fairly narrow. Women who lived in their own houses were also less likely to report poor/fair relative health post pandemic (Table 4.21). This was only significant in the Kenyan models although the direction of association was maintained despite the lack of statistical significance in Ugandan models. Women who were more educated, who lived in households with children and those who were engaged in some employment were more likely report poor/fair relative health although only in the univariable models in Kenya

(Table 4.21). However, other sociodemographic variables (religion, household size) were not associated with changes in perceived relative health post pandemic (Table 4.21).

Water, sanitation and hygiene variables were also associated with changes in perceived health relative to others own age although the associations varied between the countries. Surprisingly, in Kenya, women who had piped water into their compound or dwelling were more likely to report poor/fair relative health post pandemic (Table 4.21). This relationship was not significant in Uganda in addition to being in the opposite direction. Having to spend money to acquire water was associated with increased odds of reporting poor/fair relative health, again only in Kenya (Table 4.21). The direction of association was maintained in Uganda but the estimates were not statistically significant. Water insecurity was also associated with increased odds of reporting poor/fair relative health in both countries (Table 4.21). WaSH insecurity, however showed no significant association with changes in perceived relative health post-pandemic (Table 4.21).

Having health insurance was associated with reduced likelihood of reporting poor/fair relative health in post-pandemic in the multivariable models in both countries (Table 4.21). The associations were in opposite directions in the univariable models for Kenya and Uganda, in addition to only being marginally significant (Table 4.21).

Table 4.21: Factors associated with Perceived State of health relative to others own age post vs during COVID-19 pandemic

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Survey timing (Ref: During)				
After pandemic	1.48(1.15-1.91); 0.002**	1.30(1.00-1.69); 0.046*	1.67(1.24-2.26); 0.001***	1.29(0.98-1.71); 0.069

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Age (years)	1.01(1.00-1.02); 0.037*	1.01(1.00-1.02); 0.041*	1.02(1.01-1.03); <0.001***	1.01(0.99-1.03); 0.257
Marital Status (Ref: Unpartnered)				
Partnered	0.78(0.59-1.02); 0.066	0.70(0.50-0.98); 0.040*	0.82(0.62-1.09); 0.180	0.82(0.57-1.18); 0.290
Religion (Ref: Muslim)				
Christian	1.15(0.72-1.84); 0.565	0.88(0.58-1.34); 0.558	1.18(0.71-1.95); 0.523	0.79(0.52-1.20); 0.273
Own House (Ref: No)				
Yes	0.27(0.21-0.35); <0.001***	0.66(0.36-1.24); 0.199	0.30(0.22-0.40); <0.001***	0.64(0.33-1.24); 0.185
Education level (Ref: Primary & Below)				
Above Primary	1.63(1.27-2.09); <0.001***	0.73(0.48-1.12); 0.149	1.21(0.88-1.65); 0.240	0.84(0.54-1.31); 0.443
Household size	1.04(0.98-1.10); 0.242	0.96(0.92-1.01); 0.115	1.03(0.96-1.11); 0.344	0.98(0.93-1.04); 0.563
Household has a child (Ref: No)				
Yes	1.59(1.12-2.27); 0.010**	0.86(0.63-1.17); 0.335	1.27(0.83-1.94); 0.262	1.01(0.69-1.49); 0.958
Currently engaged in employment (Ref: No)				
Yes	1.82(1.42-2.35); <0.001***	0.79(0.61-1.02); 0.071	1.22(0.93-1.61); 0.156	0.96(0.70-1.32); 0.813
Piped water in compound or dwelling (Ref: No)				
Yes	2.06(1.58-2.69); <0.001***	0.79(0.48-1.31); 0.365	1.49(1.10-2.04); 0.011*	0.82(0.46-1.49); 0.521
Spend money on water (Ref: No)				
Yes	5.24(2.23-11.79); <0.001***	1.04(0.75-1.43); 0.817	2.67(1.14-6.27); 0.024*	1.18(0.82-1.69); 0.367
WaSH insecurity index	1.01(0.99-1.02); 0.283	1.01(0.99-1.03); 0.218	N/A	N/A
Water Insecurity index	1.03(1.01-1.05); 0.004**	1.02(1.00-1.04); 0.070	1.07(1.04-1.09); <0.001***	1.02(1.00-1.04); 0.099
Has health insurance (Ref: No)				
Yes	0.75(0.55-1.02); 0.063	1.32(0.97-1.79); 0.082	0.70(0.50-0.96); 0.028*	0.22(0.07-0.73); 0.013*

	Univariable Model		Multivariable Model	
	Odds Ratio (95% Confidence Interval); p-value			
	Kenya	Uganda	Kenya	Uganda
Model Statistics				
Area under curve			0.785	0.655
Percentage Correctly Classified			0.672	0.596
<i>Note: Results from generalized estimating equations (complementary log-log link function) with exchangeable correlation structure regression on poor/fair perceived health, presented as Odds Ratios (95% Confidence Interval); p-values; NA – coefficients not estimable due to failed convergence or variable excluded due to multicollinearity; Significance at $\alpha = 0.001^{***}$; $\alpha = 0.01^{**}$; $\alpha = 0.05^{*}$</i>				

4.3.3 Summary of objective three findings

Analysis of combined during- and post-pandemic data for each of the countries highlighted some of the changes that had occurred between 2021 and 2023. Whereas there were some improvements with regard to access to water, sanitation and hygiene in Kenya, not much changed in Uganda. For instance, more participants had piped water into compound or dwelling post pandemic in Kenya while in Uganda there was a decline. Also, there was a slight decrease in the number of Kenyan women who were spending money to acquire water whereas in Uganda the number increased. Again, water and WaSH insecurity levels reduced to a great extent in Kenya while no significant changes were noted in Uganda. In spite of all this, the post pandemic water and WaSH insecurity levels in Kenya were still higher than those in Uganda; indicative of how bad the Kenyan situation was during the pandemic. Regarding women's empowerment, more Kenyan women were responsible for making decisions relating to water collection while in Uganda more women were responsible for making decisions relating to household expenditures post pandemic when compared to during the pandemic. However, the levels of empowerment still remained low in both countries.

There were no significant increases in the number of women who had health insurance post pandemic relative to during the pandemic in both countries. Moreover, more women did perceive the accessibility and quality of healthcare services in their community as both poor/fair post pandemic. This could imply that these women were increasingly losing faith in the capacity of the healthcare system to cater for their healthcare needs. Also, the analysis revealed increasing levels of emotional distress in Kenya but a significant decrease in Uganda. On the other hand, reported wellbeing levels improved in Kenya but worsened in Uganda post pandemic. Moreover, more women in both countries did perceive the state of their health relative to others their age as poor/fair post pandemic relative to during the pandemic. With these changes, it would be safe to assume that the state of health and wellbeing for these women did not change at best but probably became worse.

Considering the three indicators of health and wellbeing (wellbeing scale, emotional distress and perceived state of health relative to others own age), perceived decline in health and wellbeing were found to be consistently associated with living in rental houses, experiencing water/WaSH insecurity and not having health insurance. Other factors such as age, marital status and household size also influenced changes in health and wellbeing but were not consistent like these three. Living in rental houses implies the participants have to pay rent from time to time in the face of high unemployment levels. Experiencing water/WaSH insecurity affects health and wellbeing both directly and indirectly and this has been well documented in literature. For instance, not using clean water could lead to several waterborne diseases, directly impacting health and wellbeing. Lastly, not having health insurance means the participants are unable to meet their medical needs as well as those for their families unless they are able to pay for the services by cash.

4.4 Summary

This chapter presented the results of four quantitative surveys in Kenya and Uganda in relation to three objectives. Two surveys were done during the COVID-19 pandemic concurrently in both countries while two other similar surveys were done post the pandemic, again concurrently. Whereas objective one assessed the state of health and wellbeing during pandemic, objective two assessed health and wellbeing post pandemic and objective three assessed changes in health and wellbeing post pandemic in reference to during the pandemic. Health and wellbeing were operationalized using wellbeing scale, GHQ-12 scale as well as perceived health relative to other's own age. Independent variables consisted of sociodemographic variables, water, sanitation and hygiene variables, empowerment variables and health insurance coverage.

During the pandemic, data was collected under difficult circumstances and within strict timelines. As such there was no much time to harmonize sampling strategies between the two countries. Hence some notable disparities in sample composition were present in the resultant data. For instance, the Ugandan sample was much smaller and consisted of older women compared to Kenyan sample. Other differences were that Kenyan women were more likely to be partnered, living in rental houses, relatively more educated, and living in households with more people. Kenyan women were also more water and WaSH insecure, less empowered but more likely to have health insurance. However, the samples were also similar in that in both countries the levels of education were generally low, women were resource deprived, less empowered, water and WaSH insecure; and lacking health insurance.

Better states of wellbeing were associated with more education, water security and having health insurance in both countries. In Kenya, better states of wellbeing were also associated with not being household head as well as being more empowered. These relationships also existed in

Uganda although in opposite direction, possibly due to age differences. Emotional distress was only associated with being older and being unemployed in both countries. In addition, emotional distress was associated with being partnered and being household head in Uganda while in Kenya emotional distress was associated with not being household head. Perceived poor/fair health relative to others of same age was associated with being older, unpartnered, living in rental houses, having fewer people in a household, being water insecure, and not being responsible for making decision regarding water collection.

Post pandemic surveys in both countries used similar sampling strategies, hence samples between Kenya and Uganda were more comparable. While there were no differences between the two countries with respect to age, house ownership; compared to Ugandans, Kenyans were likely to be partnered, not household heads, more educated, have fewer people in a household, to be experiencing higher levels of water and WaSH insecurity, and to have health insurance. This data also revealed that the women in both countries were generally less empowered, less educated, resource deprived and experiencing both water and WaSH insecurity. The levels of health insurance coverage were also very low.

Health and wellbeing were commonly associated with a number of sociodemographic variables such as age, education, being household head, poverty and marital status; WaSH access variables such as spending money to acquire water, having piped water into compound or dwelling, water/WaSH insecurity, and health insurance. Worse states of wellbeing were associated with being household heads, being poor, and spending money to acquire water, in both countries. Emotional distress was associated with being older, being less educated, not having piped water into compound or dwelling, spending money to acquire water, experiencing higher levels of both water/WaSH insecurity and not having health insurance. Moreover, poor/fair perceived relative

health was associated with being older, being unpartnered, being poor, being water/WaSH insecure and not having health insurance.

In comparing the state of health and wellbeing post pandemic relative to during the pandemic, it's important to note that Kenyan women were younger compared to Ugandan women. However, participants in both countries were generally poor, with low levels of education and experiencing high levels of water/WaSH insecurity. Although some improvements regarding water/WaSH access were observed in Kenya unlike Uganda, the water/WaSH situations were still worse in Kenya than in Uganda. Compared to during the pandemic, the levels of emotional distress increased in Kenya but reduced in Uganda; wellbeing improved in Kenya but worsened in Uganda while more people in Kenya perceived their health as poor/fair but there were no significant differences in Uganda; post pandemic. Moreover, more people in both countries considered the accessibility and quality of healthcare services as poor/fair post pandemic compared to during the pandemic.

Worsening states of wellbeing post pandemic were associated with being partnered, living in a rental house, being in a household with many people, being water/WaSH insecure, and not having health insurance in both countries. Also increasing levels of emotional distress post pandemic were associated with being older, living in rental houses, being water/WaSH insecure and not having health insurance. This too applied to both countries. Moreover, in both countries, significant increases in the number of people who perceived their health as poor/fair post pandemic were noticed among women who were older, unpartnered, lived in rental houses, experienced higher levels of water insecurity and had no health insurance.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

5.1 Introduction

This thesis examined health and wellbeing and the associated sociodemographic and household characteristics among women in Kenya and Uganda in the face of COVID-19 pandemic as well as after the pandemic with an aim of determining whether there was an improvement or not. In doing so, three research objectives were considered:

1. To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda during COVID-19 pandemic;
2. To describe health and wellbeing across sociodemographic and household characteristics in Kenya and Uganda post COVID-19; and,
3. To investigate the contribution of sociodemographic and household characteristics on health and wellbeing in Kenya and Uganda pre- and post-COVID-19 in a combined sample.

The situation in Kenya and Uganda during COVID-19 pandemic was characterized by loss of jobs, increased incidences of gender-based violence (domestic and intimate partner violence), closure of businesses as well as downward spiraling of economic performance. Existing literature establishes that women and girls had the worst experience from the effects of the pandemic as well as the non-pharmaceutical measures that were put in place to control community transmission and ease strain on an already weak healthcare system (Kumar & Kumar 2020; Kwobah et al. 2021; Bundervoet et al. 2022). The first survey was done in the face of this pandemic while a similar survey was done approximately two years later. In this research, the two surveys were combined using propensity score matching to determine whether these women had recovered from the effects

of the pandemic, that is, if their health and wellbeing had improved relative to the situation that transpired during the pandemic.

5.2 Health and wellbeing during COVID-19 pandemic

Some notable differences existed in the Kenyan and Ugandan samples. Compared to the Ugandans, the Kenyans were much younger, partnered, not household heads and more educated. The Ugandans were aged 55 years and above and mostly unpartnered hence heads of their households. The levels of both WaSH and water insecurity were high in both countries, but the situations were worse in Kenya.

In this research, probable emotional distress was assessed using GHQ-12, a tool intended to screen for general (non-psychotic) psychiatric morbidity (Goldberg & Williams 1988). Previous research have shown that adults who are relatively older tend to report less negative emotions, better mental health, and less responsiveness to daily stressors (Neubauer et al. 2019). Similarly, older adult age has been associated with less distress during shocks such as the 9/11 attacks as well as during COVID-19 since those who are relatively older tend to have a more optimistic outlook and better mental health (Scott et al. 2013; Bruine de Bruin 2021). These findings fit well with *Socio-emotional Selectivity Theory* which posits that relatively older adults are more likely to maximize their wellbeing in the limited time they perceive to have left (Carstensen 2006). According to this theory, aging is associated with an intrinsic reduction in susceptibility to psychological distress. This thesis however found older women to be more likely to report higher levels of emotional distress during COVID-19 pandemic, inconsistent with *Socio-emotional Selectivity Theory*. In the face of global shocks such as COVID-19 pandemic, losing social contacts in the elderly, becoming prohibited from engagement in common social interactions due to social distance order, and receiving limited access to social support and services may increase their

susceptibility to emotional distress (Habibi Asgarabad et al. 2023; Stuart et al. 2021). At the onset of the COVID-19 pandemic, there were concerns about stress-related mental health disorders among older adults given that they were more likely to experience severe complications, higher mortality, and more disruptions from the pandemic (Vahia et al. 2020). The *strength and vulnerability integration (SAVI) theory* of age differences in emotional wellbeing posits that age related physiological vulnerabilities prevent older adults from down-modulating sustained, serious or even unavoidable stressors (Charles & Carstensen 2010; Wrzus et al. 2013; Birditt 2014). These circumstances quintessentially describe the prevailing situation in the face of COVID-19 pandemic especially in LMICs where the elderly are unlikely to be having pension and sometimes have to take care of their grandchildren (Rishworth & Elliott 2017).

Even though being partnered especially during global crises such as COVID-19 pandemic has been associated with reduced risk of emotional distress, this research found that partnered women in Uganda were likely to report increased levels of emotional distress. Marriage and other relationship statuses have been previously associated with proximity to health-promoting resources e.g. social, psychological and economic support, which influence ability and willingness to effectively manage stress inducing circumstances similar to those caused by the COVID-19 pandemic including job loss, disrupted social relationships, and general uncertainty (Scheid & Wright 2017). In these settings, as in most parts of Africa, married women are more likely to report psychological distress possibly due to economic challenges in supporting marriage (Roxburgh 2014). While extended kin support can be a resource, in times of crisis, members of extended kinship networks can also become overwhelmed while attempting to help multiple members of the network navigate the times (Garrett-Peters & Burton 2016). Women are historically known to provide a great deal of personal, social, and economic support to family and friends (Garrett-Peters

& Burton 2016). Their kin networks expand when they become married (partnered), and this could have double implications - positive as well as negative. The positive side would be that there would be pooled financial resources while the negative side would be that they receive more requests for assistance, especially during a global pandemic when the incidences of illness, bereavement as well as job losses rapidly increase within the networks. Given that these women are expected to be willing to provide care for sick and bereaved friends and relatives without much regard for their own wellbeing, they are likely to become more distressed emotionally (Beauboeuf-Lafontant 2009; Liao et al. 2020; Hearne 2022).

Increased levels of emotional distress among partnered women could also be attributed to increased incidence of many forms of domestic violence including intimate partner violence. Periods of crisis have always been characterized by increased rates of intimate partner violence in relation to economic instability and stressful environments (Parkinson & Zara 2020; Vora et al. 2020). This was true of United States during the Great Recession as well as during the European debt crisis in the 2010s (Schneider et al. 2016; Kyriakidou et al. 2021). The risk of domestic violence during the COVID-19 pandemic was expected to be even higher following the home confinement, limited access to social services, and supporting organizations for the victims. The lockdown compelled the potential victims to be in close contact to their perpetrators who also monitored any move and effort of contacting the police (Piquero et al. 2020; Gelder et al. 2020).

Being single, widowed, separated or divorced has also previously displayed significantly poor self-rated health compared to being married or in marital union (Chola and Alaba 2013; Lindström 2009). This research confirms this association. This is because being married offers a buffer for poor health possibly through greater access to social support as well as other resources that marital unions offer (Cau et al. 2016). Moreover, married people as well as those living with

more people in a household are likely to enjoy buffers associated with proximity to health-promoting resources e.g. social, psychological and economic support, which influence ability and willingness to effectively manage stress inducing circumstances similar to those caused by the COVID-19 pandemic including job loss, disrupted social relationships, and general uncertainty (Scheid & Wright 2017).

In both Kenya and Uganda, women who were unemployed were more likely to report higher levels of emotional distress. Throughout the world, quarantine resulted in either furlough (temporary) or permanent loss of employment (layoff), creating an immediate financial loss for many. This situation is likely to cause emotional and financial distress, expressed by elevated symptoms of depression and decline in physical functioning (Catalano et al. 2011; Pellecchia et al. 2015). Previous research has also documented increased distress among people upon whom more stringent restrictions are imposed or rather those who have to deal with increased levels of hardship (Newman 1988; Reynolds et al. 2008; Bai et al. 2004). This is because loss of employment is more likely to negatively affect their feelings to a greater extent by distorting their social status. And this potentially explains why the association between unemployment and emotional distress was stronger in Uganda compared to Kenya, in addition to the fact that Ugandan women were much older. Being unemployed could also mean the women were engaging in more unpaid work, although that was not assessed in this research.

This research found a significant association between household headship and emotional distress, although the direction of association differed between the two countries. While being household head was associated with increased odds of reporting emotional distress in Uganda, the same was associated with reduced likelihood of reporting emotional distress in Kenya. Both countries face high rates of unemployment, a situation that disproportionately affects women

(Kamau & Wamuthenya 2021). The economic as well as political potential of many African women are majorly shaped negatively by the discriminatory social institutions that emanate from long-lasting norms, traditions, and codes of conduct expressed in customs, cultural practices, and informal and formal laws that guide people's behaviors and interactions (Branisa et al. 2014). Although plausible advances had been attained in Sub-Saharan Africa (SSA) towards achieving gender equality as was outlined in the Millenium Development Goals (MDGs) prior to the COVID-19 pandemic, these discriminatory norms were a significant hindrance toward further progress. Such progress included significant increases in the number of girls enrolled in primary education, significant decreases in maternal mortality ratios, significant increases in the proportion of women using contraception, increased share of women involved in non-agricultural wage employment and increased participation in political leadership roles (MDG 2015; Konte & Tirivayi 2020).

Being the head of a household implies the power to make decisions at the household level but also comes with the responsibility to provide for the needs of the household members including health, food, education among other needs. The association between household headship and emotional distress has not been adequately explored in literature but can still be explained by contextual factors. The difference in direction of association observed in this research is primarily due to differences in sample composition between Kenya and Uganda. From Table 4.1, women in Kenya were slightly more educated compared to those in Uganda. Being more educated and hence more enlightened to challenge traditional conventions and old dogmas as well as resist anachronisms that have warped their society for so long hence improving their sense of feeling that they have things under control, and this directly helps reduce their levels of emotional distress (Goldberg 1972). Attainment of higher levels of education is also likely to lead to expansion of

economic opportunities such as being formally employed or embarking on profitable business ventures which in turn improve their financial position as well as that of their household at large. The association between education attainment and emotional distress can be explained by *human capital and credentials theories* that posit that higher educational attainments are associated with reduced odds of negative mental health outcomes (Muñoz & Santos-Lozada 2021; Collins 2019; Ross 2008). On the other hand, the women in Uganda, most of whom were household heads had to work out how to provide for the needs of their families in the face of contracted economic opportunities and high unemployment levels; and this would only serve to increase their likelihood of being emotionally distressed (Pellecchia et al. 2015).

From a human capital standpoint, education fosters both psychological and economic wellbeing through better habits, skills, and resources that enable individuals to increase their effective agency (Ross 2008). Better skills in this sense involve financial literacy, risk tolerance in financial decision making and early financial socialization (Gonçalves et al. 2021; Al-Bahrani et al. 2020). Previous research has shown that education affects financial wellbeing given its relationship with higher paying jobs, and interestingly, it has a more prominent effect on the economic wellbeing of women relative to men, with higher levels of education contributing more effectively to the rise in women's income-to-needs ratios (Ozawa and Yoon 2003; Gonçalves et al. 2021). Hayward and colleagues also indicated that low educational attainment was associated with increased likelihood of insecure work, low wages and lack of benefits; and that poverty and inequality are closely linked to low educational attainment and unhealthy lifestyles (Hayward et al. 2007).

This research found that Ugandan women experienced lower levels of water insecurity compared to Kenya. This does not however immediately imply that Uganda was endowed with

better water infrastructure compared to Kenya. Age could be playing a significant role here bearing in mind that women in Uganda were significantly older compared to those in Kenya. Previous research in similar settings has found out that older household heads are more likely to adopt water conservation practices and to implement measures to protect water sources (Asaki et al. 2024). And as a result, older household heads are more likely to attain water security compared to younger household heads. In Sub-Saharan Africa, water insecurity is likely to affect women more than men (Nunbogu and Elliott 2021; Adams et al. 2021; Dickin et al. 2021). This can be explained by women's primary role in water procurement as well as water utilization for household tasks including cooking, washing, and bathing children (Graham et al. 2016; Cooper-Vince et al. 2018). Therefore inadequate supply of water impedes women's ability to complete their roles at home and within the community, which in the local context contributes to social shaming, worry and negative self-concept (Cooper-Vince et al. 2018). Prolonged water stress can also spur the transmission of water-borne diseases such as cholera, typhoid and diarrhea. Since COVID-19 prevention required frequent washing, lack of water at the household would also increase the risk of contracting the virus.

The influence of health insurance on wellbeing can easily be demonstrated in this research. The cost associated with health insurance premiums remains a significant barrier to having health insurance among low-income households (Allen et al. 2017). Without health insurance, individuals and communities are unable to access adequate healthcare services leading to preventable illnesses and chronic conditions going untreated; and resulting in unnecessary suffering and premature death (Kruk et al. 2018). The only alternative to accessing healthcare in the absence of health insurance, out-of-pocket healthcare payments, is basically out of reach for many individuals in the face of abject poverty. Moreover, out-of-pocket healthcare payments can drive people into poverty,

perpetuating a vicious cycle of poor health and wellbeing as well as economic insecurity (Aregbeshola & Khan 2018; Nicholas & Deji 2023). Unlike LMICs, high income countries tend to have well-developed infrastructures including robust healthcare systems and social safety nets. This lack of government infrastructure in Africa is evident in the limited number of healthcare insurance programs available to the public; and again amplified by low coverage in this research. The lack of coverage is particularly acute in rural areas, where healthcare facilities and services are scarce. Pandemics such as COVID-19 only serve to complicate the situation as the demand for quality and readily accessible healthcare services is increased exponentially.

The levels of emotional distress were about four times higher in Uganda compared to Kenya (88.2% versus 21.8%). The high prevalence in Uganda exceeds those reported during the same period by studies involving women in the United States (48%), Saudi Arabia (44%), China (35%), and Spain (79.6%) (Keeter 2022; Qattan 2022; Qiu et al. 2020; Gómez-Salgado et al. 2020). The difference between the values observed in Kenya and Uganda could be possibly explained by the fact that the Ugandan sample constituted older women, unpartnered and therefore household heads. Being household heads meant that they were responsible for making decisions regarding expenditures with few resources available in the face of tough economic times. The high levels of emotional distress could also possibly be explained by the fact that the majority (77.4%) of the women in Uganda were unpartnered. Being partnered has been associated with reduced distress due to the likelihood of enjoying pooled financial resources, greater social support, and less loneliness compared to being unpartnered (Hearne 2022). Moreover, in Uganda, more stringent containment measures were enacted to control the spread of the pandemic compared to Kenya. These measures, though effective, did inflict fear on the population, negatively impacting their health and wellbeing (Kitara & Ikoona 2020; Ssegawa 2020).

The state of wellbeing was significantly better in Uganda compared to Kenya. This presumably implies that they were more capable of paying bills including insurance and rent, fixing their houses, and having money to buy enough food as well as things they needed or wanted. This situation could be explained by the fact that more Ugandans compared to Kenyans were engaged in some employment, hence they had some source of income; and at the same time, they had fewer people in their households, hence relatively less expenditures to make. Moreover, more women in Uganda than Kenya lived in houses that they owned personally or were owned by members of their family, and this further relieved them of financial commitments associated with paying rent. According to the *conservation of resources theory*, becoming unemployed implies loss of resources or threat to resources (i.e., money, financial security, status, acknowledgement of accomplishment). And this negative spiral of resources loss leads to impairment in wellbeing (Virick and McKee-Ryan 2017; Gedikli et al. 2023).

On the state of health relative to others own age, more women in Uganda compared to Kenya perceived their health as poor/fair. A possible explanation to this could be differences in sample characteristics. The Ugandan sample comprised of much older people, with low insurance coverage. Moreover, much higher levels of emotional distress were noted in Uganda which could be related to this poor/fair self-perceived health, although this could be a bi-directional association. Literature extensively reports that increasing intensity of physical exercise is associated with improvement in self-reported health (Vagetti et al. 2015; Cohen et al. 2016; Lera-Lopez et al. 2019). This relationship is normally mediated by age, as older people tend to have limited functional ability. The lockdowns and curfews during the COVID-19 pandemic, further reduced these physical activities. Also, having health insurance is likely to improve access to healthcare, especially for those with chronic conditions which are normally more prevalent in older

populations. With this improved access, health insurance comes with peace of mind, and therefore better self-perceived health (Allen et al. 2014; Sommers et al. 2015). Existing literature has it that better self-reported health is associated with reduced depressive and anxious feelings as well as emotional distress (Idowu et al. 2016; Östberg 2016; Olawa et al. 2020). And with this, the poor/fair self-reported health could be contributed to by the high levels of emotional distress, the converse could also be true. The finding that older people are likely to report poor health has also been found in other parts of Africa including South Africa and Mozambique (Hosseinpoor et al. 2012; Ardington & Gasealahwe 2014).

Moreover, more women in Uganda than Kenya lived in houses that they owned personally or were owned by members of their family, and this further relieved them of financial commitments associated with paying rent. The non-pharmaceutical measures that were put in place to control the spread of COVID-19 during the pandemic led to massive loss of employment, creating immediate financial loss for many. Those who were living in rental houses had to struggle to pay their rent dues in addition to financing other recurrent needs such as food and healthcare. According to the *conservation of resources theory*, becoming unemployed implies loss of resources or threat to resources (i.e., money, financial security, status, acknowledgement of accomplishment), leading to reduced ability to meet basic needs, likely resulting in poor self-rated health (Virick and McKee-Ryan 2017; Gedikli et al. 2023).

5.3 Health and wellbeing post COVID-19 pandemic

For the data corresponding to the post-pandemic period, there were no differences in age between women in Kenya and Uganda. However, more Kenyans than Ugandans were partnered, Christians, not head of households and more educated. Kenyan households also had fewer people, with fewer households having children. Although more Ugandans were employed, Kenyan

households were significantly wealthier. Also, households in Uganda were more water and WaSH secure compared to Kenya. Despite the level of health insurance coverage was low in both countries, the situation was worse in Uganda compared to Kenya with only 5% reporting to be having health insurance. Consequently, the accessibility and quality of healthcare services were generally perceived as poor/fair widely in Uganda compared to in Kenya. Compared to Ugandans, Kenyans reported lower levels of emotional distress, better levels of wellbeing, with a higher proportion also perceiving their health as good/very good/excellent relative to others their age. These differences in health and wellbeing could be explained to a greater extent by the differences in the sample composition including marital status, education, wealth, health insurance coverage and perceived quality and accessibility of healthcare services.

In both countries, older women were likely to report poor states of wellbeing, higher levels of emotional distress and poor/fair relative health. Previous research has found an increasing trend in the global prevalence of depression, anxiety, and stress with age (Chawla et al. 2021; Colpani et al. 2018). These authors have found that, with increases in age, there is increased likelihood of excessive weight gain due to reduced physical activity, inadequate and irregular sleep patterns, loneliness as well as various physical illnesses like stroke and heart diseases. Since most African countries are likely to have limited access to mental health outgoing services, low trust levels in medical services along with concerns about antidepressant and anti-anxiety medications, the populations are at even higher risk of depression and anxiety (Kaboudi et al. 2017; Jalali et al. 2024). Lack of health insurance coupled with high poverty levels make it almost impossible for these populations to access medical services when needed; adversely affecting their wellbeing as well as how they perceive their health. The inverse relationship between age and emotional distress may not be applicable to these settings of resource scarcity where the older adults sometimes have

to provide for the needs of their younger children and grandchildren ([Rishworth & Elliott 2017](#)). This also alludes to the fact that these women are still responsible for unpaid domestic and care work as stipulated in SDG 5 (SDGs 2020). In higher income countries such as Japan, mental wellbeing tends to improve with age as the elderly having retired from work are relieved from work related stress and also the responsibility of childcare ([Hori et al. 2016](#)).

This research also found that living in one's own house was associated with better states of wellbeing in both Kenya and Uganda; and reduced odds of reporting their health as poor/fair relative to others their age in Kenya unlike Uganda. However, house ownership was not associated with emotional distress. Like in other parts of the world, individuals with low incomes who are also vulnerable face cumulative disadvantages especially when they are tenants – they are more likely to live in housing that lacks basic amenities ([Amore 2016](#)). Poor housing conditions such as poorly designed ventilation systems have been linked to health conditions such as acute respiratory conditions ([Ingham et al. 2019](#)). This could have a direct effect on how these individuals perceive their health as well as have a financial implication following the cost of seeking medical treatment, affecting wellbeing. Improvements in indoor environments have also previously been associated with significant improvements in self-reported health of occupants, reduction in visits to doctors, day off work, and days off school for children ([Howden-Chapman et al. 2007](#)). The lack of association between house ownership and self-reported health in Uganda could be linked to the fact that Ugandan sample were majorly from rural settings relative to Kenyans. The implication of owning a house then differs between the countries – owning a house for the Kenyan sample could mean being in a higher socioeconomic position compared to in Uganda. Although house ownership has previously been associated with lower rates of depressive disorders, fewer cognitive difficulties as well as better mental health; especially by mediating financial stress associated with

renting (Rahman and Steeb 2024), this research found no such association. This difference could be explained by local contextual factors which turn out to be more critical for mental health than ownership status. In resource-deprived settings such as those in Sub-Saharan Africa, the neighborhood quality and social support for wellbeing become more valuable (Rolfe et al. 2020).

Higher educational attainment was associated with reduced odds of reporting emotional distress, reduced odds of reporting poor/fair relative health in the univariable models; but not associated with wellbeing. It has been well documented that more years of education is associated with reduced risk of adverse health outcomes for example dementia and stroke (Nguyen et al. 2016; McHutchison et al. 2017). However, this association is not only unlikely to be causal but also confounded by other factors including childhood health status and socioeconomic circumstances that determine both educational attainment and health. Older individuals are also more likely to have more years of schooling, although not linearly throughout the age spectrum. For instance, elderly people are likely to have less formal education relative to their younger counterparts, especially in the context of this research. This relative effect of these extraneous variables possibly explains why education loses statistical significance in the model explaining variability in the likelihood of reporting poor/fair relative health. More educated individuals are more likely to have specific knowledge and skills useful for prevention of diseases, have greater prestige and status within the community as well as possess credentials for employment leading to higher levels of happiness (Kawachi et al. 2010; Cuñado and de Gracia 2012; Tran et al. 2021). While these mechanisms are related with emotional distress, they do not affect wellbeing (the ability to cater for basic needs) in settings where the levels of attained education are generally low, hence lack of association between education and wellbeing in the samples in both countries. Moreover, these low levels of educational attainments imply that much has to be done to accelerate

goal 4 of the SDGs (SDGs 2020). Countries like Kenya and Uganda must prioritize inclusive policies and financing that simultaneously address access, learning and equity. This should include scaling up quality early childhood education, enforcing legal guarantees for free and compulsory education as well as closing digital and infrastructure gaps.

Households with more members were associated with better states of wellbeing in Uganda but worse states of wellbeing in Kenya. However, household size did not influence the likelihood of reporting emotional distress or poor/fair health relative to others own age. Members of a household tend to make different investments in human and social capital including health education and support for the wellbeing of the members regardless of age (Lee & Mason 2012). Within-household (intra-family) support assumes a dynamic and multidirectional flow – support can flow from adult children to older parents or from older parents to children and grandchildren. The direction of flow becomes dynamic as it responds to temporary needs such as health shocks or high rates of unemployment in a region. Such support potentially includes advice, experience and knowledge especially from older members, support with household chores as well as economic support from younger members (Beyene et al. 2002; DÍAZ-VENEGAS et al. 2017). This support becomes crucial at a time when populations are trying to recover from disruptions such as those witnessed during the COVID-19 pandemic. In light of these forms of support, having many members in a household becomes meritorious, hence it was associated with better states of wellbeing in Uganda. However, the same could have a negative influence on wellbeing in different contexts. For example, in Kenya where 85.9% of the sample had to spend money to acquire water with only 35.8% engaged in some employment, having more members in a family only brings further strain to existing resources leading to poor states of wellbeing. The lack of association between household size and both emotional distress and self-reported health could imply that the

strains and the strengths associated with having more household members cancel each other in these resource-deprived settings. The mechanisms within which this occur could be evaluated in a follow-up study.

Household wealth status was associated with increased likelihood of reporting better states of wellbeing as well as reduced odds of reporting poor/fair relative health. At the same time, wealth was associated with reduced odds of reporting emotional distress in Uganda but increased odds of reporting emotional distress in Kenya. Quality of life, in general, and good health in particular, have been demonstrated to be positively associated with economic resources. Wealthier people and those of higher socio-economic standing not only enjoy higher standard of living than poor people but also tend to live longer and healthier (Semyonov et al. 2013). While economic resources afford healthier living conditions and the purchase of better medical care, poor health may also lead to deterioration and depletion of economic resources, and in extreme cases, illness may even lead to impoverishment due to high cost of medical treatment (Adams et al. 2003). To this end, the relationship between wealth and health is bi-directional. Being wealthy could also imply more requests for financial assistance from the extended kin networks especially in a sample in which 55.5% were partnered as in Kenya compared to 39.6% in Uganda. This could in turn lead to financial strain probably culminating in emotional distress, hence the finding that wealth is associated with increased emotional distress (Roxburgh 2014). Other research in similar contexts have also confirmed that denser social networks are likely to lead to increased demands on households, which could generate stress (Pendleton et al. 2014; Owens & Hadley 2024). This finding is not conclusive and may also warrant further study to explore the mechanisms within which it occurs.

This research further found a significant association between access to water, sanitation and hygiene; and all the three health and wellbeing outcomes. Women who reported to be spending money to acquire water were more likely to report worse states of wellbeing, emotional distress and poor/fair relative health. Moreover, high levels of water/WaSH insecurity were associated with worse states of wellbeing in Uganda unlike in Kenya, emotional distress and poor/fair relative health. Lack of water in a household has an adverse influence on health and wellbeing especially in the context of most African countries where women are assigned roles pertaining to household chores including cooking and washing among others, all of which require water ([Apatinga et al. 2024](#); [Cooper-Vince et al. 2018](#)). In addition, the women are also responsible to ensure enough water is available for use by all the household members. Prolonged water stress would also likely lead to diseases such as diarrhea, typhoid and cholera (Robinson 2023). All these consequences have a significant bearing on wellbeing, emotional distress and perceived relative health, and especially among women. Hence, by associating water/WaSH insecurity to poor states of health and wellbeing, this research points that much needs to be done, especially in LMICs, to achieve SDG 6 (SDGs 2020). Measures should be put in place to mobilize comprehensive financing mechanisms, leverage innovative technologies, strengthen institutional capacity, foster multi-stakeholder partnerships as well as integrate water management across all sectors and governance levels.

Having health insurance was associated with better states of wellbeing in Kenya unlike Uganda, reduced odds of reporting emotional distress as well as reduced odds of reporting poor/fair relative health. These associations have remained valid during the pandemic as well as post pandemic. The lack of association between health insurance and wellbeing in Uganda is probably attributable to very low insurance coverage (5%), inadequate to detect statistical effect. According

to *economic theory*, people purchase health insurance not only to avoid the risk of financial loss, but also as a mechanism for gaining access to healthcare that would be otherwise unaffordable (Folland et al. 2024). It immediately follows that the primary purpose of health insurance is to improve health (Cutler & Zeckhauser 2000). Good health in turn increases productivity, lifetime earnings, and time spent in activities that maximize utility; thereby positively impacting wellbeing, emotional distress as well as perceived health (Weissman & Epstein 1994; Grossman 1972; Mugo 2023). With the low levels of health insurance coverage observed in this research, drastic measures would need to be taken if the global health targets are to be met by 2030 in accordance with SDG 3 (SDGs 2020). A substantial intensification of efforts would be necessary to address the deep-seated inequalities, strengthen primary care, build resilient and inclusive health systems and ensure universal access to quality healthcare.

5.4 Health and wellbeing post COVID-19 pandemic compared to during the pandemic

The levels of emotional distress increased significantly in Kenya but decreased significantly in Uganda post pandemic compared to during the pandemic. The post-pandemic emotional distress levels were still higher in Uganda due to sample differences such as age but atleast the trajectory was downward. This is inspite of the fact that Ugandan sample could be regarded as more vulnerable as they were much older compared to Kenyan sample. The post-COVID survey was conducted when a new government had just been elected in Kenya in August of the previous year, 2022. The government began by pursuing more drastic measures like increasing taxes, marshalling legislative support to pass a highly contested Finance Bill 2023 despite growing public discontent arguing that it was meant to drive post-COVID-19 economic recovery and address the rising public debt, among other policy problems such as affordable housing (Nation 2023; Onyango 2024). These only served to exert further economic pressure to a

population whose employment sector was most hit by COVID-19 – job loss was at 55.1% according to an Afrobarometer survey conducted in 2021/22 involving 19 countries (Onyango 2024). Also, according to the Afrobarometer survey, Kenyans were still dealing with the high cost of living, a surge in fuel prices, and diminishing cash income in 2022. These tough economic times with apparently no hope of the future becoming better only led to rising levels of emotional distress especially among those who were older and had to depend on their working children for support, those who lived in rental houses, those who experienced higher levels of water insecurity and those who had no health insurance as this research reports.

During the pandemic, Ugandans had to deal with more stringent community transmission control interventions; which apparently led to low COVID-19 cases being reported in the country compared to neighboring countries like Kenya, Tanzania and Rwanda (Bhuckory and Ojambo 2020; Kitara and Ikoona 2020). The restrictive measures were being issued in quick intervals, barely few hours apart (Ssegawa 2020). This came with loss of income, rising poverty levels as well as economic contraction, negatively impacting health and wellbeing and probably leading to very high reported emotional distress levels as reported in this research (Nuwematsiko et al. 2022). However, when the restrictions were lifted, the Ugandan government made structural reforms that helped boost inclusive growth prospects, safeguard jobs for the growing youth population, reignite business activities by providing tax relief to businesses among other measures leading to significant growth in Gross Domestic Product to pre-pandemic levels and significant reduction in inflation rate (Kaggwa et al. 2023). This has led to improvements in living condition and a reduction in poverty levels, and thereby significantly reducing the levels of reported emotional distress in the Ugandan population.

Also in the post-pandemic era, more women in both countries perceived their health as poor/fair relative to others their age; when compared to during the pandemic. This could be partially explained by the fact that none of the countries reported significant increases in insurance coverage. This trend in self-rated health is worrying considering the increasing burden of non-communicable diseases in Sub-Saharan Africa (Gulis et al. 2025). Without health insurance and in the face of poverty, these women are likely not to be able to access services such as cervical and breast cancer screening or specialized treatment of various chronic conditions (Ponce-Chazarri et al. 2023). In similar low-income settings, poor perceived health has been associated with increased odds of mortality. For instance, a longitudinal study in Indonesia found that those who perceived their health as poor were more likely to die in subsequent follow-up periods than their counterparts who viewed their health as good, even after adjusting for measures of nutritional status, physical functioning, symptoms of poor physical health, depression and hypertension (Frankenberg and Jones 2004). Also, a study in Bangladesh reported that poor self-rated health was associated with reduced measured physical performance among the elderly.

In this research, more women in both countries perceived the accessibility and quality of healthcare services in their community as poor/fair post pandemic compared to during the pandemic. Access to healthcare could be conceptualized as *the possibility to identify healthcare needs, to seek healthcare services, to reach the healthcare resources, to obtain or use healthcare services, and to actually be offered services appropriate to the needs for care* (Levesque et al. 2013). Poor access to healthcare has been previously primarily associated with low health insurance coverage (Ilinca et al. 2019; Otieno et al. 2020). Literature also has demonstrated that health insurance coverage is primarily determined by employment-related factors and income (Buigut et al. 2015). However, in settings with high levels of unemployment, an overwhelming

majority tend to engage in informal employment which generally lacks entitlements such as health insurance. In the absence of health insurance people resort to out-of-pocket payments for healthcare services which have also been associated with low access to primary care (Wiysonge et al. 2017; Otieno et al. 2020). Direct out-of-pocket costs place a huge burden of bearing the costs of illness to the sick person and their households, and is therefore, a major contributor to inequities (Atake and Amendah 2018).

Poor accessibility of healthcare services results from poor health infrastructure, lack of appropriate medical equipment, drugs and other essential supplies especially in public healthcare facilities; that if not addressed, jeopardizes the efforts towards achieving Universal Health Coverage in alignment with Sustainable Development Goal 3.8 (Barasa et al. 2018). Experiences of poor quality care due to under-resourcing of healthcare personnel and equipment also leads to diminishing confidence on healthcare services (Bohren et al. 2014). This lack of trust in providers in turn limits care seeking as well as increasing preference for traditional medicine over biomedical providers especially in LMICs (Bohren et al. 2014; Dawkins et al. 2021). Herbal medicine, a form of traditional medicine that makes use of medicinal herbs to treat ailments, has the potential to induce adverse effects if used incorrectly or in overdose. The likelihood of adverse effects becomes more apparent due to indiscriminate, irresponsible, and nonregulated use and lack of proper standardization (Angell and Kassirer 1998; Kamsu-Foguem and Foguem 2014; Ozioma et al. 2019). This is because the rich flora of Africa contains numerous plants with toxic constituents such as neurotoxins which can harm the major systems of the human body, leading to health complications hence further adversely impacting health and wellbeing (Kamsu-Foguem & Foguem 2014). Possibly, the COVID-19 pandemic revealed that the existing healthcare services were unable to meet the healthcare needs of the populations in these settings and therefore raised

their expectation as to what should constitute an ideal healthcare system. This rising expectation alongside a reality that did not change much only serves to widen the gap between expectation and reality, hence worsening wellbeing.

Worsening states of health and wellbeing post pandemic were associated with increasing age, living in rental houses, experiencing higher levels of water/WaSH insecurity and lacking health insurance. Older women were more likely to report worsening health and wellbeing outcomes post pandemic relative to their younger counterparts. This pattern is however divergent from that observed in previous studies. Such studies attribute decline in emotional distress across life course to stressor frequency decreases with age (Almeida et al. 2023; Aldwin et al. 2014). This can be partially explained by differing goals and life tasks common at each life stage. In young adulthood, common development tasks include gaining educational and occupational skills, achieving financial independence, and cultivating adult social networks. These tasks are normally associated with challenges and struggles often accompanied with daily stressors. Older adults are however likely to experience lower levels of daily stressors as a result of decreased social roles and expectations associated with retirement and empty nests, and increased leisure time (Aldwin et al. 2014). While the benefits associated with retirement, empty nests and leisure time apply to high income economies like the United States, the same does not apply to old age in LMICs like Kenya and Uganda where older women sometimes have to engage in unpaid work such as taking care of their grandchildren (Rishworth & Elliott 2017). Moreover, the increase in emotional distress levels with age as found in this research corroborates with the fact that age-related changes in physiology may create difficulties down-modulating higher levels of distress, that is, increases in age is associated with reductions in reactivity whenever stressors occur (SAVI model) (Almeida et al. 2023; Birditt 2014).

Compared to those who live in their houses, renters are potentially more vulnerable as they are likely to have lower incomes and are at a risk of eviction without government intervention especially when tenants delay in remitting their rents (Oswald et al. 2023). These challenges associated with housing have direct implications for wellbeing with existing literature reporting a deterioration of mental health and an increase of psychological distress attributable to tenure insecurity and unaffordable rental housing (Bentley et al. 2018; Mason et al. 2013). Rental houses even in higher income economies such as New Zealand are always associated with precarity linked to substandard quality, overcrowding, unaffordability and failure to meet the needs of the individual and household (Bates et al. 2019). For renters, housing precarity can be additionally related to frequent residential mobility, ongoing uncertainty as well as pressure from landlord to relocate all of which are likely to undermine experiences of security. Such insecure rental tenure coupled with low-quality housing can deplete wellbeing and exacerbate health problems, especially when accompanied by financial stresses. At the financial level, experiences of insecurity could stem from low pay or part-time employment, loss of savings, lack of insurance, or asset poverty; hence giving rise to struggles to meet accommodation and basic living costs, and affording healthcare (Bates et al. 2019; Grenier et al. 2017; Colic-Peisker et al. 2015). Hence, living in rental houses is associated with worse states of health and wellbeing in space as reported by existing literature as well as overtime as this research has found.

The finding that water/WaSH insecurity is likely to lead to worsening health and wellbeing is in line with existing literature which has extensively reported that water insecurity is likely to impact the levels of stress, anxiety, depression, and other adverse wellbeing indicators (Collins et al. 2019; Brewis et al. 2021; Bisung & Elliott 2016; Nunbogu & Elliott 2022). The burdens of water management and the toll of mental health, domestic water supply responsibilities and the

corresponding rising mental load are not evenly distributed, but disproportionately allocated to women and girls within the household (Bisung & Elliott 2016; Akpabio et al. 2021; Amondo et al. 2022; Nounkeu & Dharod 2022). In the absence of clean, piped water in the household in sufficient quantity, household members, predominantly women, have to sacrifice their time, money, energy and even water quality to secure water from alternate sources, exposing them to increased risk of infection and diseases, physical injuries, and decreased mental wellbeing (Geere et al. 2018; Collins et al. 2019; Rosinger et al. 2020). A more recent study in Mozambique found that the level of food insecurity and subsequent impact on mental health can be exacerbated by water insecurity; water insecurity and food insecurity likely being the dominant stressors of populations in the global south (O'Brien et al. 2024). In addition to these evidence from qualitative studies and cross-sectional surveys, this research reports that persistent water/WaSH insecurity could potentially lead to sustained or even worsening poor states of health and wellbeing over time.

Access to health insurance coverage is likely to lead to improvements in health and wellbeing via two major pathways. First, having health insurance can provide “peace of mind”. Health insurance primarily functions as a means of protecting individuals from negative health shocks and catastrophic medical expenditures (Nyman 1999). Thus, this *ex-ante* reduction in risk can induce individuals to be more satisfied with their lives thereby decreasing anxiety and stress. Secondly, health insurance coverage can lead to improvements in financial and health conditions by reducing out-of-pocket healthcare spending (Goldin et al. 2021; Argys et al. 2020; Brevoort et al. 2020). This becomes particularly important in settings such as those in Kenya and Uganda in the face of rising incidences of non-communicable diseases as people are able to be screened in good time and also help shoulder the high costs associated with treatment and management of these conditions. However, in spite of the epidemiological transition in Africa, this thesis reports

persistently low levels of health insurance coverage and a healthcare accessibility and quality that is increasingly being perceived as poor/fair.

5.5 Interpretation according to Sen's capability approach

This thesis therefore found worse states of health and wellbeing to be associated with being older, experiencing high levels of water/WaSH insecurity and not having health insurance during the pandemic. In light of the capability approach, these situations are likely to influence the capability and functioning of a person as they try to bridge the gap between their expectation and their reality (wellbeing). For instance, older women are likely to suffer from diseases due to declining immunity. In the absence of quality and accessible healthcare system, they won't have the capability to achieve good health. Water/WaSH insecurity is another impediment towards the capability to attain good health and wellbeing. This was especially problematic in the face of the pandemic when people had to wash their hands frequently to reduce their likelihood of COVID-19 infection. Not having health insurance also implies that people are unable to access medical services when needed in the face of high levels of poverty coupled with widespread loss of jobs (loss of income). Hence, even though hospitals did exist, without health insurance people are unable to get the needed healthcare services due to limiting environmental conversion factors which affect their freedom to transform the resources into a functioning.

In the post-pandemic period, this research found that health and wellbeing were associated with age, educational attainment, household wealth, water/WaSH insecurity and health insurance coverage. In light of Sen's capability approach, these factors were significant barriers towards achieving the lives these women have reason to value (Sen 1995). All these factors could be regarded as personal conversion factors that influence the degree to which a person can transform resources into functionings (Robeyns & Byskov 2011). For instance, low levels of education is

likely to be associated with: lack of knowledge to prevent diseases, lower prestige and status in the society, and lack of credentials necessary to secure employment; leading to lower levels of happiness (Tran et al. 2021). Similarly, in the context of this research whereby women are responsible for household chores including cooking and washing, lack of water in the household not only means that they are unable to accomplish the assigned roles, but also that their health and wellbeing will be significantly impacted. Moreover, coupled with these personal conversion factors are the social conversion factors such as cultural norms that discriminate against women, and environmental conversion factors such as weak healthcare system, as prevalent in the context of this research. Therefore, policies and other changes aimed at improving health and wellbeing needs to be evaluated according to their impact on the capabilities as well as the actual functionings of these women.

5.6 Conclusions and contributions to knowledge

The COVID-19 crisis exposed stark global inequities, fragilities and unsustainable practices that pre-dated the pandemic, hence intensifying its impact. To many people around the world, the pandemic was the most destabilizing experience of their lives. While millions of people were infected within a very short time, nearly everyone was affected by lockdowns, travel restrictions and the resulting economic decline, social change and fear. In this respect, the pandemic was both a biological as well as a social phenomenon, reminding the world that the wellbeing of people, populations and the planet are intertwined. The pandemic did exert a heavy social and economic toll on marginalized populations such as women and older adults, moreso those from countries without structurally resilient economies similar to those in Sub-Saharan Africa like Kenya and Uganda.

This research points out how multiple vulnerabilities can intersect simultaneously and multiplicatively to worsen health and wellbeing of populations. These vulnerabilities include being a woman in patriarchal cultures, being elderly, living in settings with rising incidences of non-communicable and infectious diseases in spaces with weak healthcare systems and low insurance coverage, and facing high levels of poverty. In such contexts, the results report poor states of health and wellbeing characterized by high levels of emotional distress and poor/fair self-rated health during the pandemic and continue to persist well thereafter. Moreover, worse health outcomes were consistently found among women who were older, lived in rental houses, experienced high levels of water/WaSH insecurities and lacked health insurance. These conditions not only affected their health and wellbeing during as well as after the pandemic but also influenced their ability to build back better from the socioeconomic impacts of the pandemic.

Some alarming trends were noticed with regard to accessibility and quality of healthcare services in these communities. First, there were no significant differences in health insurance coverage between instances almost three years apart. This implies that healthcare, despite being widely regarded as a fundamental human right, is still out of reach for many in LMICs. In the absence of health insurance, people have to make out-of-pocket payments for treatments in the midst of high levels of poverty, high levels of unemployment or precarious employment. Second, compared to during the pandemic, more people perceived the accessibility and quality of healthcare services as poor/fair. This points to decreasing trust in existing healthcare services and probably increasing reliance on traditional medicine such as herbal medicine which tends to be toxic to the body primarily due to unregulated dosages.

In this thesis, propensity score matching was used to overcome data constraints associated with lack of pre-post or longitudinal data. PSM has been widely used in the past to measure the

impact of an intervention in experimental designs by eliminating prior differences (not associated with treatment) – participants and non-participants always differ even in the absence of treatment/intervention. Its basic idea is to find individuals who are similar to the intervention participants from a pool of control participants, considering all relevant pretreatment characteristics. This thesis proposes that the method can also be used to assess impact between two repeated cross-sectional studies, by identifying comparable participants in the two studies to produce a pseudo-longitudinal or panel data necessary to measure differences over time while eliminating or reducing the influence of sample differences. There exists several propensity score matching algorithms, of which none dominates the rest. Hence, before settling on one, the quality of matching process needs to be assessed, for example through examining the resultant love plots and/or performing sensitivity analysis. One caveat to this method is that it only mimics longitudinal studies and must not be regarded as an equivalent substitute.

5.7 Limitations

Interpretation of these findings is subject to several limitations. First, the surveys relied on self-reported responses and may therefore be subject to social desirability bias for instances where sensitive topics were addressed, like having to depend on illegal connections as a strategy of coping with water insecurity. Whenever it was necessary, the data collectors aimed to gain trust with the participants and conducted surveys in safe locations in order to reduce the potential for bias. Although the GHQ-12, the tool used to assess emotional distress has been validated in similar contexts, it is likely to overestimate the prevalence of major depressive disorders due to false positives (Tsai 2014). Other variables that were assessed based on self-reports include wellbeing and state of health relative to others own age. These too are not entirely perfect but can provide a depiction of the state of health and wellbeing upon which important inferences can be drawn.

Additionally, this research employed cross-sectional study designs, which limit the ability to infer a causal relationship between independent variables and health and wellbeing. Using PSM came in handy to evaluate progress made post the pandemic but it also has operational limitations and cannot replace a longitudinal study. Finally, the statistical models used in this research did not account for the effect of potential unobserved confounders such as family health and wellbeing states, domestic violence, food security and partner support. In spite of all these limitations, important inferences can still be drawn from this research to inform policy in these contexts as well as provide directions for future research.

5.8 Directions for future research

Several significant contributions to knowledge proceed from this research, yet it still indicates need for further research in a number of key areas. To begin with, relevant literature as well as this thesis has revealed an important relationship between older people, living in rental houses, experiencing high levels of water/WaSH and lacking health insurance; with higher levels of reported emotional distress, poor self-rated health and poor state of wellbeing during as well as post COVID-19. The same factors influenced the process of recovering better post pandemic. However, to inform policy, further research of intensive nature would be necessary to explore the mechanisms within which these associations occur. Such follow-up qualitative studies would be able provide a deeper understanding of these findings. The intensive nature of qualitative research will further contextualize these findings to help understand more fully the lived experiences of the women herein surveyed. The resultant findings will be necessary to fine tune policy implementation as they will unravel the mechanisms within which the associations found in this study occur.

Furthermore, since some of the multivariable models did not have ‘good’ predictive powers, as indicated by diagnostic statistics (percentage correctly classified, mcFadden’s r^2 and area under curve), further research needs to be done to incorporate more explanatory variables such as domestic violence, partner support. This adjustment should be made alongside increasing the sample size in order to simultaneously increase statistical power. The effectiveness of propensity score matching for repeated cross-sectional studies could also be further explored by comparing it with other alternative methods such as stratification, inverse probability weighting and regression adjustments.

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Appendices

Appendix A: List of Independent and Outcome Variables

Variable	Type	Options	Referent group
Independent Variables			
Age	Numerical		
Marital Status	Factor	Partnered (currently married, co-habiting)	Unpartnered
		Unpartnered (single/widowed/divorced)	
Religion	Factor	Christian	Muslim
		Muslim	
Household head	Factor	No	No
		Yes	
Live in Own house	Factor	No	No
		Yes	
Education level	Factor	Primary & Below	Primary & Below
		Above Primary	
Household size	Numerical		
Household has a child	Factor	No	No
		Yes	
Currently engaged in employment	Factor	No	No
		Yes	
Wealth Status	Factor	Less Poor	Less Poor
		Poor	
Piped water in compound or dwelling	Factor	No	No
		Yes	
Handwashing facility present	Factor	No	No
		Yes	

Spend money on water	Factor	No	No
		Yes	
Water Insecurity Index	Numerical		
WaSH Insecurity Index	Numerical		
Responsible for making decisions relating to water collection	Factor	No	No
		Yes	
Responsible for making decisions relating to managing toilets	Factor	No	No
		Yes	
Responsible for making decisions relating to attending WaSH meetings	Factor	No	No
		Yes	
Responsible for making decisions relating to household expenditures	Factor	No	No
		Yes	
Responsible for making decisions relating to sanitation and hygiene	Factor	No	No
		Yes	
Has health insurance	Factor	No	No
		Yes	
Outcome Variables			
Wellbeing index	Numerical		
Emotional distress	Factor	0 = Below cut-point (<4)	
		1 = Above cut-point	
Perceived health relative to others own age	Factor	0 = Good/Very Good/Excellent	
		1 = Poor/Fair	
Perceived accessibility of healthcare services	Factor	Good/Very Good/Excellent	
		Poor/Fair	
Perceived quality of healthcare services	Factor	Good/Very Good/Excellent	
		Poor/Fair	

Appendix B: GHQ-12 Scale coding for emotional distress index

Question	Response	Assigned Value
Been able to concentrate on what you're doing?	Less so than usual/Much less than usual Same as usual/More so than usual/Don't know/Refused to answer	1 0
Lost much sleep over worry?	Not at all/No more than usual/Don't know/Refused to answer Rather more than usual/Much more than usual	0 1
Felt you were playing a useful part in things?	Less so than usual/Much less than usual Same as usual/More so than usual/Don't know/Refused to answer	1 0
Felt capable of making decisions about things?	Less so than usual/Much less than usual Same as usual/More so than usual/Don't know/Refused to answer	1 0
Felt constantly under strain?	Not at all/No more than usual/Don't know/Refused to answer Rather more than usual/Much more than usual	0 1
Felt you couldn't overcome your difficulties?	Not at all/No more than usual/Don't know/Refused to answer Rather more than usual/Much more than usual	0 1
Been able to enjoy your normal daily activities?	Less so than usual/Much less than usual Same as usual/More so than usual/Don't know/Refused to answer	1 0
Been able to face up to your problems?	Less so than usual/Much less than usual Same as usual/More so than usual/Don't know/Refused to answer	1 0
Been feeling unhappy and depressed?	Not at all/No more than usual/Don't know/Refused to answer Rather more than usual/Much more than usual	0 1
Been losing confidence in yourself?	Not at all/No more than usual/Don't know/Refused to answer Rather more than usual/Much more than usual	0 1
Been thinking of yourself as a worthless person?	Not at all/No more than usual/Don't know/Refused to answer Rather more than usual/Much more than usual	0 1
Been feeling reasonably happy, all things considered?	Less so than usual/Much less than usual Same as usual/More so than usual/Don't know/Refused to answer	1 0

Appendix C: During-pandemic survey tool

Good morning/afternoon; my name is_. I am here to invite you to answer some questions about your health and the health of your family. This should only take about 20 minutes or so. Before we begin, I will read you some information about the study and about how your information will be kept strictly confidential: <Pending privacy statement> Would it be ok if I started asking you a few questions now?

Interviewer to introduce themselves with the provided script

Q Participant is ready to begin

Q Participant is not ready to begin. Is there be another day or time more convenient for the participant? Are you able to reschedule a visit?

Record the location of this household

Ensure the device's GPS is enabled.

latitude (x.y⁰)

longitude (x.y⁰)

altitude (m)

accuracy (m)

Gender of participant

- ☐ Male
- ☐ Female

Age of participant, in years.

Marital status of the participant*

- ☐ Single or never married
- ☐ Currently married or living with someone
- ☐ Separated, divorced or widowed
- ☐ O Participant refused to answer

Participant's relationship to the household head?*

- ☐ Is household head
- ☐ Spouse of household head
- ☐ They are another family member

How many other male adults (18+) live in this household?	*
How many other female adults (18+) live in this household?	*
How many other male children live in this household?	*
How many other female children live in this household?	*
Religion of participant* ☐ Christian ☐ Muslim ☐ Other (Specify)	
Does the participant own or rent this house? ☐ Own ☐ Rent ☐ Owned by another family member ☐ Other (Specify)	
What kind of work does the participant mainly do? ☐ Does not work ☐ Subsistence farming ☐ Employed for pay full time ☐ Employed for pay part time ☐ Unemployed and looking for work ☐ Temporary or seasonal work for pay ☐ In school ☐ Self-employed	

What was the total household income for last year (2019):
How long has the participant lived in this community? (Years)
Has the participant ever attended school ☐ Yes ☐ No
What is the highest level of education completed? ☐ Primary ☐ Junior Secondary ☐ Senior Secondary/Vocational/Technical ☐ Teaching/Nursing College ☐ Some University

- Completed University
- Graduate School
- Professional degree (medicine, law, dentistry)

"Now we have a few questions about household items"

Select household items that are present

*

- Cupboard
- Cassette, CD or DVD player
- Television
- Mobile phone
- Sofa set
- Electricity

Household member with a bank account, mobile account, or account with an agent

What is the main material of the floor of this household?

*

- Earth or sand
- Cement screed (cement, aggregates, and water)

What is the main material of the exterior walls of this household?

*

- Cement
- Other

What is the main material of the roof of this household?

- Thatch or palm leaf
- Iron, zinc, or aluminum sheets

What type of fuel does this household mainly use for cooking?

- Wood
- Other

"Now we'd like to know more about what kind of water source and toilet this household uses"

What is the main source of drinking water for this household? * ☐ Piped water ☐ Dug well ☐ Water from spring ☐ Rainwater collection ☐ Delivered water ☐ Water kiosk ☐ Packaged water ☐ Surface water ☐ Other
Please specify source of water used for other purposes
Please select the specific type based on the source
What is the main source of water used by members of this household for other purposes, such as cooking and hand washing? * ☐ Piped water ☐ Dug well ☐ Water from spring ☐ Rainwater collection ☐ Delivered water ☐ Water kiosk ☐ Packaged water ☐ Surface water ☐ Other
Please specify source of water used for other purposes
Please select the specific type based on the source
Does this household spend money on water?* ☐ Yes ☐ No
Where is the location of the source of drinking water? * ☐ In dwelling ☐ In yard or plot ☐ Elsewhere
How long does it take to travel to the location of the source of water and come back? * ☐ Participant does not know ☐ Household members do not collect water from outside the residence ☐ Record duration to travel for water
Record the total time taken for a single round trip including queuing. <i>Record in minutes</i>
Who is primarily responsible for obtaining water each day? <i>Select the individual primarily responsible for water collection</i> ☐ Adult male ☐ Adult female ☐ Girl (< 15 years old) ☐ Boy (< 15 years old)
How many trips did that person make in the last week? ☐ Participant does not know

○ Record number of trips
Record the number of trips
We would like to learn about the places that household members of this households uses to wash their hands. Ask the participant to please show you where members most often wash their hands? ○ Observed fixed place ○ Observed mobile place (bucket, jug, or kettle) ○ No observed place, no handwashing place in the household, yard or plot ○ No observed place, permission to observe was not granted
Is there presence of water? <i>Observe</i> ○ Water is available ○ Water is not available
What kind of toilet facility do members of this household usually use? If 'Flush' or 'Pour flush', probe:* Where does it flush to? (observe if necessary) <i>Note: If not possible to determine, ask permission to observe the facility</i> ○ Flush or pour flush ○ Dry pit latrines ○ Composting toilets ○ Bucket ○ Container based sanitation ○ Hanging toilet or hanging latrine ○ No facility or bush ○ Other
Please specify the type of toilet
Please select the specific type of toilet
Is this facility shared with others who are not members of this household? ○ Yes ○ No
Where is this toilet located? ○ In household ○ In own yard or plot ○ Elsewhere

Is there a senior in this household? Are they able to go to the toilet room, use the toilet, arrange their clothes, and return without any assistance (may use cane or walker for support and may use bedpan/urinal at night).

Ask only if relevant: If there is a senior in the household being cared for by another

- ☐ Yes
- ☐ No
- ☐ Participant does not know
- ☐ Participant refused to answer
- ☐ Not applicable

When a member of this household is menstruating, are they able to wash and change in privacy while at home?

Ask only if relevant

- ☐ Yes
- ☐ No
- ☐ Participant does not know
- ☐ Participant refused to answer
- ☐ Not applicable

Has the access to water changed in anyway in the past year? (to capture implementation of any NGO* or government programs to enhance water access to stem the spread of the virus)

- ☐ Yes- how?
- ☐ No
- ☐ Participant does not know
- ☐ Participant refused to answer

Record an open ended answer as to how change in access to water has occurred in the past year

Ask participant to think about their day yesterday. How many times did they wash your hands with soap and water and/ or use hand sanitizer?

"Now we'd like to discuss how you make decisions about water or sanitation issues within your household, and within your community. Please answer the questions, thinking about how the situation has been in the last 12 months."

Proceed by asking the participant how decisions within the household are made about the following issues

When decisions are made regarding collection of water in the household, who is it that normally takes the decision?

Ask participant to select all where applicable

- ☐ Participant (Self)
- ☐ Spouse
- ☐ Other household member

○ Other non-household member ○ Not applicable (e.g water on premises)	
How much input do you have in making decisions about collection of water in the household? ○ No input or input in few decisions ○ Input into some decisions ○ Input into most or all decisions	
When decisions are made regarding managing and maintenance of household toilet or hygiene facilities, who is it that normally takes the decision? <i>Ask participant to select all where applicable</i> ○ Participant (Self) ○ Spouse ○ Other household member ○ Other non-household member	*
How much input do you have in making decisions about managing and maintenance of household toilet or hygiene facilities? ○ No input or input in few decisions ○ Input into some decisions ○ Input into most or all decisions	
Within your household when decisions are made about attending community water, sanitation and hygiene meetings (e.g. planning of water facilities or resolution of problems}, who is it that normally takes the decision? <i>Ask participant to select all where applicable</i> ○ Participant (Self) ○ Spouse ○ Other household member ○ Other non-household member ○ Not applicable (no community meetings)	*
How much input do you have in making decisions about attending community water, sanitation and hygiene meetings how much input do you have? ○ No input or input in few decisions ○ Input into some decisions ○ Input into most or all decisions	
When decisions are made regarding household expenditure related to water (buying water, paying fees, containers, etc), who is it that normally takes the decision? <i>Ask participant to select all where applicable</i> ○ Participant (Self) ○ Spouse ○ Other household member ○ Other non-household member ○ Not applicable (no payments for water in last 12 months)	*

How much input do you have in making decisions about household expenditures related to water (buying water, paying fees, containers, etc)?

- ☐ No input or input in few decisions
- ☐ Input into some decisions
- ☐ Input into most or all decisions

When decisions are made regarding expenditure related to sanitation and hygiene (buying soap, building handwashing or sanitation facilities, emptying pits, maintaining, facilities, etc), who is it that normally takes the decision? *

Ask participant to select all where applicable

- ☐ Participant (Self)
- ☐ Spouse
- ☐ Other household member
- ☐ Other non-household member
- ☐ Not applicable (no payments for water in last 12 months)

How much input do you have in making decisions about expenditures related to sanitation (buying soap, building handwashing or sanitation facilities, emptying pits, maintaining facilities, etc)?

- ☐ No input or input in few decisions
- ☐ Input into some decisions
- ☐ Input into most or all decisions

"Now I have a few questions about how comfortable you feel speaking up in public when the community needs to make important decisions on water, sanitation and hygiene"

Proceed by asking the participant how they feel about the following issues

Do you feel comfortable speaking up in public to help decide on water, sanitation or hygiene implementation (like wells, hygiene promotion programs) in your community? (eg in a meeting about planning activities, or resolving break-downs)

Ask participant

- ☐ No, not at all comfortable
- ☐ Yes, but with difficulty
- ☐ Yes, comfortably
- ☐ Not applicable

Do you feel comfortable making a complaint to community leaders or local authority about water, sanitation and hygiene services (like break-downs, poor quality) in your community?

Ask participant

- ☐ No, not at all comfortable
- ☐ Yes, but with difficulty
- ☐ Yes, comfortably
- ☐ Not applicable

Have you complained about any challenges to your community leaders or local authority

Ask participant

- ☐ Not at all
- ☐ rarely
- ☐ Very often
- ☐ Not applicable

How effective do you think your complaints are to resolve this issue?

Ask participant

- ☐ Very effective
- ☐ Fairly effective
- ☐ A little bit effective
- ☐ Not active in complaints

"Now I'd like to ask you a few questions about some of the challenges facing you, your family and your nation"

Proceed by asking the participant about how they feel about about the following issues. Encourage the participant to choose one response but do not read out lists

What would you say the greatest challenge facing you or your family is right now?

Ask participant

- ☐ Water
- ☐ Sanitation
- ☐ Food
- ☐ Family disputes
- ☐ Money
- ☐ Housing
- ☐ Land
- ☐ Sickness

*

- Other

Please specify the sickness

Please specify the challenge your family faces right now.....

What would you say the greatest challenge facing your community right now?

Ask participant

- Water
- Sanitation
- Food
- Family disputes
- Money
- Housing
- Land
- Sickness
- Other

Please specify the sickness

Please specify the challenge your family faces right now.....

What would you say the greatest challenge facing Uganda right now?

Ask participant

- Water
- Sanitation
- Food
- Economy
- Corruption
- Housing
- Land
- Healthcare
- Sickness
- Other

Please specify the sickness

Please specify the challenge your family faces right now.....

We know that sometimes in Uganda, women are the subject of beatings by their husbands. What do you think about this? Can you tell me, is a husband justified in hitting or beating his wife if:"

Proceed by asking the participant to respond to the following statements with the provided responses

OK

Select which response the participant agrees with the most	No	Yes, some of the time	Yes, most of the time
She goes out without telling him*	☐	☐	☐
She neglects the children*	☐	☐	☐
She argues with him*	☐	☐	☐
She refuses to have relations with him*	☐	☐	☐
She burns the food*	☐	☐	☐
She argues with her mother or father in law *	☐	☐	☐
She does not provide (enough) water for the household	☐	☐	☐

"We know too that sometimes in UGANDA, seniors are the subject of abuse and neglect by their children or other close relations. I'd like to know what you think about this. When I read each of the following statements, tell me how much you agree or disagree with the statement read:"

Proceed by asking the participant to respond to the following statements with the provided responses

OK

Read out the following statements and indicate how much the participant agrees or disagrees with the statement*	Strongly agree	Slightly agree	Neutral	Slightly disagree	Strongly disagree
Manhandling of older people, parents or parents-in-law is not considered violence or abuse*	☐	☐	☐	☐	☐
Physically touching older people without their consent is not sexual abuse*	☐	☐	☐	☐	☐
If an older person's hygiene, safety and nutrition needs are not met, that is considered neglect*	☐	☐	☐	☐	☐
If an older person is housed in unsuitable living conditions, that is considered neglect*	☐	☐	☐	☐	☐

If an older person is subject to beating, slapping, kicking, biting and/or having things thrown at them, that is considered	☐ se*	☐	☐	☐	☐
If an older person is subject to shouting, insults, name calling or ridicule, that is considered abuse*	☐	☐	☐	☐	☐
If an older person's goods or money are stolen by force or by deceptions, that is considered abuse*	☐	☐	☐	☐	☐

"Now I'd like to ask you a few questions about your experience with getting water or using the latrine" OK		
Have you ever been bothered by anyone when going to the latrine or into the bush to relieve yourself or fetch water? * <i>Ask participant</i> ☐ Yes ☐ No ☐ Participant does not know ☐ Participant refused to answer		
Can you tell me about this? <i>Ask participant</i> Was it water related? Was it sanitation related?	Yes ☐ ☐	No ☐ ☐
How was it sanitation related? <i>Ask participant</i> ☐ Physical violence ☐ Sexual violence ☐ Intimidation with no violence ☐ Other		
Please specify which way it was sanitation related <i>Ask participant</i>		
Has anyone else in your household ever been bothered by anyone when going to the latrine or into the bush to relieve yourself or fetch water? * <i>Ask participant</i> ☐ Yes ☐ No ☐ Participant does not know ☐ Participant refused to answer		

Can you tell me about this? <i>Ask anyone else within the household</i>	Yes	No
Other household member: Was it water related?	☐	☐
Other household member: Was it sanitation related?	☐	☐
How was it sanitation related? <i>Ask anyone else in the household</i> ☐ Physical violence ☐ Sexual violence ☐ Intimidation with no violence ☐ Other		
Please specify which way it was sanitation related <i>Ask anyone else in the household</i>		
Has anyone else you know ever been bothered by anyone when going to the latrine or into the bush to relieve yourself or fetch water? <i>Ask participant</i> ☐ Yes ☐ No ☐ Participant does not know ☐ Participant refused to answer		
Can you tell me about this? <i>Ask anyone else the participant knows</i>	Yes	No
Was it water related?	☐	☐
Was it sanitation related?	☐	☐
How was it sanitation related? <i>Ask anyone else the participant knows</i> ☐ Physical violence ☐ Sexual violence ☐ Intimidation with no violence ☐ Other		
Please specify which way it was sanitation related <i>(Ask anyone else the participant knows)</i>		

"Now we'd just like to chat about how you've been doing over the past year" <i>"indicate how often each experience occurred for you in the past year"</i>					
	Never	Rarely (maybe once per year)	Sometimes (2-3 times over the year)	Often (almost every other month)	Very often (more than once per month)
I could not pay my bills on time (eg, water, electricity, loan payments)	☐	☐	☐	☐	☐
I could not pay my bills on time (eg, water, electricity, loan payments)	☐	☐	☐	☐	☐
I could not pay health insurance premiums for myself or my dependents	☐	☐	☐	☐	☐
I could not pay my rent on time	☐	☐	☐	☐	☐
I could not fix my house	☐	☐	☐	☐	☐
I ate less because there was not enough food or money to buy food	☐	☐	☐	☐	☐
I did not have enough money to buy the things I needed	☐	☐	☐	☐	☐
I did not have enough money to buy the things I wanted	☐	☐	☐	☐	☐

"Now we'd just like to chat about how you've been doing over the past year" <i>"indicate how often each experience occurred for you in the past year"</i>					
Household water insecurity access scale over the past 30 days (a) <i>Ask participant</i>	Very often	Often	Sometimes	Rarely	Never
Have you been worried that your household would not have enough water?	☐	☐	☐	☐	☐
Has a household member drank water from an undesirable source?	☐	☐	☐	☐	☐
Has a household member drank unsafe water?	☐	☐	☐	☐	☐
Has a household member drank less water than needed because there was not enough?	☐	☐	☐	☐	☐
Has a household member used less water than needed because there was not enough?	☐	☐	☐	☐	☐
Has a household member go to bed thirsty because there was not enough water?	☐	☐	☐	☐	☐
Have never had any water at all in your household?	☐	☐	☐	☐	☐

Has a household member felt angry or frustrated because there was not enough water?	☐	☐	☐	☐	☐
Household water insecurity access scale over the past 30 days (b) <i>Ask participant</i>					
Have you had safety concerns accessing a sanitation facility or going to the bush?	☐	☐	☐	☐	☐
Have you defecated in the open or used an undesirable place to relieve yourself?	☐	☐	☐	☐	☐
Have you been unable to wash or practice adequate hygiene because there was not enough water?	☐	☐	☐	☐	☐
Have you been without a place with water and soap to wash your hands when you needed to?	☐	☐	☐	☐	☐
Household water insecurity access coping measures <i>Ask only if the participant experienced any of the issues from the previous question</i>		Yes	No	Don't Know	Refused to answer
Have you taken extra measures to store water		☐	☐	☐	☐
Borrowed water from a neighbour		☐	☐	☐	☐
Harvested rain water in order to cope		☐	☐	☐	☐
Bought water from a private vendor		☐	☐	☐	☐
Taken extra measures to conserve water		☐	☐	☐	☐
Recycle or reused water in order to cope		☐	☐	☐	☐
Acquire water from a distant source		☐	☐	☐	☐
Purify unsafe water		☐	☐	☐	☐
Make illegal connection to a public water pipeline		☐	☐	☐	☐
Other		☐	☐	☐	☐
Please describe other measures that were taken to cope with issues					
Household food insecurity index over the past 4 weeks <i>Ask participant</i>	Never	Rarely	Sometimes	Often	Very often
How often did you worry that your household would not have enough food?	☐	☐	☐	☐	☐
How often were you or any household member unable to eat the kinds of foods you	☐	☐	☐	☐	☐

preferred because of a lack of resources?					
How often did you or any household member have to eat a limited variety of foods due to a lack of resources?	☐	☐	☐	☐	☐
How often did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	☐	☐	☐	☐	☐
How often did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	☐	☐	☐	☐	☐
How often did you or any household member have to eat fewer meals in a day because there was not enough food?	☐	☐	☐	☐	☐
How often was there ever no food to eat of any kind in your household because of lack of resources to get food?	☐	☐	☐	☐	☐
How often did you or any household member go to sleep at night hungry because there was not enough food?	☐	☐	☐	☐	☐
How often did you or any household member go a whole day and night without eating anything because there was not enough food?	☐	☐	☐	☐	☐

"Now we'd like to ask you a few questions about how you are feeling"
OK

In general, relative to others your own age, would you say your health is:

Ask participant

- ☐ Excelent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

*

Do you currently have health insurance for yourself and/or for other members of your household? * <i>Ask participant</i> ☐ Yes, self ☐ Yes, all in household ☐ Yes, self and children in household ☐ Only children ☐ No ☐ Other
Please specify who has health insurance with this household <i>Ask participant</i>
In general, how would you rate the accessibility of health care services in your community? * <i>Ask participant</i> ☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor
In general, how would you rate the quality of health care services in your community? * <i>Ask participant</i> ☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor
If you or someone in your household gets sick, who do you trust to provide care? <i>Ask participant</i> ☐ Self ☐ Relative ☐ Friend ☐ God/ Allah ☐ Traditional healer ☐ Doctor ☐ Nurse ☐ Other

Please specify who you would trust to provide your household with care during sickness	
"Now, I would like to ask you about how you have been feeling recently about your general health" OK	*
Been able to concentrate on what you're doing? <i>Ask participant</i> ☐ Better than usual ☐ Same as usual ☐ Less than usual ☐ Much less than usual ☐ Do not know ☐ Refused to answer	*
Lost much sleep over worry? <i>Ask participant</i> ☐ Not at all ☐ No more than usual ☐ Rather more than usual ☐ Much more than usual ☐ Does not know ☐ Refused to answer	
Felt you were playing a useful part in things? <i>Ask participant</i> ☐ More so than usual ☐ Same as usual ☐ Less useful than usual ☐ Much less useful than usual ☐ Do not know ☐ Refused to answer	*
Felt capable of making decisions about things? <i>Ask participant</i> ☐ More so than usual ☐ Same as usual ☐ Less so than usual ☐ Much less than usual	*

○ Do not know ○ Refused to answer
Felt constantly under strain? <i>Ask participant</i> ○ Not at all ○ No more than usual ○ Rather more than usual ○ Much more than usual ○ Does not know ○ Refused to answer
Felt you couldn't overcome your difficulties?* <i>Ask participant</i> ○ Not at all ○ No more than usual ○ Rather more than usual ○ Much more than usual ○ Does not know ○ Refused to answer
Been able to enjoy your normal daily activities?* <i>Ask participant</i> ○ More so than usual ○ Same as usual ○ Less so than usual ○ Much less than usual ○ Do not know ○ Refused to answer
Been able to face up to your problems?* <i>Ask participant</i> ○ More so than usual ○ Same as usual ○ Less so than usual ○ Much less than usual ○ Do not know ○ Refused to answer

Been feeling unhappy and depressed?* <i>Ask participant</i> ☐ Not at all ☐ No more than usual ☐ Rather more than usual ☐ Much more than usual
Been losing confidence in yourself?* <i>Ask participant</i> ☐ Not at all ☐ No more than usual ☐ Rather more than usual ☐ Much more than usual ☐ Does not know ☐ Refused to answer
Been thinking of yourself as a worthless person?* <i>Ask participant</i> ☐ Not at all ☐ No more than usual ☐ Rather more than usual ☐ Much more than usual ☐ Does not know ☐ Refused to answer
Been feeling reasonably happy, all things considered?* <i>Ask participant</i> ☐ More so than usual ☐ Same as usual ☐ Less so than usual ☐ Much less than usual ☐ Do not know ☐ Refused to answer
"Now we'd like to talk about recent challenges in Uganda" OK
Have you heard about this new virus, COVID-19 (Coronavirus)?* <i>Ask participant</i> ☐ Yes ☐ No

Where did you first hear about COVID-19 (Coronavirus)

- ☐ A friend, family member or neighbour
- ☐ A health care professional
- ☐ Radio
- ☐ The television
- ☐ Other

Please specify where you first heard about COVID-19 (Coronavirus)

How often this year have you heard about it?

- ☐ Never
- ☐ Once or twice a week
- ☐ Several times a week
- ☐ Daily

From what source do you frequently get information about COVID-19 (Coronavirus) from?

- ☐ Radio
- ☐ TV
- ☐ Newspaper
- ☐ Community forum
- ☐ Community Health worker
- ☐ Family or Friend
- ☐ Social media
- ☐ Other

Please specify the source you most frequently get information about COVID-19 (Coronavirus) from?

Did you share the information about COVID-19 (Coronavirus) you learned with others?

- ☐ Yes
- ☐ No

Do you feel you have enough information about the COVID-19 (Coronavirus) virus information?

- ☐ Yes
- ☐ No
- ☐ Participant does not know
- ☐ Participant refused to answer

What type of information would you like to have about the COVID-19 (Coronavirus) situation?

○ How to cure COVID-19 ○ How to protect yourself and family ○ How it spreads or how you can catch it ○ Other
Please specify what other information you would like to have about the COVID-19 (Coronavirus) situation
What have you been told about how to prevent you or your family from getting sick? ○ Wash hands frequently ○ Wear a mask ○ Social distance ○ Pray ○ Stay home ○ Monitor the health of you and your family members ○ Get tested if you suspect you have been exposed ○ Other
Please specify what other measures you have been told about how to prevent you or your family from getting sick
Have you been doing these things? ○ Yes ○ No
Which of the measures have you taken to prevent you or your family from getting sick? ○ Wash hands frequently ○ Wear a mask ○ Social distance ○ Pray ○ Stay home ○ Monitor the health of you and your family members ○ Get tested if you suspect you have been exposed - Other
How worried are you personally about COVID-19 (Coronavirus)? ○ Not at all worried ○ Slightly worried ○ Somewhat worried

- Moderately worried
- Extremely worried

How likely do you think that... <i>Repeat the answer options to the participant in order of left to right</i>	Extremely unlikely	Moderately unlikely	Somewhat unlikely	Neutral	Somewhat likely	Moderately likely	Extremely likely
You will be directly and personally affected by catching COVID-19 (Coronavirus) over the next 6 months?	☐	☐	☐	☐	☐	☐	☐
Your friends and family will be directly affected by catching COVID-19 (Coronavirus) in the next 6 months?	☐	☐	☐	☐	☐	☐	☐
How much do you or disagree with the following statements:			Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
COVID-19 (Coronavirus) will not affect many people in Uganda	☐	☐	☐	☐	☐	☐	☐
I Will probaly get sick with the COVID-19 (Coronavirus) virus	☐	☐	☐	☐	☐	☐	☐
Getting sick with COVID-19 (Coronavirus) can be serious	☐	☐	☐	☐	☐	☐	☐
If I get sick with COVID-19(Coronavirus), I wouldn't want anyone to know because then they would treat me differently	☐	☐	☐	☐	☐	☐	☐
I'm going to read things people have said about the COVID-19 (Coronavirus) virus. Please tell me if you think each is definitely true, probably true, probably false or definitely false?"				Definitely true	Probably true	Probably false	Definitely false
The virus can spread when an infected person touches someone's hand or face, kisses them, or sneezes or coughs near them				☐	☐	☐	☐
Washing hands frequently helps prevent the spread of COVID-19				☐	☐	☐	☐
Infected people may not show symptoms for 5 - 14 days				☐	☐	☐	☐
If you show symptoms, or think you have it, you should get tested				☐	☐	☐	☐

People who have recovered from COVID-19 should be avoided to prevent getting the disease				☐	☐	☐	☐
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Have you had, the COVID-19 (Coronavirus) infection? * ☐ Yes, I had it ☐ No ☐ Don't know ☐ Participant refused to answer
How was COVID-19 diagnosed? ☐ I diagnosed myself based on symptoms ☐ I was diagnosed by a doctor based only on symptoms ☐ I was diagnosed based on a positive test ☐ I don't know ☐ Other
Please specify how you were diagnosed with COVID-19 (Coronavirus)
If you were infected by COVID-19, how seriously do you think it would affect your health? ☐ Not very much ☐ Alot ☐ Very much ☐ Extremely impacted
What about anyone else in your household - have they had COVID-19?* ☐ Yes ☐ No
How were they (household member) diagnosed with COVID-19? ☐ Diagnosed themselves based on symptoms ☐ Diagnosed by doctor based on symptoms ☐ Based on a positive test ☐ I don't know ☐ Other
Are they (household member) well now? ☐ Yes ☐ No ☐ Deceased ☐ Don't know
Do you know anyone (else) who has been diagnosed with the virus? ☐ Yes ☐ No

How are you related to this person?.....
How were they (non-household member) diagnosed with COVID-19? ☐ Diagnosed themselves based on symptoms ☐ Diagnosed by doctor based on symptoms ☐ Based on a positive test ☐ I don't know ☐ Other
Are they (non-household member) well now? ☐ Yes ☐ No ☐ Deceased ☐ Don't know
Do you know anyone who has passed from the virus? * ☐ Yes ☐ No
Please specify your relationship ☐ Friend ☐ Family ☐ Neighbour ☐ Other
How has your daily life changed since the virus has come to Uganda? * <i>Select all that apply</i> ☐ Social distancing ☐ Kids not in school ☐ Wearing a mask ☐ Challenges getting food ☐ Challenges getting water ☐ Washing hands more often ☐ Other
Please specify in what other way your life has changed since the virus has come to Uganda

What do you think the biggest change to your daily life has been?* <i>Insert open ended response</i>					
"Now I'd like to read some statements to you and you can tell me how much you agree or disagree with the statement"	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
It really bothers me when people cough or sneeze without covering their mouth.	☐	☐	☐	☐	☐
I prefer to use hand sanitizer or wash my hands after shaking another's hand	☐	☐	☐	☐	☐
I avoid going to public places because of fear of getting sick with COVID-19	☐	☐	☐	☐	☐
I avoid touching things like door handles or stair railings when I am in a public place	☐	☐	☐	☐	☐
I dislike wearing a facemask	☐	☐	☐	☐	☐
A person's temperature should be taken before they enter any public place	☐	☐	☐	☐	☐
I am fine with going to very crowded public places	☐	☐	☐	☐	☐
I frequently use hand sanitizer/wash my hands with soap and water	☐	☐	☐	☐	☐
I would isolate at home for 14 days if I were symptomatic or had a positive COVID-19 test	☐	☐	☐	☐	☐
I have changed the way I live my life because of COVID-19	☐	☐	☐	☐	☐
How satisfied are you with the Ugandan Government's response to COVID-19?* ☐ Very satisfied ☐ Satisfied ☐ Somewhat satisfied ☐ Not very satisfied ☐ Not at all satisfied					
How much do you trust the information for the Ugandan Government about COVID-19?* ☐ Completely trusting ☐ Mostly trusting ☐ A little trusting ☐ Not at all trusting					

Now I'm going to read you some measures the government of Uganda may have taken to help prevent the spread of COVID-19. I'd like to know whether or not you support the Government's decision to take these measures"	A lot	A little	Neutral	Not at all
Stopping greeting another with handshakes or kisses	☐	☐	☐	☐
Those have contact with infected individuals staying home for 14days	☐	☐	☐	☐
Requiring people with COVID-19to stay home until they are well	☐	☐	☐	☐
Stopping sporting matches	☐	☐	☐	☐
Stopping cultural events (eg,music concerts)	☐	☐	☐	☐
Stopping prayer gatherings *	☐	☐	☐	☐
Closing schools	☐	☐	☐	☐
Closing restaurants and social clubs	☐	☐	☐	☐
Closing churches and mosques	☐	☐	☐	☐
Shutting down transportation between cities	☐	☐	☐	☐
Closing off a city for 2 weeks	☐	☐	☐	☐
Closing transportation in and around cities	☐	☐	☐	☐
Closing workplaces	☐	☐	☐	☐
Shutting down markets	☐	☐	☐	☐
What would be the biggest problems for you if you had to stay in the house for 14 days?* ☐ Food and water ☐ Running out of money ☐ Losing your job ☐ None ☐ Other				
Please specify how you would be affected if you had to stay in the house of 14 days				
If someone in your household was sick, would you have a separate room in your house to keep them isolated for 14 days? ☐ Yes ☐ No ☐ Participant does not know ☐ Participant refused to answer				
Is there anything else you'd like to share with me today that we haven't already talked about? <i>Record open ended if related to WASH and/or COV/0 only. If you have any concerns about the quality of the data</i>				

collected in this survey please list them here. Try to give important details but be concise.

Appendix D: Post-pandemic survey tool

Good morning/afternoon; my name is _____. I would like to chat with _____ is she home?

Hello – I would like to invite you to answer some questions about your health and the health of your family. This should only take about 20 minutes or so. Before we begin, I will read you some information about the study and about how your information will be kept strictly confidential:

<Participant information letter/consent >

Would it be ok if I started asking you a few questions now?

If no – would there be another day or time when it would be more convenient for us to chat?

Interviewer record and schedule a revisit OR begin asking questions...

Respondent ID

Community name (e.g., Kisumu W, Kisumu E, Kisumu C)

Interviewer ID

Date (recorded automatically by Kobo)

Start Time (recorded automatically by Kobo)

Location (interviewer turn on data collection and record location in Kobo)

A. Socio-demographics

Let me start with just a few questions about you...

1. **Sex:** male/female <Interviewer should be able to record this>

- ☐ Male
- ☐ female

2. **Age** in years

3. **Marital Status**

- ☐ Single/never married
- ☐ Currently married or living with someone
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

- Refused to answer

4. **What is your relationship to the household head?**

- Self
- Spouse
- They are another family member

We would like to understand how many others live here with you

Household Roster:

5. How many people live here with you?

Adults over 18+ years:	# male	# female
Children under 18 years:	# male	# female

6. Is anyone in the household over 60 years of age?

- Yes
- No

If yes, how many?	# male	# female
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7. Are there any persons in the household with a disability?

Yes

No

If yes, how many?	# male	# female
-------------------	--------	----------

8. What is your religion?

- Christian
- Muslim
- Other (please specify)

9. How long have you lived in this house? < insert # years>

10. Do you own or rent this house?

- Own
- Owned by another family member
- Rent

- Other (specify)
11. How long have you lived in this community? < insert #years>
12. Have you ever attended school? If Yes, what is the highest level of education you have completed?
- No schooling
 - Primary
 - Junior Secondary
 - Senior Secondary/Vocational/Technical
 - Teaching/Nursing College Housing
 - Some University Completed University Graduate School
 - Professional degree (medicine, law, dentistry)

B. COMMUNITY ATTITUDES

Now I'd like to ask you a few questions about some of the challenges facing you, your family and your nation <interviewer – encourage respondent to choose one response but do not read out list>

1. What would you say the **greatest challenge** facing you/your **family** is right now?
 - Water
 - Sanitation
 - Food
 - Family disputes
 - Money
 - Housing
 - Land
 - Sickness (please specify – we want specially to capture the **virus**)
 - Other (please specify)

2. What would you say the **greatest challenge** facing your community is right now?
 - Water

- Sanitation
- Food
- Community disputes
- Economy
- Housing
- Land
- Corruption
- Health (please specify – we want specially to capture the **virus**)
- Other (please specify)

3. What would you say the **greatest challenge** facing your **County** is right now?

- Water
- Sanitation
- Food
- Community disputes
- Economy
- Housing
- Land
- Corruption
- Health (please specify – we want specially to capture the **virus**)
- Other (please specify)

4. What would you say the **greatest challenge** facing your **Country** right now?

- Water
- Sanitation
- Food
- Economy

- Corruption
- Housing
- Land
- Health (please specify – we want specially to capture the **virus**)
- Healthcare
- Other (please specify)

C. WASH access

Now we'd like to know more about what kind of water source and toilet you use.

1. What is the main source of <u>drinking water</u> for your household?	Piped water Piped into dwelling Piped into compound, yard or plot Piped to neighbour Public tap / standpipe Borehole or tubewell Dug well Protected well Unprotected well Water from spring Protected spring Unprotected spring Rainwater collection Delivered water Tanker-truck Cart with small tank /drum/ Jerrycans Water kiosk Packaged water Bottled water Sachet water Surface water (river, stream, dam,lake, pond, canal, irrigation channel) Other (Specify)
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2. What is the main source of water used by members of your household for <u>other purposes</u>, such as cooking and cleaning/washing?	Piped water Piped into dwelling Piped into compound, yard or plot Piped to neighbour Public tap / standpipe Borehole or tubewell Dug well Protected well Unprotected well Water from spring Protected spring Unprotected spring Rainwater collection Delivered water Tanker-truck Cart with small tank /drum/ Jerrycans Water kiosk Packaged water Bottled water Sachet water Surface water (river, stream, dam,lake, pond, canal, irrigation channel) Other (Specify)
3. IF spending money on water... How much do you usually spend on water per day?	No cost Or <record in local currency>
4. If you do not have access to piped water, who in the household is primarily responsible for obtaining water each day?	Adult male Adult female Girl (<15 years) Boy (<15 years)

Select the individual primarily responsible for water collection	
5. Where is that water source located? Note: Can be skipped if the response is piped on premises or compound	In on dwelling In own yard/plot Elsewhere
6. How long does it take to go there, get water, and come back? Note: Record in minutes the total time taken for a single round trip including queuing.	Members do not collect Number of minutes: Don't know
7. How many trips does that person typically make in a day?	Number of times Don't know
8. What kind of toilet facility do members of your household usually use? If 'Flush' or 'Pour flush', probe: Where does it flush to?	Flush / pour flush Flush to piped sewer system Flush to septic tank Flush to open drain Flush to don't know where Dry pit latrines Pit latrine with slab Flush to pit latrine Pit latrine without slab / Open pit Composting toilets Twin pit with slab Twin pit without slab Other composting toilet Bucket Container based sanitation Hanging toilet/hanging latrine No facility/Bush/Field Other specify
9. Do you share this facility with others who are not members of your household?	Yes No

10. Where is this toilet located?	In own dwelling In own yard/plot Elsewhere
11. Can you access this toilet and use it at all times, day and night?	Yes No – If no, why not? Limited mobility Distance not always available safety issues Other (please specify) Don't know Refused
12. Has your access to water changed in any way since COVID? (to capture implementation of any NGO or government programs to enhance water access to stem the spread of the virus)	Improved Not improved Stayed the same Don't know Refused to answer

D. Empowerment in WASH Index

D1. Decision-making in WASH

“Now I have some questions about taking decisions about various aspects of household life.”			
No		Options	Instructions
	Did you participate in collection of water in the past 12 months?	Yes	
		No	
		Not applicable (water on premises or delivered)	SKIP TO NEXT DECISION
	When decisions are made regarding collection of water, who is it that normally takes the decision?	Self	SELECT ALL PPLICABLE
		Spouse	
		Other household member	

		Other non-household member	
		Not applicable	
	How much input did you have in making decisions about collection of water?	No input or input in few decisions	
		Input Into Some decisions	
		Input into most or all decisions	
		No decision made	
		Small extent	
		Medium extent	
		To a high extent	
	Did you participate in managing water use inside the household in the past 12 months?	Yes	
		No	
	When decisions are made regarding managing water use inside the household , who is it that normally takes the decision?	Self	SELECT ALL APPLICABLE
		Spouse	
		Other household member	
		Other non-household member	
	How much input did you have in managing water use inside the household about collection of water?	No input or input in few decisions	
		Input into Some decisions	
		Input into most or all decisions	
		No decision made	
	Did you participate in purchasing large household items in the past 12 months?	Yes	
		No	
		Not applicable (no toilet or no hand washing station e.g. open defecation)	SKIP TO NEXT DECISION
	When decisions are made regarding purchasing large household items who is it that normally takes the decision?	Self	SELECT ALL APPLICABLE
		Spouse	
		Other household member	
		Other non-household member	

	How much input did you have in making decisions about large household purchases?	No input or input in few decisions	
		Input Into Some decisions	
		Input into most or all decisions	
		No decision made	
0	Did you participate in running a small business or self employment in the past 12 months?	Yes	
		No	
		Not applicable (no community water planning meeting or activities)	SKIP TO NEXT DECISION
1	When decisions are made about you running a small business or being self employed who is it that normally takes the decision?	Self	SELECT ALL APPLICABLE
		Spouse	
		Other household member	
		Other non-household member	
2	How much input did you have in making decisions about running a small business or being self-employed?	No input or input in few decisions	
		Input Into Some decisions	
		Input into most or all decisions	
		No decision made	
3	Did you participate in household expenditure related to water (fees, containers, etc.) in the past 12 months?	Yes	
		No	
		Not applicable (no payments for water, infrastructure or equipment have been made by the household)	SKIP TO NEXT DECISION
4	When decisions are made regarding household expenditure related to water (fees, containers, etc.) , who is it that normally takes the decision?	Self	SELECT ALL PPLICABLE
		Spouse	
		Other household member	
		Other non-household member	
5	How much input did you have in making decisions about household expenditure related to water (fees, containers, etc.) ?	No input or input in few decisions	
		Input Into Some decisions	
		Input into most or all decisions	
		No decision made	

6	Did you participate in waged or salaried employment in the past 12 months (e.g., both agriculture and other wage work?	Yes	
		No	
		Not applicable (no expenditures on sanitation construction, maintenance or cleaning were made in the household)	SKIP TO NEXT DECISION
7	When decisions are made regarding working in waged or salaried employment, who is it that normally takes the decision?	Self	SELECT ALL APPLICABLE
		Spouse	
		Other household member	
		Other non-household member	
8	How much input did you have in making decisions about your waged or salaried employment?	No input or input in few decisions	
		Input Into Some decisions	
		Input into most or all decisions	
		No decision made	

D2. GROUP MEMBERSHIP

“Now I am going to ask you about groups in your community. These can be formal or informal and customary groups”			
No	Q.	Options	Instructions
1	Is there a Water or sanitation user’s group in your community?	Yes	
		No	
		Don’t know	SKIP TO NEXT GROUP
2	Are you an active member of this Water or sanitation user’s ?	Yes	
		No	
3	Do you have input into decisions taken by this group? (e.g. activities, use of funds, leadership)	Yes	
		No	
4	Is there an Agricultural / livestock/ fisheries producer’s group in your community?	Yes	
		No	
		Don’t know	SKIP TO NEXT GROUP

5	Are you an active member of this Agricultural / livestock/ fisheries producer's group ?	Yes	
		No	
6	Do you have input into decisions take by group? (e.g. activities, use of funds, leadership)	Yes	
		No	
7	Is there a Credit or microfinance group in your community?	Yes	
		No	
		Don't know	SKIP TO NEXT GROUP
8	Are you an active member of this Credit or microfinance group ?	Yes	
		No	
9	Do you have input into decisions take by group? (e.g. activities, use of funds, leadership)	Yes	
		No	
10	Is there a religious group in your community?	Yes	
		No	
		Don't know	SKIP TO NEXT GROUP
11	Are you an active member of this religious group ?	Yes	
		No	
12	Do you have input into decisions take by group? (e.g. activities, use of funds, leadership)	Yes	
		No	
13	Is there a Education (eg. PTA) in your community?	Yes	
		No	
		Don't know	SKIP TO NEXT GROUP
14	Are you an active member of this Education (eg. PTA) ?	Yes	
		No	
15	Do you have input into decisions take by the group? (e.g. activities, use of funds, leadership)	Yes	
		No	
16		Yes	
		No	

	Is there a Trade and business association group in your community?	Don't know	SKIP TO NEXT GROUP
17	Are you an active member of this Trade and business association ?	Yes	
		No	
18	Do you have input into decisions take by the group? (e.g. activities, use of funds, leadership)	Yes	
		No	
19	Is there any other women's group in your community?	Yes	
		No	
		Don't know	SKIP TO NEXT GROUP
20	Are you an active member of this women's group?	Yes	
		No	
21	Do you have input into decisions take by the group? (e.g. activities, use of funds, leadership)	Yes	
		No	
22	Is there any other group in your community (specify)?	Yes	
		No	
		Don't know	SKIP TO NEXT GROUP
23	Are you an active member of this group?	Yes	
		No	
24	Do you have input into decisions take by the group? (e.g. activities, use of funds, leadership)	Yes	
		No	

D3. ACCESS TO CAPITAL

Now I'd like to ask you some questions about your participation in making decisions on ownership of certain items				
Q.no				
1	Does anyone in your household currently have a large consumer durable (refrigerator, tv, sofa)?	1	Yes	
		2	No	Skip to next item

2	Do you own any of these items?	1	Yes, solely	
		2	Yes, joint with others in the household	
		3	No, others in the household do	
3	Does anyone in your household currently have a small consumer durable (radio, cookware	1	Yes	
		2	No	Skip to next item
4	Do you own any of these items?	1	Yes, solely	
		2	Yes, joint with others in the household	
		3	No, others in the household do	
5	Does anyone in your household currently have a cellphone?	1	Yes	
		2	No	Skip to next item
6	Do you own any of this cellphone?	1	Yes, solely	
		2	Yes, joint with others in the household	
		3	No, others in the household do	
7	Does anyone in your household currently have a means of transportation (bicycle, motorcycle, car)?	1	Yes	
		2	No	Skip to next item
8	Do you own any of these items?	1	Yes, solely	
		2	Yes, joint with others in the household	
		3	No, others in the household do	
9		1	Yes	

	Does anyone in your household currently have land for agriculture or other purposes?	2	No	Skip to next section
10	Do you own any of the land for agriculture or other purposes?	1	Yes, solely	
		2	Yes, joint with others in the household	
		3	No, others in the household do	
11	Does any member of your household have a bank account, mobile money account, or account with an agent?	1	Yes, solely	
		2	Yes, joint with others in the household	
		3	No, others in the household do	
12	Do you have access to any of these accounts	1	Yes, solely	
		2	Yes, jointly	
		3	No	
		4	Others in the household do	

E. WELLBEING

Now we'd just like to chat about how you've been doing

Please indicate how often each experience occurred for you

“Over the past year...”	Never	Rarely (maybe once per year)	Sometimes (2 – 3 times over the year)	Often (almost every other month)	Very often (more than once per month)
1. I could not pay my bills on time (eg, water, electricity, loan payments)					
2. I could not pay my medical bills for myself or my dependents					
3. I could not pay my rent on time					
4. I could not fix my house					
5. I ate less because there was not enough food or money to buy food					
6. I did not have enough money to buy the things I needed					

“Prior to the COVID 19 Pandemic...”	Never	Rarely (maybe once per year)	Sometimes (2 – 3 times over the year)	Often (almost every other month)	Very often (more than once per month)

7. I could not <u>pay my bills</u> on time (eg, water, electricity, loan payments)					
8. I could not pay my medical bills for myself or my dependents					
9. I could not <u>pay my rent</u> on time					
10. I could not fix my house					
11. I ate less because there was not enough food or money to buy food					
12. I did not have enough money to buy the things I needed					

13. When these things happen, what things do you do to cope? Interviewer- Record response

E2. Household Water Insecurity Access Scale (HWIS)

In the past 30 days how often have you...					
	Very Often	Often	Sometimes	Rarely	Never
1. ...worried that your household would not have enough water?					
2. ...or any household member drank water from an undesirable source?					
3. ...or any household member drank unsafe water?					
4. ... or any household member drank less water than needed because there was not enough?					
5. ... or any household member used less water than needed because there was not enough?					
6. ... or any household member went to bed thirsty because there was not enough water?					
7. ...never had any water at all in your household?					
8. ...or any household member felt angry or frustrated because there was not enough water?					
Over the past 30 days...have you...					

	Very Often	Often	Sometimes	Rarely	Never
9. ...had safety concerns accessing a sanitation facility or going to the bush?					
10. ...defecated in the open or used an undesirable place to relieve yourself?					
11. ...were not able to wash or practice adequate hygiene because there was not enough water?					
12. ...did not have a place with water and soap to wash your hands when you needed to?					

13. When these water issues happen, what things do you do to cope? Interviewer- Record response

A. Health Status

Now we'd like to ask you a few questions about how you are feeling.

1. In general, relative to others your own age, would you say your health is:
 - ☐ Excellent
 - ☐ Very Good
 - ☐ Good
 - ☐ Fair
 - ☐ Poor
2. Do you currently have **health insurance** for yourself and/or for other members of your household?
 - ☐ Yes, self
 - ☐ Yes, all in household
 - ☐ Yes, self and children in household
 - ☐ Only children in household
 - ☐ No
 - ☐ Other (please specify)
3. In general, how would you rate the **accessibility** of health care services in your community?
 - ☐ Excellent
 - ☐ Very Good
 - ☐ Good
 - ☐ Fair
 - ☐ Poor
4. In general, how would you rate the **quality** of health care services in your community?
 - ☐ Excellent
 - ☐ Very Good
 - ☐ Good
 - ☐ Fair
 - ☐ Poor
5. If you or someone in your household gets sick, who do you trust to provide care?
 - ☐ Self
 - ☐ Relative/Friend
 - ☐ God/Allah
 - ☐ Traditional Healer
 - ☐ Doctor
 - ☐ Nurse
 - ☐ Other (please specify)

F2. GHQ12: Now, I would like to ask you about how you have been feeling recently.

1. Been able to concentrate on what you're doing?

- ☐ Better than usual
- ☐ Same as usual
- ☐ Less than usual
- ☐ Much less than usual
- ☐ Don't know
- ☐ Refused to answer

2. Lost much sleep over worry?

- ☐ Not at all
- ☐ No more than usual
- ☐ Rather more than usual
- ☐ Much more than usual
- ☐ Don't know
- ☐ Refused to answer

3. Felt you were playing a useful part in things?

- ☐ More so than usual
- ☐ Same as usual
- ☐ Less useful than usual
- ☐ Much less useful
- ☐ Don't know
- ☐ Refused to answer

4. Felt capable of making decisions about things?

- ☐ More so than usual
- ☐ Same as usual
- ☐ Less so than usual
- ☐ Much less capable
- ☐ Don't know
- ☐ Refused to answer

5. Felt constantly under strain?

- ☐ Not at all
- ☐ No more than usual
- ☐ Rather more than usual
- ☐ Much more than usual
- ☐ Don't know
- ☐ Refused to answer

6. Felt you couldn't overcome your difficulties?

- ☐ Not at all
- ☐ No more than usual
- ☐ Rather more than usual

- ☐ Much more than usual
- ☐ Don't know
- ☐ Refused to answer

7. Been able to enjoy your normal daily activities?

- ☐ More so than usual
- ☐ Same as usual
- ☐ Less so than usual
- ☐ Much less than usual
- ☐ Don't know
- ☐ Refused to answer

8. Been able to face up to your problems?

- ☐ More so than usual
- ☐ Same as usual
- ☐ Less so than usual
- ☐ Much less able
- ☐ Don't know
- ☐ Refused to answer

9. Been feeling unhappy and depressed?

- ☐ Not at all
- ☐ No more than usual
- ☐ Rather more than usual
- ☐ Much more than usual
- ☐ Don't know
- ☐ Refused to answer

10. Been losing confidence in yourself?

- ☐ Not at all
- ☐ No more than usual
- ☐ Rather more than usual
- ☐ Much more than usual
- ☐ Don't know
- ☐ Refused to answer

11. Been thinking of yourself as a worthless person?

- ☐ Not at all
- ☐ No more than usual
- ☐ Rather more than usual
- ☐ Much more than usual
- ☐ Don't know
- ☐ Refused to answer

12. Been feeling reasonably happy, all things considered?

- ☐ More so than usual

- about the same as usual
- less so than usual
- much less than usual
- Don't know
- Refused to answer

Knowledge, Attitudes, Practices, COVID-19

Now we'd like to talk about recent challenges in **Kenya**; let's chat about COVID-19

1. How worried are you personally about COVID-19?

- Not at all worried
- Slightly worried
- Somewhat worried
- Moderately worried
- Extremely worried

14. How likely do you think it is that you will be directly and personally affected by catching COVID- 19

- Extremely unlikely
- Moderately unlikely
- Somewhat unlikely
- Neutral
- Somewhat likely
- Moderately likely
- Extremely likely

15. How likely do you think it is that your friends and family will be directly affected by catching COVID- 19

- Extremely unlikely
- Moderately unlikely
- Somewhat unlikely
- Neutral
- Somewhat likely
- Moderately likely
- Extremely likely

16. If I get sick with COVID-19, I wouldn't want anyone to know because then they would treat me differently

- Strongly disagree
- Somewhat disagree

- Neutral
- Somewhat agree
- Strongly agree
- Don't know
- Refused to answer

17. Have you had; the COVID-19 (Coronavirus) infection?

- Yes, I had it **Please go to NEXT QUESTION**
- No - skip next question
- I don't know
- Refused

18. How was COVID-19 diagnosed?

- I diagnosed myself based on symptoms
- I was diagnosed by a doctor based only on symptoms
- I was diagnosed based on a positive test
- Other – Please Specify: _____
- ☐ ☐ ○ I don't know

19. How many other people in your household were infected with COVID-19? Interviewer to record the number

20. Has anyone close to you passed from the virus? (eg family, friend or household member

- Yes
- No

21. What do you think the **biggest change** to your daily life has been as a result of COVID-19?

<insert open ended response>

22. How satisfied are you with the Kenyan Government's response to COVID-19?

No Very satisfied

- Very satisfied
- Satisfied
- Somewhat satisfied
- Not very satisfied
- Not at all satisfied

23. How much do you trust the information from the Kenyan Government about COVID-19?

- Completely trusting
- Mostly trusting
- A little trusting
- Not at all trusting

B. Paid and unpaid work for women in Kenya

1. Before the onset of the Covid-19 Pandemic, were you engaged in any paid work, as a salaried employee, a self-employed person or an intern?
 - ☐ Yes
 - ☐ No
 - ☐ Don't know
 - ☐ Refused
2. If yes, what kind of work did you do?
 - ☐ Don't know
 - ☐ Refused
3. During the Covid-19 Pandemic, were you engaged in any paid work, as a salaried employee, a self-employed person or an intern?
 - ☐ Yes
 - ☐ No
 - ☐ Don't know
 - ☐ Refused
4. If yes, what kind of work did you do?
5. Are you currently engaged in any paid work, as a salaried employee, a self-employed person or an intern?
 - ☐ Yes
 - ☐ No
 - ☐ I don't know
 - ☐ Refused to answer
6. If yes, what is your main source of income at the moment?

Employed or salaried, farming, business, fishing, others (specify)

 - ☐ Don't know
 - ☐ Refused
7. How has your personal source of income been affected since the onset of COVID-19?
 - ☐ No change in income
 - ☐ Lost all income

- Increased
 - Decreased
 - Don't know
 - Refused
8. What is the location of your paid work station?
- Home
 - Away from home
 - Both at home and away from home
 - Don't know
 - Refused
9. How many hours do you work for pay per day?
- 8 hours
 - Less than 8 hours
 - More than 8 hours
 - Don't know
 - Refused
10. How many days in a week do you work for pay?
- 1 through 7
 - Don't know
 - Refused
11. During the Covid-19 Pandemic, did you do any unpaid work, in your family's business, for example in a farm or in a shop belonging to a member of your family, food, fuel and water collection etc?
- Yes
 - No
 - Other (Specify)
 - Don't know
 - Refused
12. Have you or any other member of your household received any social protection grants and/or any in-kind support from the Government and/or other non-state actors at national and/or county level since the onset of covid-19?

- Yes
 - No
 - Don't know
 - Refused
13. Which social protection grants and/or any in-kind support did you or other member of your household receive from the Government and/or other non-state actors at national and/or county level since the onset of Covid-19?
- Food
 - Cash
 - Food and Cash
 - None
 - Don't know
 - Refused
14. In your household, who normally looks after the children?
- Me
 - Spouse
 - Babysitter
 - A relative
 - Day care
 - Don't know
 - Refused
15. Apart from a kindergarten and compulsory school hours, are the children in your household regularly looked after by someone who is not a member of your household?
- Yes
 - No
 - Don't know
 - Refused
16. If the above answer is yes, how much is the daily payment for their services?
- (Record daily wage for the services offered)
17. When schools were closed during COVID-19 lockdowns, who in your household took responsibility for looking after the children?

- ☐ Me
- ☐ Spouse
- ☐ Babysitter
- ☐ A relative
- ☐ Don't know
- ☐ Refused

18. When schools were closed during COVID-19, did your household undertake any home schooling with the children?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Refused

19. If yes, who was responsible for home schooling?

- ☐ Me
- ☐ Spouse
- ☐ Babysitter
- ☐ Relative
- ☐ Don't know
- ☐ Refused

20. Who is mainly responsible for household tasks in your home?

- ☐ I am
- ☐ Another family member in the household
- ☐ Person(s) outside the family
- ☐ I don't know
- ☐ Refused to answer

21. Does your household include anyone with a disability (physical or mental) or older person who needs special care?

- ☐ Yes – level of care required? Occasional; Frequent; Very frequent;
- ☐ No
- ☐ I don't know

- Refused to answer
- 22. Who is the primary person who provides that level of care?
 - I do
 - Other family member in the household
 - All members of the family help out
 - Person(s) outside the family – Go to Q.23
 - Institutional supports outside the household – Go to Q. 23
 - I don't know
 - Refused to answer
- 23. If the above answer is other, how much is the daily payment for that service?

(Record the cost for the services offered)
- 24. Approximately (in hours per day) how long does it take you to accomplish all your daily household and other chores?
- 25. Does spending time doing unpaid housework hinder you from doing any paid work?
 - Yes
 - No
 - I don't know
 - Refused to answer
- 26. During the Covid-19 Pandemic, did you leave work or stop working in order to take care of sick people in your household?
 - Yes – Q. 30
 - No
 - I don't know
 - Refused to answer
- 27. If the answer is yes, please estimate how much money you lost per week by leaving work to look after the sick?
- 28. During the Covid-19 Pandemic, did you ever lose your employment and have to move into the household of family/friends and depend on them for food and accommodation?
 - Yes
 - No
 - I don't know

- Refused to answer
29. During the covid-19 pandemic, did any of your family members move back to join your household?
- Yes – how many? How old?
 - No
 - I don't Know
 - Refused to answer
30. How much time do you spend each week in leisure or recreational activities? Record in hours

Survey completion

Is there anything else you'd like to share with me today that we haven't already talked about?

Would you be interested in taking part in more research activities with us (interviews; community meetings)?

- Yes
- No
- DK
- Refused

If so, document name and best method of contact (e.g., mobile number)

Outcome of interview

- Completed (1)
- Not Completed (2)

Interviewer:

Observations to data collector: if you have any concerns about the quality of the data collected in this survey please list

them here. Try to give important details but be concise.