



African Population and
Health Research Center



USAID'S HEALTH EVALUATION AND APPLIED RESEARCH DEVELOPMENT (HEARD) PROJECT

Country Profile: Kenya

Urban Health Assessment: Nutrition and Water Sanitation and Hygiene (WASH) Challenges Facing Children and Adolescents in Urban Slums in Nairobi

Table of Contents

Acknowledgments	2
Executive Summary	3
Introduction	5
Urbanization in Kenya	5
Kenya's Urban profile.....	6
Nutrition and WASH at a Glance	7
Sub aim 1: Literature review	9
Methods.....	9
Findings.....	10
Summary of Findings.....	14
Sub aim 2: Urban Dataset Review	15
Methods.....	15
Results and Discussion	16
Opportunities	17
Conclusions	17
Sub-aim 3: Policy and program review	18
Methods.....	18
Findings.....	18
Conclusion and Recommendations	22
Stakeholder mapping exercise	22
Methods.....	23
Findings.....	23
Conclusion.....	27
Community Case Study	28
Methods.....	28
Key Findings.....	28
Conclusions and Recommendations.....	32
Conclusions and Way Forward	33
References.....	34
Appendices.....	38

Acknowledgments

This project was funded by the United States Agency for International Development (USAID) through University Research Co., LLC (URC), the prime recipient. We acknowledge key stakeholders in Nutrition and WASH from government, county and sub-county level, the Division of Nutrition, Ministry of Health non-governmental and community-based organizations for their participation in the policy and community mapping exercise. We also thank the Nutrition Research Technical Working Group for their contribution, the study community in Korogocho for their participation in the project and the Policy Engagement and Communications team at APHRC for their support. We acknowledge support from the APHRC Right to Food project that has shared pictures highlighting the urban nutrition and sanitation conditions highlighted in this report.

Disclaimer: The Health Evaluation and Applied Research Development (HEARD) is funded by the United States Agency for International Development (USAID) under cooperative agreement number AID-OAA-A-17-00002. The project team includes prime recipient, University Research Co., LLC (URC) and sub-recipient organizations. This report was produced for review by the United States Agency for International Development (USAID). It was prepared by APHRC, and was authored by Dr. Elizabeth Kimani-Murage, Dr. Antonina Mutoro, Dr. Tadesse Zerfu, Milka Wanjohi and Esther Anono. This report is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this report and findings of this study are the sole responsibility of APHRC and do not necessarily reflect the views of USAID or the United States Government.

Executive Summary

Background

Children and adolescents living in urban informal settlements are vulnerable to nutrition and health deficits, but little is known about how environmental, socio economic and cultural factors interact to influence child and adolescent nutrition and health.

Objective

This study aimed to understand 1) factors which contribute to poor nutrition, water, sanitation and hygiene (WASH) among children and adolescents living in slums/informal settlements and 2) solutions/policies put in place to address these challenges with an aim of identifying effective interventions and key areas which require intervention.

Methods

Four methods were used for data collection: 1) a desk review of grey and published literature to understand the key contextual vulnerabilities facing children in poor urban areas; 2) a review of quantitative datasets to identify and list characteristics of datasets on Nutrition and WASH in adolescents and children. A search of quantitative published and grey literature highlighting nutrition and WASH vulnerabilities in children and adolescents was conducted. The identified literature was summarized and an urban data inventory with a summary and description of existing quantitative datasets was populated; 3) Desk review of nutrition and WASH policies and focus group discussions with policymakers and key stakeholders was also carried out to identify existing policies, programmes key actors and platforms that address urban nutrition and WASH; 4) A case study of Korogocho slum was carried out to identify community-based actors and organizations required for successful design and implementation of interventions targeting adolescents and children. Community mapping, key informant interviews and focus group discussions were used for data collection.

Findings

Literature Review: We identified 92 papers from the literature review, most of which, 38, focused on service (health and WASH) and care vulnerabilities (infant, young child and adolescent feeding). The available evidence shows that there is poor utilization of public health facilities in urban informal settlements. Slum residents preferred private health facilities despite the fact that they lack skilled staff and equipment. Environmental pollution with faecal matter was common and this was attributed to poor access to toilets. Childhood parasitic infections were also common especially among school children. Maternal perceptions about infant feeding, and socio-economic and cultural factors played a key role in influencing how mothers choose to feed their infants. There was however limited information about nutrition and WASH challenges faced by adolescents, orphans and refugees.

Dataset Review: A total of 48 quantitative datasets, which consisted of large nationwide and county surveys, were identified. Information collected from these surveys included child weight and length/height measurements, age, socio-economic status, infant and young child feeding practices (breastfeeding and complementary feeding), water, sanitation and hygiene indicators such as access to water and toilets. Some datasets also had information on infections such as diarrhea and parasitic infections. The following indicators were missing: 1) Undernutrition (stunting, underweight, wasting and micronutrient deficiencies) in adolescents, school aged children, orphans and street children; 2) Access to water and toilets by adolescents, school aged children, orphans and street children; 3) Infant and young child feeding practices in adolescent mothers.

Policy review and stakeholder mapping: A total of 84 policy and policy-related documents were identified, but only three, 1) The Urban Nutrition Strategy; 2) The Urban and Cities Amendment Act 2019 and 3) the Nairobi County Urban Agriculture Promotion and Regulation

Act, were designed to address the needs of urban populations. Five other national policy documents, Kenya Environmental Sanitation policy, Food and Nutrition Security Policy, Reproductive Health Policy, Reproductive Maternal, New born, Child and Adolescent Health Policy and the Prototype County Environmental Health and Sanitation Bill, 2016, outlined how to address the needs of the urban poor. Stakeholders agreed that Kenya had many policies, what was lacking was context specific implementation strategies.

During the stakeholder mapping exercise, approximately 27 programs were identified, most of which targeted children in urban areas. Programs which targeted adolescents mainly focused on sexual and reproductive health. Corruption, lack of sustainability, lack of financial resources and poor coordination and communication between implementing organizations were identified as barriers to successful program implementation.

Community case study: Access to health and nutrition services was poor especially among adolescents and school going children, who accessed health facilities only when they were unwell. Poor access and utilization of health facilities was attributed to lack of medical supplies, cost of treatment, waiting times at the facilities and poor staff interactions. Among adolescents, lack of adolescent friendly services was highlighted as a key reason for poor access. Poor infants and young child feeding practices such as limited exclusive breastfeeding in the first six months of life as recommended by the WHO were reported and this was mainly attributed to poverty.

The type of food eaten was dependent on financial ability and most diets were monotonous. Street foods were commonly eaten because they were affordable and easier to access. Poor access to food due to poverty was reported as a major barrier to good nutrition. Coping strategies reported included: scavenging in dumpsites, involvement in criminal activities, prostitution, consumption of cheap low-quality foods and skipping meals. Among school children, school meals were the main meals eaten by children, but children and parents complained that the meals were monotonous as they mainly consisted of boiled maize and beans. Poor access to water and toilets and poor waste disposal was also reported. This had a negative impact on health and hygiene practices. Formal and informal programs and interventions were identified, but a key limitation of the programs was that most were following “trends” rather than addressing the needs of the community.

Conclusion

Children and adolescents are faced by nutrition and WASH challenges some of which are addressed by on-going programs. There are also many policies addressing nutrition and WASH in Kenya, but what is lacking context specific implementation strategies. This highlights the need for contextualized nutrition and WASH strategies. There is also a need to improve data, especially in the area of adolescent nutrition. This information can potentially be used for decision making. Target communities should also be actively engaged in program design and implementation to promote ownership and sustainability.

Introduction

Kenya's urban population has rapidly increased, with a large proportion of the population consisting of children and adolescents (41%) [1]. Currently, approximately 32% of the population resides in urban areas and although the country has seen rapid economic growth in tandem with urbanization, this increase has exerted pressure on critical facilities such as water, sanitation, security, infrastructure, housing and transportation [2]. In Nairobi for example, over half of the population resides in informal settlements which are characterized by extreme poverty levels and poor access to basic resources such as nutritious food, hygiene and sanitation facilities [3].

These living conditions exposes residents of informal settlements to health and nutrition deficits which have a negative impact on their survival. For example, undernutrition rates among children in informal settlements ranges between 26% and 50% [4-6]. There are currently no definite figures about the proportion of adolescents who are undernourished in urban informal settlements, but figures from the Kenya Demographic and Health Survey show that 17% of adolescent girls are undernourished (Body Mass Index < 18.5 kg/m²) [7]. Given the poor living conditions in slums it also possible that a large proportion of adolescents in urban informal settlements are also undernourished. Teenage pregnancies in Kenya are also high, approximately 18% of adolescent girls pregnant [7]. This has a negative impact not only on their survival, but also on the health and survival of their children. Considering the fact that the impact of undernutrition is not only limited to one stage of the lifecycle, that is undernourished children are likely to grow in to undernourished adults who in turn give birth to undernourished children. There is a need for a better understanding of the causes of malnutrition and solutions that best address the needs of children, adolescents and families in informal settlements.

The causes of malnutrition have been shown to be multifactorial [8], but despite this, focus is usually on individual immediate causes, diet and disease. There is therefore a general lack of understanding of the extent in which other underlying and basic factors influence child and adolescent health in urban informal settlements in Kenya.

Urbanization in Kenya

Rapid urbanization is a common characteristic of many low- and middle-income countries worldwide. In Sub-Saharan Africa, 59 per cent of the urban population lives in slums and by 2050, Africa's urban dwellers are projected to have increased to 1.2 billion [9]. In 2009, 32% of Kenya's population resided in urban areas, which was a significant increase from 5.2% in 1948 [1]. The urban population is expected to further increase to 46% by 2030. The population of the capital, Nairobi, has grown more than ten-fold since 1960, representing some of the highest population growth rates in Africa [10].

The rapid increase in the urban population in Kenya can be attributed to high fertility rates especially among teenage girls, with about 18 per cent of teenagers (ages 15 to 19 years) giving birth each year [7]. In 2009, Kenya's fertility rate was 4.6 children per woman, and although this was a significant decline from the early 1990's, the current fertility rate is still considered to be high [11]. Reduced mortality rates and increased rural to urban migration have also significantly contributed to rapid population growth rate. There has been a significant decrease in rural populations coupled with an increase in urban populations. For example, in 1999, 81% of the population in Kenya resided in rural areas while 19% of the population resided in urban areas. However, in 2009 proportion of rural residents decreased to 69%, while the proportion of urban residents increased to 31%, an indication of high rates of rural to urban migration [1]. Rapid urbanization in Kenya can also be attributed to forced displacement. Nairobi has been a place of refuge for displaced populations from other areas in the country [12]. There were

approximately 100,000 refugees residing in Nairobi, but the exact number of this population is not known because urban refugees tend to be highly mobile and reluctant to come forward due to fears of deportation or being sent to refugee camps [13].

The rapid population increase, has exerted pressure on services in the urban areas resulting in constrained provision of critical facilities such as water, sanitation, security, infrastructure, housing and transportation. Kenya has an inadequate supply of affordable and decent housing, a low level of urban home ownership (16 percent), and extensive slums and squatter settlements [14]. It is estimated that out of the 200,000 housing units required annually in urban areas, only 40,000–50,000 are produced, of which only 6,000 units (20%) cater for low income households [14]. This is despite the fact that low-income households represent about 48 percent of the total demand for new houses in Kenya. Considering that more than 60 percent of the Kenyan population is younger than 25 years, the demand for housing will rise steadily as this group reaches adulthood [9]. In order to cater for the increasing demands of the growing population especially in informal settlements, there a need for improved urban planning to ensure that all urban residents have access adequate housing, food, safe water and sanitation facilities.

Kenya's Urban profile

This document highlights nutrition and Water Sanitation and Hygiene (WASH) challenges faced by children and adolescents in informal settlements in Nairobi as well as current policies and strategies put in place to address them, with an aim of identifying effective interventions as well as key areas which require intervention. It focuses on seven key areas which influence nutrition and WASH

- a. Policies and strategies that shape urban nutrition and WASH;
- b. Socio-cultural and economic factors (vulnerabilities) that influence behaviors related to child nutrition in poor urban contexts;
- c. Programs or initiatives that shape nutrition and WASH in poor urban areas;
- d. Key actors and platforms that influence nutrition of children in poor urban contexts;
- e. Formal/informal systems for healthcare related to child nutrition;
- f. Formal/informal systems for food in poor urban contexts;
- g. Environmental factors that influence hazardous exposures that can adversely influence child nutrition in poor urban contexts.

The profile is a summary of key findings from four processes 1) a desktop review of published and grey literature and 2) summary of quantitative data sets 3) a desktop review policies and strategies targeting children under 5 and adolescents and a stakeholder mapping exercise with policy makers and 4) a case study conducted in Korogocho slum in Nairobi Kenya.

This profile can be used by different stakeholders in health, urban planning, WASH to identify key nutrition and WASH vulnerabilities facing children and adolescents

1. It will serve urban nutrition **implementation platforms** by:
 - Identifying nutrition and WASH programs/interventions in urban informal settlements
 - Highlighting specific nutrition and WASH implementation challenges in urban contexts through a participatory process (which can further be leveraged for future program implementation);
 - Identifying health *and* non-health actors (and their roles) required to facilitate successful program implementation;
 - Uncovering promising urban nutrition-related interventions/approaches that could be integrated into existing and new programs, for expansion and/or scale up.
2. It will inform the urban nutrition **research agenda** by:

- Highlighting gaps in literature and data available for analysis of urban nutrition among adolescents and children in Kenya
 - Informing future implementation science needs such as interventions, approaches requiring further investigation to facilitate implementation and scale up
3. It will inform **policy/advocacy** development by
- Identifying national opportunities and gaps related to advancing urban nutrition among children and adolescents
 - Using results to make a stronger case for future investments in urban health and development for children and adolescents

Nutrition and WASH at a Glance

Rapid urbanization coupled with extreme poverty, are major problems which lead to health and development challenges among urban populations [15]. Studies show that urban residents have worse health outcomes than rural residents, an indication that the “urban advantage” is only limited to affluent urban populations [3, 16, 17]. This can be explained by extreme poverty which limits access to basic facilities and services. For example, in urban informal settlements in Nairobi, approximately 99% of the health facilities are privately owned meaning they are not regulated by government, which significantly compromises the quality of health care offered to slum residents. Food insecurity also remains a challenge in urban poor settings as up to 85% of households are food insecure [18, 19]. Access to water and sanitation is also a challenge as only about 18% of total urban population has access to a sewer system and 70% rely on septic tanks and pit latrines [2]. All these partly explain why urban residents, especially in informal settlements have worse health outcomes compared to other urban and rural residents (Table 1). For example, undernutrition rates and diarrhea rates are higher among slum residents and a small proportion of children residing in slums meet their dietary diversity.

Although these differences have been highlighted by different surveys, there is still inadequate information about factors which influence health and nutrition status of children and adolescents. There is also inadequate information about the prevalence of different vulnerabilities (micronutrient deficiencies, adolescent nutrition status), current programs and interventions put in place to address them and the effectiveness of these interventions. This urban profile aims to address some of these gaps.

Table 1: Comparison of child characteristics in urban informal settlements, urban areas, Nairobi and rural areas

Characteristic	Slums	KDHS		
		Urban	Nairobi	Rural
Nutrition status of children under 5 years				
Stunting	43*	19.8	17.2	29.1
Wasting	-	3.4	2.0	4.4
Underweight	-	7.0	3.8	12.9
Overweight	-	-	-	-
Breastfeeding				
Exclusive breastfeeding	2 ^{\$}	61 ^{&}	-	-
Early initiation	-	-	-	-
Complementary feeding				
Meeting minimum meal frequency	72.3*	68.3	70.0	67.2
Meeting minimum dietary diversity	40.3	67.3	71.4	50.8
Iron and Folic Acid Supplementation (all women)	-	74.9	74.7	65.9
WASH				
Access to piped water	27.6	43.2	-	12.1
Poor access to flush toilets/improved sanitation	46.2	25.5	-	20.6
Safe Disposal of child's stool	-	86.6	87.4	80.6
Childhood illness and infections				
Diarrhea prevalence children under 5	20.2	14.3	15.6	15.7
Treatment of diarrhea in a health facility	42.7	56.7	57.4	58.1
Tapeworms	-	16.9	-	22.3
Hookworm	-	16.9	-	24.6
Schistosoma mansoni	-	17.4	-	22.9
Related development indicators				
Education and literacy				
No education				
Men	-	8.9	19.5	4.5
Women	2.0	3.6	1.7	9.3
Reproductive health				
Fertility	3.5	3.1	2.7	4.5
Age at first sexual debut	19.0	18.8	17.8	17.3
Current use of contraceptive	48.2	61.8	62.6	55.5
Adolescents				
Current use	14.6	-	-	-
Ever use contraceptives	25.0	10.1	-	-

Urban, Nairobi and Rural data are from the 2014 Kenya Demographic and Health Survey (KDHS)
Slum data obtained from NCCS 2012 unless otherwise stated

*data from Network to Improve the Nutrition of Infants and Young Children Living in Poverty (NINO LIP) project. A study carried out by APHRC.

\$ Data from Kimani-Murage, 2011

Sub aim 1: Literature review

Children living in urban informal settlements in Kenya are exposed to various nutrition and WASH vulnerabilities [6], which have a negative impact on their growth and development. Although various studies have highlighted these challenges [4, 6, 20, 21] there is lack of a comprehensive overview of published and grey literature which highlight nutrition and WASH vulnerabilities faced by children and adolescents in informal settlements in Nairobi. The purpose of this literature review was to

- Document evidence available on nutrition, WASH vulnerabilities, services/ programs and interventions targeting children and adolescents (0-19 years) living in the informal settlements in Nairobi Kenya.
- Identify information gaps related to child and adolescent nutrition in published and grey literature

Methods

Three members in the group conducted literature search in the following databases: PubMed, Google Scholar, Science Direct databases and Springer Link and other weblinks sites. The following keywords were used: “adolescents”, “children under-five”, “Nairobi”, “urban poor”, “slums”, “informal settlements”, “nutrition”, “water”, “sanitation”, “hygiene”, “vitamins”, “diarrhea”, “parasitic infections”, “wasting”, “stunting”, “malnutrition”, “health care”, “infant feeding”, “HIV/AIDS”, “dietary diversity”, “nutrition services/programs”, “diabetes”, “feeding practices”, “cultural factors”, “food access”, “coping strategies”, “food security”, “day-care centres”, “environment”, “housing”, “schools”, “gender”, “poverty”, “labor”, “employment”, “diet”, “schools”, “child care practices”, and “maternal nutrition”. Additional papers were identified by reviewing reference lists from the individual studies and reviews that were retrieved from the electronic searches. The following limits were applied: humans, English language, birth to 19 years. We limited the search to studies published between 2005 and 2018.

All identified literature from the independent searches was consolidated and divided among three members of the research team to abstract the relevant literature based on a predefined inclusion and exclusion criteria. One of the team members then cross-checked all references and any disagreements were resolved by discussion.

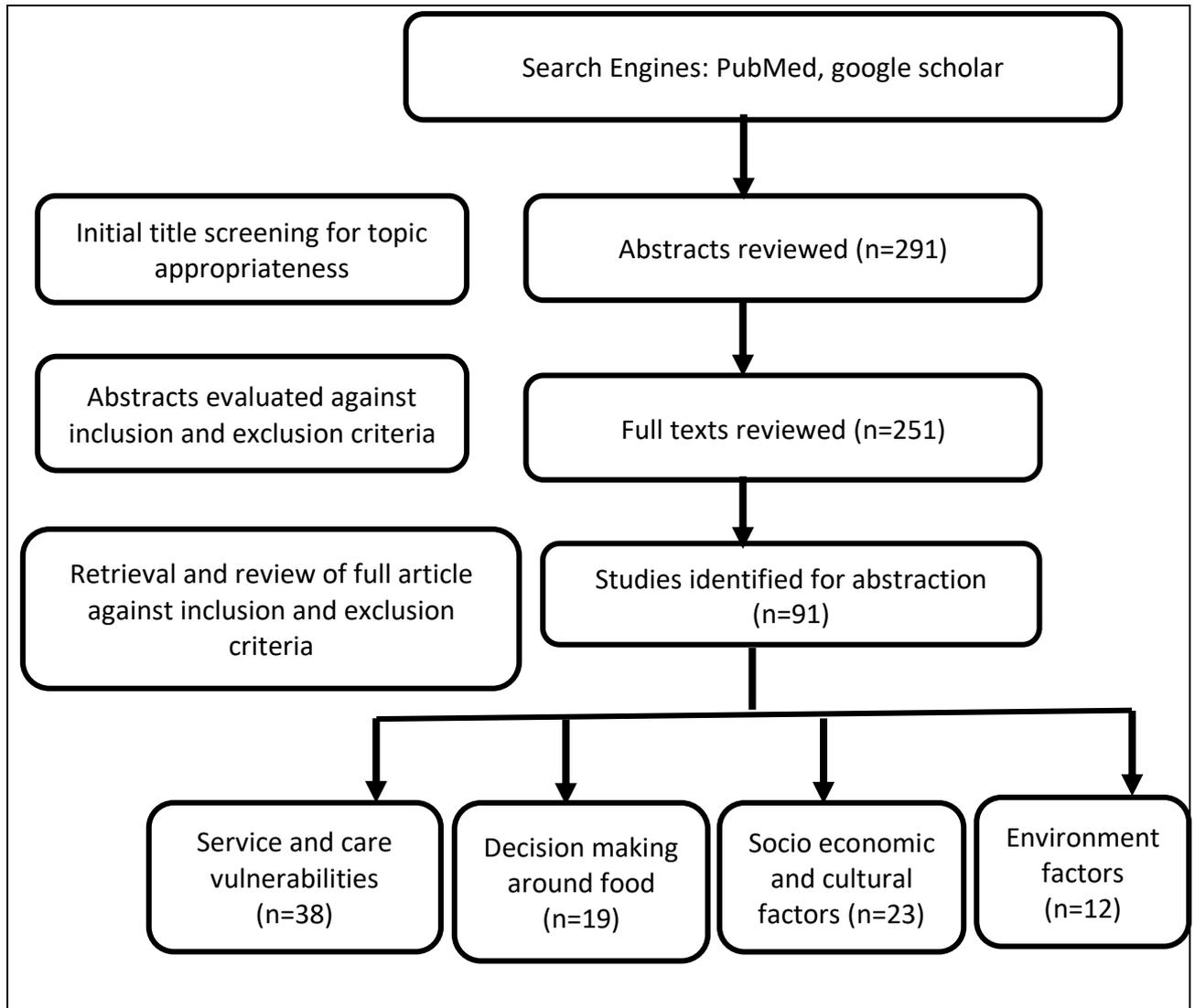
Inclusion and exclusion criteria

Published (observational and intervention studies, literature and systematic reviews) and grey (Masters and PhD theses, reports from government and non-governmental organizations, webpages, policy documents and strategies) literature focusing on nutrition and WASH in children and adolescents aged between 0 and 19 years in urban areas in Nairobi were included. We also included studies conducted in informal settlements in Nairobi.

Studies which focused on other aspects of health not directly related to nutrition and WASH outcomes such as contraceptive use, particular aspects of HIV/AIDS such as treatment interventions were excluded. We also excluded studies conducted outside Nairobi, because of the vast amount of literature available focusing on Nairobi as well as the lack of proper classification of the urban environments outside Nairobi. Further, studies that had aggregated data from the national surveys were excluded for lack of disaggregated data for urban informal settlements. We used a standardized extraction form to collect data from studies (see annotated bibliography).

The identified literature was later validated by four researchers from different academic institutions. The researchers were selected based on their expertise in the field of adolescent and child nutrition and WASH.

Figure 1: Flow diagram for studies on adolescents and children under years



Findings

We identified 92 papers which met the inclusion criteria (Refer to excel sheet 1 for annotated bibliography). Most of the studies, 38, focused on service and care vulnerabilities but only 12 studies highlighted environmental vulnerabilities. Studies which highlighted service and care vulnerabilities mainly highlighted access and utilization of health facilities for antenatal care. Most of these studies were cross-sectional studies [22-30], but a few were secondary analysis of longitudinal data [31-33]. Study highlighting access to maternity health services were mainly published before 2010 [21, 22, 28, 34]. Given the versatile nature of slum conditions it is likely that there has been an improvement in access to facilities.

Studies assessing environmental vulnerabilities were mainly cross-sectional quantitative studies, most of which were published after 2010. These studies focused on soil transmission of parasitic infections and diarrhea [35-37], sack gardening [38] and strategies of promoting hand washing with soap [39]. The two that were published before 2010 focused on the role of

women in promoting hygiene and sanitation [40] and microbial contamination of water sources in slum areas [41].

Studies assessing socio-cultural and economic factors affecting nutrition and WASH were also mainly cross-sectional studies which published after 2010. They mainly focused on food security and coping strategies [42-45], vulnerabilities faced by orphans [19, 46, 47], child care practices in day care centers [48, 49], the impact of depression on breastfeeding [50], school feeding programs [51] and overweight and obesity among school going children [52]. Studies assessing factors affecting decision making around food were relatively recent and most of the studies were cross-sectional studies (see annotated bibliography for details). Only three studies were randomized control trials which aimed to assess WASH [53] and infant young child feeding interventions [54, 55].

Service and Care Vulnerabilities and Systems Available and Accessible to the Urban Poor related to Maternal/Adolescent Nutrition

Health facilities are platforms where information about infant and young child feeding and care practices is shared. Poor access and utilization of these services therefore means that caregivers lack access to information, which has the potential to improve child feeding and care practices. We found that there are various health service providers in urban poor settings most of which are private health facilities, which lack adequate staff and equipment to cater to the needs of women and adolescents [28, 56, 57]. Most of these facilities also lack linkages with the county and are therefore unregulated and lack the capacity to deliver health services that have impact [56]. Despite this, most mothers prefer to use these facilities because they are easily accessible, cheaper and offer more hospitable services than government hospitals [28, 58, 59]. Studies reviewed show some of the factors that are associated with access to health facilities in Nairobi's slums include maternal and paternal education, ethnicity, parity, advice offered by a professional during antenatal clinics, pregnancy "wantedness", education, wealth and pregnancy complications [21, 28, 29]. These factors highlight the need for further in-depth exploration of the cultural and socio demographic characteristics of urban poor communities which are likely to impact health seeking behavior and child care practices.

Access to immunization services is also inadequate especially among children aged between 12 and 24 months [60]. Some factors limiting access to immunization services include; birth order, low maternal education and caregiver involvement in income generating activities [IGA] [60].

Poor adolescents are less likely to access health facilities [61]. Among adolescents, poor access to health services is associated with lack of adolescent-friendly services, inadequate school health services, and lack of adequate awareness among adolescents on available preventive reproductive health services [62]. These factors highlight the need for targeted interventions, which aim to improve access and utilization of health services in these populations. More awareness about existing health services available to mothers and adolescents is also required. HIV/AIDS was also a barrier to access and utilization of health facilities [63]. For example, pregnant women reported they avoided visiting health facilities due to compulsory HIV screening tests as part of the their antenatal care package [63]. There is therefore a need to address the stigma of HIV/AIDS in this population.

There was also evidence showing that refugee populations in urban areas have poor access to basic facilities such as health and education [13]. A qualitative study carried out in seven slums in Nairobi, Eastleigh, Satelite, Kawangware, Kayole, Ruiru, Githurai and Kangemi, showed that refugees had poor access to health services [13]. Although they had access to public health facilities, they were required to pay for drugs and treatment. Only a handful were eligible for

medical care through a referral system, which required registration with the United Nations High Commission for Refugees (UNHCR). Most refugees used city council run health centers which required them to pay double what Kenyan citizens pay for medical services [13].

Interventions to Improve Access to Care

In order to address the challenge of poor access to, and quality of, health care in urban slums, various interventions have been put in place including Partnership for Maternal, Newborn and Child Health (PAMANECH), which aimed to assess the effect of strengthened healthcare delivery systems on the quality, accessibility, and affordability of Maternal Newborn and Child Health (MNCH) services in Korogocho and Viwandani slums in Nairobi. Through public-private partnerships the project 1) upgraded the infrastructure of six private health facilities; 2) established a network of 180 Community Health Volunteers (CHVs) to deliver community-based services including referral for preventive and curative care; 3) built capacity of over 200 healthcare workers, in public and private facilities, in various essential MNCH care packages; 4) built capacity of 17 city level government officials in various leadership and management packages, improving leadership and governance; 5) strengthened the health management information system at the facility and community levels; and 6) established an emergency referral system by providing two ambulances. Sixteen youth groups were also engaged, to provide escort service for pregnant women, mothers and their children at night when it was insecure to access health care. These interventions led to increased utilization of essential maternal and child health services [64]. A voucher-based intervention has also been tested in low income areas in Nairobi. Findings from this study showed an increase in facility-based delivery, but no significant increase in vaccinations was observed [27]. When scaled up, such interventions have the potential to increase demand for healthcare services.

Geography, Environment and Infrastructure

Geography, environment and infrastructure have a significant influence on infant, young child and adolescent health. Poor health outcomes in slums are attributed to poor environmental conditions and infrastructure, limited access to services due to lack of income to pay for treatment and preventive services, and reliance on poor quality, mostly informal and unregulated health services that are not well suited to meeting the unique realities and health needs of slum dwellers [31].

Environmental pollution, specifically soil contamination, is common in urban poor areas and is associated with diarrhea, iron deficiency and soil transmitted infections among pre-school and school aged children [65]. Soil samples from slum areas were shown to contain high levels fecal bacteria [36]. This can be attributed to lack of safe and hygienic toilet facilities and lack of proper sewerage systems, which in turn leads to exposure to human waste [41, 66, 67]. Poor utilization of toilets can be attributed to insecurity in slums which limits access to these facilities especially at night [66]. Proximity and cost of toilet facilities also influences access especially in cases where households need to pay for toilets [66, 67]. There is also evidence of heavy metal contamination in slums [38], but little is known about its impact on the health of children and adolescents in this context. More research on this area is therefore required.

Access to safe portable water is limited in poor urban areas. Water samples from slum areas in Makadara division, Nairobi, were shown to be contaminated by fecal bacteria [41] highlighting the need for both proper human waste disposal and water treatment. Simple water treatment procedures such as use of chlorine have the potential to reduce water contamination [68].

Limited access to water also negatively influences hygiene practices, alternative products such hand sanitizers have the potential to improve hygiene [53]. Baseline data from a hand hygiene intervention in schools in low income areas showed that lack of water was one of the key

reasons why pupils did not wash their hands after using the toilet [53]. Although the use of hand sanitizers improved hand hygiene practices, a relatively large proportion of children still did not practice hand hygiene after toilet use. A better understanding of factors which influence individual behavior around hygiene practices is required for the design of effective and sustainable behavior change interventions.

Decision-making around Food Behaviors/Feeding Practices among Caregivers and Socio-economic and Cultural Factors

There are various factors which influence maternal decisions when it comes to breastfeeding and complementary feeding. Some of the key factors include maternal health, household food security, influence by health workers and nutrition knowledge [69-71]. Maternal perceptions about infant feeding, particularly in the context of HIV/AIDS, such as exclusive breastfeeding is mandatory for HIV positive women but optional for HIV negative women, also play a key role in influencing how mothers choose to feed their infants. Socio-cultural factors have also been shown to influence decision making/feeding practices whereby different communities have different perceptions about the types of foods children should eat [72]. Efforts should therefore be geared towards behavior change communication, to educate the community on the benefits of breastmilk and exclusive and continued breastfeeding. Potential interventions that are likely to influence food behaviors and feeding practices include nutrition counselling and maternal support especially at community level [54, 55].

In a qualitative study which aimed identify to health and nutrition priorities for adolescents in Kenya showed that in urban informal settlements decisions around what to eat was a concern for their parents for some while others were self-reliant [73]. The cost of food was a major barrier to food access. Adolescents were also responsible for sourcing and preparing their own meals and most of their diets were monotonous. This was however motivation for them to participate in income generating activities so as to be able to get more diverse diets. This study also showed that adolescents selected foods based on whether or not the foods were filling and adolescent girls were given less food because they were perceived to snack more [73]. Lack of proper food storage facilities created a demand for street foods which were more readily available [73].

Post-partum depression has also been associated with poor infant feeding [74, 75], but there is currently limited information about the prevalence of mental health problems among women and adolescents pre and post pregnancy [75].

Suboptimal infant and young child feeding practices and care are common in slums partly because of challenges faced by urban poor women such as a lack of knowledge, poverty and the need to return to/ find employment shortly after birth, all of which have a negative impact on breastfeeding and childcare [32, 76]. Women often work as casual laborers in workplaces that are not supportive of breastfeeding and optimal childcare. Some of the key coping strategies used by these women include; combining work and child care, reliance on kin and neighbors, use of center-based care. Women highlighted numerous disadvantages associated with taking children to work or depending on others for child care assistance. Though mothers appear to prefer using day care centres, high cost, poor hygiene and feeding practices are highlighted as drawbacks to using these facilities [48, 49].

Community acceptance is also an important factor which influences nutrition especially in children under 6 months [77]. In some communities, women who exclusively breastfeed are sometimes assumed to be HIV positive, a perception which increases the prevalence of mixed feeding. There is therefore a need for community engagement to address underlying stigma when it comes to issues concerning infant and young child feeding. Factors associated with

improved feeding practices include advice from health workers, peer to peer support, and support from spouses [77].

Family composition (family size and primary caregiver) is associated with immunization status, access to food and educational security. Orphans are at risk poor health outcomes in part because of poor access to health care and food [46], but few studies focus on this vulnerable group.

Food insecurity also remains a problem in urban slums [45, 78]. Some of the key coping strategies used by urban poor include: borrowing money and food; consumption of cheap non nutritious food; reduced food portion; restriction of adult food consumption, and reduced meal time [44]. These strategies have been shown to vary with age and gender. For example, women first borrow food from friends, relatives and well-wishers, and only then will they access food aid. Boys on the other hand first turn to crime, then child labor and subsequently drug and substance abuse [44]. Among adolescents, coping strategies include eating poor quality and cheap foods such as cuts of factory bread and residue from alcohol brewing process. They also participate in income generating activities to get money for food. These activities include washing clothes, collecting scrap and plastic for sale, construction and prostitution [73].

Summary of Findings

Findings from the literature review show that residents of informal settlements in Nairobi are exposed to multiple vulnerabilities which have a negative impact on the health of women, adolescents and children under 5 years. This often associated with poverty, food insecurity, poor child care and feeding practices, mother's education, poor professional, poor WASH and social support among other maternal characteristics. Most of the studies highlighted sub optimal Infant and Young Child Nutrition (IYCN) specifically breastfeeding and complementary feeding practices. Among the adolescent focus was on their sexual and reproductive health, but literature which focused on nutrition vulnerabilities showed that adolescents had poor access to quality and safe food. This resulted in the use of coping strategies such as scavenging in dump sites and participation in income generating activities.

Literature on WASH showed that access to portable and safe water; access to toilet and waste disposal in urban informal settlements is wanting. This impacted negatively on the health and nutrition status of children and adolescents.

There was evidence to show that refugees living in urban informal settlements were vulnerable to nutrition and WASH vulnerabilities, but the data was not disaggregated by age. It was therefore difficult to establish specific challenges faced by children and adolescents.

Most of the studies reviewed studies were conducted in Korogocho, Viwandani and Kibera, which are not representative the situation in other slum areas. In order to have a better understanding of context specific factors which influence adolescent and child nutrition, more studies across different slums are required. Few studies have also been carried out testing interventions, which makes identification of effective approaches difficult. Despite the fact that there is an overlap in nutrition and WASH vulnerabilities, most studies focus on only one or two aspects of nutrition and WASH. In order to get a clear picture of challenges faced by the urban poor, a more holistic approach is required when highlighting problems faced by the urban poor.

Gaps and Recommendations

1. There is limited information on Nutrition and WASH challenges facing adolescents and adolescent mothers and their children. This is despite the fact that adolescents make up a large proportion of the Kenyan population and teenage pregnancies are on the rise.

There is therefore a need for studies assessing vulnerabilities faced by adolescents and the impact on their health. There is also a need for intervention studies testing potential solutions to these challenges.

2. There is limited information on impact of environmental contamination with heavy metals on health and nutrition outcomes. This is despite evidence of environmental contamination with heavy metals. There is therefore a need for more research on how exposure to heavy metals influences health and nutrition of children and especially adolescents who are likely to be exposed when they are scavenging for food in dump sites.
3. The refugee population in urban areas is increasing, despite this there is limited information on the health and nutrition of refugees given that they have limited access to basic services such as health. There is therefore a need to further explore challenges faced by this population and potential ways in which these challenges can be addressed.
4. Mental health problems such as postpartum depression have been shown to negatively impact infant and young child feeding. There is however limited information on how common this problem is in urban informal settlements. There is a need for studies which assess mental health challenges faced by caregivers of infants and young children.

Sub aim 2: Urban Dataset Review

Children and adolescents residing in urban informal settlements in Nairobi are faced with various nutrition and WASH vulnerabilities. What is needed is quantitative data that can be used to highlight and quantify these vulnerabilities. This work package aimed to identify and list the characteristics of in-country, city and community-scale quantitative datasets that include data on food and nutrition and WASH among children and adolescents. The focus of the dataset review was children and adolescents, but the search was widened to capture more datasets which contained related data, which are captured in our data inventory. The dataset will enable identification of information gaps and potential sources of information highlighting vulnerabilities faced by children and adolescents.

Methods

All identified literature in sub-aim 1 in addition to national surveys and potential articles were reviewed by three members in the research group to identify relevant studies. A detailed description of the search strategy is provided in sub aim 1. In addition to the search terms used in sub-aim one we also included the terms “surveys” and “Kenya”.

All the relevant studies were evaluated for relevance and availability. Thereafter, all the identified studies were consolidated and divided amongst the three members of the research team for abstraction based on a predefined inclusion and exclusion criteria.

All relevant published literature with quantitative data including systematic reviews, unpublished grey literature like Masters and PhD thesis and national surveys focusing on nutrition and WASH problems facing children and adolescents aged between 0 and 19 years were included. Studies which included adolescents and or children under 5 years as a sub-population along with other population groups were also included.

Conversely, the following studies were excluded: qualitative studies; studies focusing on other aspects of health not directly related to nutrition and WASH outcomes such as reproductive health issues; studies on access to nutrition and health services; and studies on disease burden such as HIV/ AIDS. We used a standard extraction form to summarize information presented in the identified literature based on pre-defined themes.

Results and Discussion

A total of 48 quantitative datasets, which consisted of large nationwide and county surveys such as the Kenya Demographic and Health Survey and small surveys (small cross-sectional studies) conducted between 2005-2018 were identified (Refer to excel sheet 2 for a summary). Out of the 48 datasets, 11 are available on request, 29 will require communication with study authors and for 8 studies no contact information was provided. A high proportion of the surveys (71%) were small surveys conducted in specific settlements, most of which focused on children under 5 years and women of reproductive age.

Information collected from these surveys included child anthropometric measurements weight, height, age, socio-economic status, infant and young child feeding practices (breastfeeding and complementary feeding), water, sanitation and hygiene indicators such as access to water and toilets (Table 2). Some datasets also had information on infections such as diarrhea and parasitic infections.

The following indicators were not adequately covered in the datasets;

1. Prevalence of under and over nutrition among adolescents, school aged children, orphans and street children
2. Prevalence of micronutrient deficiencies among children and adolescents
3. Access to WASH facilities such as toilets and piped water by school going children
4. Dietary practices among adolescents and infant and young child feeding practices among adolescent mothers
5. The prevalence of infections such as diarrhea by adolescents

Table 2: Summary of number of studies identified highlighting nutrition and WASH vulnerabilities in children and adolescents in urban settings

Vulnerabilities	Number of studies
Nutrition status	
Stunting	23
Wasting	18
Underweight	23
Overweight/obesity	5
Micronutrient deficiencies	8
Feeding practices	
Exclusive Breastfeeding	9
Complementary feeding	13
Food security	14
Dietary practices	11
Hygiene Practices	
Water access	14
Toilet access	10
Hygiene practices (hand washing e.t.c)	13
WASH related infections	25
Socio-economic status	
Household wealth	11
Income indicators	9
Livelihood	9
Household composition	9

Opportunities

Currently, nationwide and slum surveys do not include a representative sample of informal settlements and current slum surveillance systems only target specific slums for example the Nairobi Urban Health Demographic and Surveillance System targets residents of Korogocho and Viwandani. Yet, there is evidence to show variations in population and health dynamics in different slums. In order to give a clear picture of nutrition, WASH and health challenges facing the urban poor, more surveys should be conducted in different slums. This is likely to lead to targeted policies and higher budget and resource allocations to low income populations. Large surveys such as the Kenya Demographic and Health Survey should include nutrition and health measures for adolescents as the current KDHS mainly focuses on reproductive health.

Conclusions

A total of 48 datasets highlighting vulnerabilities faced by urban populations some of which mainly focused on low income populations were identified. Although these datasets are informative, they were not generalizable to all low-income urban populations. Given that nutrition and WASH vulnerabilities vary within and across different informal settlements there is a need for larger slum surveys conducted across all 21 informal settlements across all urban areas in Kenya. The recent Nairobi SMART was conducted in 10 informal settlements in Nairobi yet there are approximately 25 major slums.

Sub-aim 3: Policy and program review

Kenya has policies addressing health and development challenges, but there is currently little information about how supportive the policy environment is when it comes to addressing the nutrition and WASH needs of children and adolescents in urban areas. The aim of the policy and program review was to identify policies and programs and practices that exist or are underway, to address nutrition and WASH vulnerabilities, especially among the urban poor in Kenya, with a specific focus on children and adolescents. Evidence generated from this review will inform gaps and opportunities to strengthen the policy and strategy environment and facilitate targeted action in urban areas specifically urban informal settlements.

Methods

The team conducted independent literature searches on relevant policies, strategies, frameworks and government actions related to nutrition and WASH among adolescents and children under 5 years. Additionally, relevant bills and acts related to nutrition and WASH were searched. The search focused on general national level as well as urban specific policy documents and government actions. The online search was done through review of relevant websites such as government ministries' websites, government parastatal websites, institutional websites such as FAO, WHO and UNICEF, academic and research publications and reports on policy reviews. The following search words were used "policies", "action plans", "framework", "Nutrition", "Water", "hygiene", "Sanitation", "adolescent", "children" and "strategies" "urban". Informal consultations were also made with various government officers on relevant policies that were either not available online or were under development. For the relevant documents that were not available online, physical documents were reviewed, while for the policy documents that were still under development, evidence of the development process e.g. draft copies or email communications from the relevant stakeholders or policy makers was requested.

Inclusion and exclusion criteria

Documents identified by each of the members were checked by the entire team, for decision on their eligibility. All nutrition specific and sensitive policies, strategies, program information, national guidelines and policy frame works relating children under 5 years and adolescents, that were developed between 2005 and 2019 were included. Relevant documents that were developed during this period but have been updated were excluded and only the updated versions of the same documents were included.

A detailed review was then conducted on the documents that were found eligible. Key information on the document type, year of development, author, target population, geographic focus (either rural/ urban) implementation, and funding sources were then extracted into an excel file (appendix 1).

Findings

Types of policy documents identified

A total of 92 documents were identified, but only 84 were found eligible for inclusion in the evidence pack (see excel sheet for a details summary of policies). The rest, 8 were excluded, because updated and newer versions of the documents had been developed between 2005 and 2019, the updated documents were included instead. Table 3 summarizes the documents that were reviewed.

Table 3: Number of Policy and strategy documents classified by target group

Document type	Adolescent specific	Under 5 specific	General (children and adolescent)	Total
National Policies	1	7	8	16
National Guidelines	2	11	8	21
Policy strategies	0	2	15	17
National action plans	1	0	2	3
Framework	0	2	4	6
Legal documents	0	3	10	13
Manuals/protocols	0	4	4	8
Total	4	29	51	84

Policy documents were mainly developed by the government's ministry of health, with some collaboration from various line ministries, mainly the ministry of agriculture (for food security related policy documents) and the ministry of education (for school meals and nutrition related documents); and with participation by various stakeholders and implementing partners as highlighted in the list of participants sections.

This denotes government's leadership in policy development and a strong multisectoral approach in the nutrition sensitive and specific policy development as evidenced by the involvement of various government ministries and non-governmental agencies in the development.

Although most of the policy documents did not have information on the funder (and hence assumed to be the government) those that had funding information were either by the government, UN agencies, USAID, DFID. Nutrition specific policies focusing on child nutrition, under nutrition and nutrition in HIV were mainly funded by UNICEF, WHO and USAID, while those focusing on food security and food provision were funded by FAO and WFP. Further, nutrition sensitive policy documents, focusing on adolescent health and sexual and reproductive health rights and HIV and AIDS had UNFPA, UNAIDS, USAID, PEPFAR, Global Fund as the common funding sources while those focusing in NCDs had WHO as a key funder. Discussion with the stakeholders revealed that other funders include European Union, JICA, World Bank and UK Aid. This highlights that although the government takes leadership in the development of policies, it depends, to some extent on non-government funding to drive the policy development process.

The policies reviewed were classified in to three broad categories i) those that are broad in focus, covering the nutrition specific and sensitive issues and targeting both children (under 5 years) and adolescents ii) those that have specific focus on adolescents and iii) those that have specific focus on children (under 5 years).

1. Policy Documents Targeting both Children and Adolescents

a) Nutrition specific

These are policy documents with a general focus on both adolescents and children, addressing a wide range of nutrition specific issues across all population groups (including children and adolescents). They include: i) *Nutrition programming and service delivery* (National Nutrition Action Plan and the Scaling Up Nutrition (SUN) policy documents) ii) *Food security and food provision* (the National Food security policy and food security bill, National Healthy Diets and Physical activity guidelines, the Kenya food composition tables and the school nutrition and meals strategy for Kenya) iii) *Food safety and regulations* (Food Drug and Chemical Substances Act and the Guidelines on Registration of Food or Dietary Substances) iv) *Nutrition*

in the context of HIV (The national guidelines on Nutrition and HIV) and v) Micronutrient supplementation (IFAS supplementation policy statement).

b) Nutrition sensitive policy documents

The nutrition sensitive policy documents identified mainly address general health related issues that indirectly impact on nutrition including health service delivery (health facility and community level) sexual and reproductive health, child and adolescent rights, Water, Sanitation and Hygiene (WASH) as well as prevention and management of HIV/ AIDS and other chronic diseases such as cancer. Specifically, the issues addressed by the nutrition sensitive policy documents reviewed include; i) *WASH* (Kenya Environmental Sanitation and Hygiene Strategic Framework (2016 – 2020), Kenya Environmental Sanitation and Hygiene Policy (2016 – 2020), National ODF Kenya 2020 Campaign Framework, Prototype County Kenya Environmental Health and Sanitation Bill) ii) *General health policies and programming* (the Kenya health policy, the health act, and the health bill, the health sector strategic and investment plan); iii) *Sexual and reproductive health and rights* (National Reproductive health policy and National Reproductive health strategy, the Reproductive health Strategy and the reproductive maternal, child and adolescent health investment frameworks); iv) *School health* (National school health policy and the school health strategy and implementation plan; v) *HIV prevention, control and management* (HIV/AIDs strategic framework, Guidelines for HIV and STI programming); vi) *NCD prevention and control* (National strategy for prevention and control of NCDs, National guidelines for cancer management and the cancer control strategy; vii) *Mental health / drugs and substance abuse* (Alcohol Drink Control Act and the Tobacco Control Act, which provide for the prohibition of the sale and marketing of these alcohol and tobacco products to children under 18 years); viii) *Health service provision* (Community Health Strategy and training packages, which focus on the service provision/ delivery at primary (community) level and the standard and Guidelines for *mhealth* systems which focuses on service delivery through mobile platforms); ix) *Children rights and protection* (Children Act, which provides for parental responsibility, fostering, adoption, custody, maintenance, guardianship, care and protection of children. This act also highlights that children have the right to health and medical care, provided by parents and government, should be protected from economic exploitation or cultural rights that may harm the health). Although these health policies are not nutrition specific, most of them acknowledge optimal nutrition as a key component for achieving optimal health. For example, disease specific policies (HIV and NCDs) further acknowledge nutrition across all population groups (including children and adolescents) as an important component in the etiology, prevention, management and or control of these diseases.

The school health policies focus on the school as a platform and avenue for health service provision, targeting school going children (both adolescents and young children). Provision of nutritious school meals is recommended as a strategy for promoting optimal health among school going children.

2. Policy Documents Targeting Children under Five Years

One third (31.3%) of the policy documents identified targeted children under 5 years. Most of these were nutrition specific, mainly addressing; i) *Infant and young children nutrition*, mainly on general feeding recommendations for children (Maternal Infant and Young Child Nutrition (MIYCN) policy statement, MIYCN strategy, Baby Friendly Community Initiative (BFCl) guidelines) and some specific to breastfeeding (Breastfeeding mother Bill, Breast Milk Substitutes (BMS) act, Baby Friendly Hospital Initiative (BFHI), human milk banking guidelines) or complementary feeding (Complementary feeding recipe book); ii) *Under nutrition*, mainly recommendations and guidelines on treating and managing malnutrition

under nutrition (national guidelines on management on integrated management of acute malnutrition and the community based management of acute malnutrition); iii) *Micronutrient supplementation*, recommendations and guidelines on the use of key micronutrient supplements for optimal child nutrition (policy guidelines on vitamin A supplementation, Iron and Folic Acid Supplementation, home fortification with micronutrient powders).

In addition, some nutrition sensitive policy documents targeting children under 5 years were identified. They focused on; i) *Early childhood development (ECD)*, providing directions on early childhood care and learning (ECD policy framework, the draft care for child development (CCD) module, the ECD service standard guidelines); ii) *HIV/AIDS*, mainly recommendation and strategies on prevention of mother to childhood HIV transmission and infant feeding in the context of HIV, iii) *Management of childhood illnesses*, mainly recommendations on treating and managing childhood illnesses at community and health facility (Integrated management of childhood illnesses, integrated community case management of childhood illnesses).

3. Policy Documents Targeting Adolescents

Nine adolescent specific policy documents were identified most of which focused on adolescent sexual and reproductive health and rights and HIV/AIDS (National Adolescent Sexual and Reproductive Health policy, the Adolescent Package of Care in Kenya (HIV specific), Fast Track Plan to end HIV/AIDS Among Adolescents and Youth). There were no nutrition specific policy documents exclusively targeting the adolescents.

4. Policy Documents Focusing on Urban Areas

Only three policy documents were specifically designed to address the needs of urban populations. These included: the Urban Nutrition Strategy; Urban and Cities Amendment Bill, which provides definitions of urban areas and cities and provides for the service provision requirement (water, hygiene, sanitation, solid waste management, health services etc.) within urban areas and cities; and the Nairobi County Urban Agriculture Promotion and Regulation Act, which provides the framework for the regulation and control of urban agriculture. Five other national policy documents explicitly outlined how to address issues affecting the urban poor. These are;

1. The Kenya Environmental Sanitation policy which aims to improve access to safe sanitation and prioritize scale up of urban sanitation with the aim of achieving on open defecation free Kenya. In urban informal settlements they aim to “*promote low cost appropriate technologies, such as twin pit, Urine Diverting Dry Toilets, or eco-sanitation, in peri-urban and slum areas and in other small to medium sized urban centers. The Component Sharing Model will be adopted for these areas.*”
2. The Food and Nutrition Security Policy aims to ensure adequate, safe and nutritionally diverse diets are accessed by all the urban poor and ensure it takes into account their growing numbers. This is through promoting urban employment, Urban agriculture (crops and livestock) and strengthening existing urban-rural linkages which hold potential to improve food access and overall food security and nutrition conditions in these areas
3. The Reproductive health policy seeks to improve access by women to reproductive health information and to ensure skilled care throughout the continuum of pregnancy, delivery, post-partum and post-natal periods among the urban poor.
4. The Reproductive Maternal, New born, Child and Adolescent Health Policy (RMNCAH) framework targets the urban slums to address inequity in health care and aims to reduce out of pocket payments for the urban poor.

5. Prototype County Environmental Health and Sanitation Bill envisions for each urban area, a watershed storm water management plan which will be implemented in accordance with the prescribed standards and ensure equitable financing of environmental health and sanitation by supporting the development and management of sanitation services.

All the urban policy documents mentioned did not specifically target children and adolescents.

Conclusion and Recommendations

Most of the policy documents are authored by the government, which reflects government leadership in policy development. There is notable contribution from other government ministries and relevant non-governmental stakeholders in most of the documents. This suggests strong multisectoral collaborations in the policy development process. The Kenya health sector strategic plan (2013) highlights the main role of the national government as policy formulation and capacity building (among others), while the county government is mandated to contextualize and implement the policy guidance provided by the national government. There were however, very few context specific policy documents. There is therefore a need to strengthen and build the capacity of the counties to contextualize the national policies with specific attention to the nutrition and WASH issues in urban areas given the unique vulnerabilities presented in these contexts.

Child and adolescent obesity and NCDs are a growing problem in the country, but we did not find any policy documents with specific focus on prevention and management and control of overweight/ obesity and NCDs among this age cohort. Most of the policies focus on optimal child feeding and prevention and management of under nutrition and micronutrient deficiencies. It is therefore important to shift the focus from under nutrition, to the double burden of malnutrition, with equal emphasis on both under and over nutrition, while building on the already existing multisectoral platforms.

We also noted the non- existence of nutrition specific policy documents with specific focus on adolescents. This is a major policy gap, given the nutrition and WASH vulnerabilities faced by this age cohort and the adverse effects of poor nutrition. Development of nutrition specific adolescent nutrition policy guidance is therefore recommended as well as the integration of nutrition within the existing sexual reproductive health policy documents. Schools present a great platform for adolescent and child nutrition service delivery platform, as provided for in the already existing school health policies and strategy, however this does not cover higher institutions, which host older adolescents. Expansion of the scope of the school health policy to cover institutions of higher learning would ensure a comprehensive reach to older adolescents. There are also limited policies addressing WASH issues among the target population but also in general.

Kenya has many national nutrition policies most of which focus on infants and young children. There are however limited policies which address the needs of children and adolescents in urban environments, specifically urban informal settlements.

Stakeholder mapping exercise

The policy desk review was complemented by a policy mapping exercise which took place on the 25th of April 2019. The aim of the mapping exercise was to:

- Validate findings from the policy desk review
- Identify key health and non-health actors working in Nutrition and WASH
- Nutrition and WASH programs targeting children and adolescents

- Identify nutrition and WASH implementation challenges in urban contexts

Methods

A total of 63 stakeholders from government, non-governmental organizations and academic institutions were approached for participation. During the workshop, participants were divided into 4 groups which consisted of a representative from the government, academia and a NGO; and a person dealing with adolescent health and nutrition. A set of structured questions were used for data collection. These included;

1. Can you name and list current policies, programs and interventions that address one or more determinants of health, nutrition and WASH in Kenya?
2. What are the current formal and informal services/systems/strategies that address the nutrition, WASH and health needs of adolescents and children under five years in urban areas and specifically informal settlements/slums?
3. Is there any social behavior change communication (SBCC) information available?
4. What are the strengths and limitations of these services/systems/strategies?
5. Are there current or past urban development/plans, informal settlement upgrading/slum improvement programs in Kenya? If so, are they including adolescents/youth, nutrition/WASH as focal areas?
6. Are there specific adolescent/youth programs in the urban informal settlements?

At the end of the mapping exercise all the groups reconvened and presented their findings. The whole exercise was recorded using a tape recorder. The recording was later transcribed and coded using NVivo version 12, the coded transcript was validated by a second person to ensure all the codes were captured.

Findings

Out of the 63 participants invited for the workshop, only 21 attended, 13 from the government, four from non-governmental organizations and the rest from academic institutions.

Policy Validation

During the policy validation exercise, the workshop participants reviewed the list of policies identified during the policy review. They highlighted that some policy documents targeted entire populations rather than specific groups or areas. These findings are in agreement with what was observed during the desk review process, where only a few urban specific policies targeting specific groups were identified.

“...However, cutting across whether it was youth or adolescent some are silent like food nutrition policy, it deals with nutrition for the whole population and it doesn’t specifically deal with groups per say. But the IYCN policy is specific on infant and young child nutrition for example maternal health. So again, depending on which policy you are looking at they will address differently...” [Participant policy mapping exercise]

The need for contextualization of the general policies to address the needs of different settings and target groups was highlighted as a key action point that was required. There was also an agreement that Kenya has many policies, but what is lacking is implementation strategies, which are required for successful implementation of interventions.

“When we start talking of policy documents how far can you go in terms of classifying for the urban or rural area? There is no guiding nutrition policy document unless it is an urban nutrition policy which is again very specific. If you are looking at adolescents, the government will be looking at adolescent girl whether in urban or the rural area. So, I think

what we have been looking for is more of how do we operationalize the policies and strategies that are there to fit the context of urban set up...” [Participant policy mapping exercise]

“I think the only problem or the only gap that we have is implementation. So many documents that you wonder whether these documents will help this country but now what we need to check through is how we implement...interventions using these policy documents. Sometimes you may have a policy but without a strategy it becomes a problem. All the policies we have talked about we have to make sure we have relevant strategy to address them, the issues that we were focusing” [Participant policy mapping exercise]

Nutrition and WASH Programs and Interventions Targeting Children and Adolescents

A number were identified during the policy mapping exercise (see excel sheet for a summary). The programs and interventions implemented mainly focused on the following areas 1) health system strengthening 2) infant and young child feeding 3) WASH 4) economic empowerment 5) child protection 6) adolescent health. These interventions were implemented by 25 non-governmental organizations working in partnership with the ministry of health and the Nairobi County Council. Funding organizations were mainly NGOs such as USAID, UNICEF, Concern Worldwide.

Three slum improvement programs, which aim to improve housing and infrastructure in informal settlements were identified; 1) the Kenya Slum Upgrading Project, which is run by the Ministry of Housing in collaboration with UN Habitat; 2) Mathare IVA housing program, which is run by the Amani housing trust and the Ministry of Housing and Lands; 3) the Kenya Informal Settlement Improvement Program which is led by the Kenyan government with support from the World Bank.

The following were identified as barriers to successful implementation of programs and interventions.

1. Corruption and lack of accountability in institutions running programs.
2. Poor involvement of target communities when designing programs and interventions
3. Lack of sustainable programs and interventions as most programs end once the donors withdraw funding.

“We have a very big program called national school based de-worming program in this country where we are de-worming 6 million children every year since 2011. And the partners have been supporting this program since then and this partner ought to have moved out. Unfortunately, we are not very serious on taking over from the partner. Taking over meant, can the government come up with a budget to procure 6.5 million...? So we need to think how we now hold ourselves as the government to be serious on sustainability..” [Participant from the mapping exercise]

4. Inconsistent supply of commodities required for program implementation for example micronutrient powders and ready to use therapeutic foods
5. Lack of proper recording and poor information sharing systems especially for programs which offer similar services which leads to wastage of resources for example deworming programs in Nairobi

“..when APHRC feels like they have some de-wormers they go out and de-worm, the county will de-worm, school health will de-worm, someone comes and de-worms and then this information is not shared so you just hear rumours and then there is nothing that clearly shows that this school has been de-wormed.” [Participant from the mapping exercise]

6. Lack of adequate equipment (weighing scales and height boards) to conduct surveys which provide information on vulnerabilities faced by children and adolescents
7. Lack of synergy/coordination between organizations carrying out similar projects was highlighted as a challenge that led to replication of projects

“coordination problems like I heard some people talking why is this organization implementing care group this other one is implementing BFCL, this other one is implementing mother to mother support when they are almost the same thing but called different names, so there is lack of coordination.” [Participant from the mapping exercise]

8. Lack of organizations that lobby for adolescent nutrition and WASH interventions or programs

Recommendations to Address Barriers

1. Need for community involvement from the design to the implementation phase to ensure ownership and sustainability of projects.
2. The government was seen to have a key role to play when it came to ensuring sustainability of projects and interventions. The development of sustainability strategies by donors and program implementors was suggested as a key method of ensuring project sustainability.

“The government need to demand from the onset that when you come up with your design of intervention you must bring on board sustainability strategy. Sustainability in most of the cases is taken up by the government because the partner is just bridging the gap that the government is having and this partner is just there for a short period of maybe one year or five years, but if the government is not serious with coming up with sustainability strategy then we shall continue looking at factors like nutrition for the under-fives or for the adolescent.” [Participant from the mapping exercise]

“On sustainability issue I am looking at something that is coming up in the operational framework, implementation framework, if there is a framework then that framework should be able to give us some exit strategies for those who are donating money for 2 years, 3 years we should demand that we see an exit framework so that we see how this program is going to be sustainable because our goals right now are saying sustainable development goals, so we are expected that anything, any policy or framework or guideline should aim at making whatever they are doing sustainable by putting strategies in place and that can only be done by having some framework to guide the whole process.” [Participant from the mapping exercise]

3. Need for customized programs which address basic challenges such as corruption rather than short term interventions
4. Need for the government to take up some of the work currently done by NGOs such as support of compensation of community health volunteers
5. Involvement of youth in the policy and program formulation process was seen as seen as a method that would ensure that the needs of the youth are adequately addressed
6. Need for a comprehensive list of programs and interventions in urban informal settlements shared to all stakeholders so that there is awareness about on-going programs and projects. Efforts have been made to address this such as the Research Nutrition Technical Working Group which is made up of key stakeholders in the nutrition field in Kenya. The group meets once every month to discuss and review on-going programs/projects and interventions.

Social Behavior Change Communication (SBCC) related to Nutrition and WASH

The following social behavior change communication were identified during the policy mapping exercise:

1. Unilever, a private company has a social impact model dubbed “Heroes for change” that recruits volunteers every 6 months to deliver behavior change messages related to hygiene and feeding habits. In 2017, they reached 180,660 children and individuals and this has led to increased awareness about hygiene practices and nutrition. There is also super school of five which mainly promotes hand hygiene to primary school children
2. Infection control officers/public health officers conduct hand washing demonstrations in schools.
3. The school health guidelines which uses focal persons to disseminate information on hygiene in schools.
4. School health clubs [youth led platforms] which provide information on WASH
5. Carolina for Kibera and Feed the Children are implementing the Care Group Model aimed toward providing support for mothers with children under five years on nutrition and WASH
6. Mentor Mother Programs- recruitment of lead mothers, instilling knowledge of income generating activities (best practice for sustainability to reduce dependency)
7. AMREF and the Ministry of Agriculture promoted green houses in Dagoretti for schools to help promote feeding programs in schools
8. Population Services Kenya, a non-governmental organization supports trainings on hygiene and family planning
9. USAID provides evidence-based information on MIYCN: feeding during pregnancy, initiation of breastfeeding in the first one hour of life, exclusive breastfeeding for 6 months, continued breastfeeding up to 2 years, complementary feeding and hygiene and proper sanitation.

Platforms on which the information is shared include:

- Print media- brochures, pamphlets
- Social Media – Facebook, twitter, Instagram, YouTube
- Community dialogue days
- Community theaters (skits, puppets, plays)
- Churches, Mosques and Temples
- Schools Health clubs
- National Policies

Nutrition and WASH Challenges Faced by Children and Adolescents

Participants also highlighted some of the nutrition and WASH challenges faced by children and adolescents, most of which were barriers to intervention uptake. These included:

1. Cultural beliefs and practices which have a negative impact on exclusive breastfeeding
“Some of the challenges we have observed and especially in our informal is cultural practices where mothers probably will not initiate breastfeeding until a few things have happened; the baby has gotten some herbs and then some myths and misconceptions where if this happens then something else will happen that is very undesirable and especially the issues of incest where you cannot breastfeed an incest child and so when we have these adolescents who get children from incestuous relationships a lot of time either they will abandoned them or they will not breastfeed them or something will happen. So those are the cases you will find are abandoned a lot of times and poorly fed because they believe

that if that child is breastfed, they are going to die.” [Participant from the mapping exercise]

2. Misconceptions about the impact of breastfeeding on physical appearance was identified as a major barrier to exclusive breastfeeding especially among adolescents

“Some ignorance and perceptions issues especially from adolescents or young mothers; if they breastfeed their breasts are going to sag and they will lose the physical beauty...this is a city and a lot of those adolescents you find that they are engaging in other activities that require their beauty, they are engaged in commercial sex work, they are engaged in dances and club houses, so they are going out there and the nature of their occupations will not allow them to have saggy breasts so the baby will be the sacrificial lamb and will not be breastfed so that she is beautiful or presentable.” [Participant from the mapping exercise]

3. Lack of psychosocial support for pregnant adolescents was also identified as a barrier to uptake of health and nutrition services by adolescent girls.

“Lack of psycho-social support again for the adolescents again...just the issue that you are young and pregnant is stress in itself and then it comes accompanied by many issues and so that lack of support again takes us back.” [Participant from the mapping exercise]

4. Food insecurity, characterized by intake of monotonous diets was identified as a major barrier to proper nutrition. Apart from food insecurity, the poor dietary diversity was also attributed to ignorance/ lack of knowledge about good nutrition. Certain foods were assumed to be consumed by only people from certain communities

“...food insecurity in the poor households, poor dietary diversity, a lot of people will eat but eat the same food all the time, poor knowledge, probably inadequate knowledge about what good nutrition is, someone will have the limited sources but then sometimes will not buy the right food with the little resources that they have..” [Participant from the mapping exercise]

Conclusion

There are currently many policies in Kenya most of which target general populations, but what is lacking is contextualized implementation strategies. There is therefore a need for the development of context specific implementation strategies. There is currently lack of policies and strategies which address the nutrition needs of adolescents. More policies and strategies are therefore required in order to address the needs of this vulnerable group.

Many programs and interventions addressing nutrition and WASH needs of mostly children and to some extent adolescents, are currently being implemented in urban informal settlements by different organizations. There is however, lack of communication between implementing organizations which leads to replication of activities and wastage of resources. This challenge can be addressed by improved communication and information sharing between implementing organizations.

Corruption and lack transparency were identified as major barriers to successful implementation of programs and interventions. In order to address this accountability within the government and implementing organizations is required. Lack of sustainable programs was also identified as a major problem when it came implementation. Efforts such as community involvement in program design and the development of sustainability strategies by the government are required to ensure promote sustainability.

Community Case Study

The community case study presented an opportunity to do an in-depth analysis of a specific urban slum or informal settlement with an aim of answering the overall assessment question: What contributes to poor nutrition among children and adolescents and what solutions can be used to best address their needs? The selected case study site was Korogocho slum, where African Population and Health Research Center has been running the Nairobi Urban Demographic Surveillance System for the past 18 years. The aim of the case study was to identify: 1) Nutrition and WASH issues affecting children and adolescents and 2) Ways of improving implementation of solutions that can address the nutrition and WASH problems.

Methods

This study phase targeted parents and caregivers of children less than 5 years, children between 5-9 years and adolescents 10-19 years and adolescents. Additionally, the local administration, community leaders, sub county officials, Community Based Organizations (CBOs), Non-governmental Organizations (NGOs), Local institutions (Day-care centers, early childhood centers and schools) and youth leaders were also targeted.

Three qualitative data collection methods were used (for more details see case-study report):

- **Community mapping** exercise which aimed to identify community-based actors and organizations, NGOs, governmental, academic and other stakeholders required for successful design, implementation and uptake of maternal/childhood and adolescent nutrition-focused interventions. The mapping exercise was done during one community participatory workshops.
- **Key informant interviews** which aimed to collect more detailed information in order to: 1) Describe in more detail roles of different organizations as well as on-going programs and interventions in the community. This enabled us to validate the mapping exercise 2) Describe health seeking behaviors, food systems/services and socio-economic and cultural vulnerabilities.
- **Community workshops** which aimed to detail the specific nutrition and WASH vulnerabilities facing children and adolescents as well as potential solutions.

Key Findings

A summary of the number of interviews and study participants is presented in appendix 2. Out of the planned 40 interviews, only 32 interviews, 9 FGDs and 23 KIIs, were conducted. The 8 interviews did not take place either because of bureaucracy (2) or refusal to participate in the study (6). All participants who declined to participate were either from CBOs or NGOs.

Below is a summary of some of key themes that arose from the case study. For more details refer to the attached case study report.

Service and Care Vulnerabilities

Nutrition Vulnerabilities

The health and nutrition status of children, specifically, children under 5 years was considered to be poor, especially among children born to adolescent mothers. This was attributed to poor feeding practices. The nutrition status of school children on the other hand was considered to be better than that of children under five years because of school feeding programs. Undernutrition among adolescents was also reported and this was attributed to poor access to nutritious food. Early pregnancy was reported to further compromise the nutrition status of adolescent girls. Overall, poor access to nutritious food because of poverty was reported to have a negative impact on the nutrition status of the target group.

Nutrition vulnerabilities were attributed to unemployment which was associated with poverty which led to poor access to nutritious food. Some caregivers reported that they were not able to afford diverse diets due to limited finances. Lack of knowledge about the types of foods suitable for children was also reported to be a major barrier to proper IYCF.

Poor infant feeding was reported to common among who were either employed or were actively seeking employment. This was attributed to the fact that they had to leave their children for long hours without proper care. Some caregivers opted to use day care centers as an alternative source of child care, but the quality of care offered in these centers was reported to be poor as children were offered monotonous diets. Sharing of food including ready to use therapeutic among children at the center was also reported.

“You know, as the parent feeds her child, she can be observing her child. It is not the same way that woman you have left with will take care of your child. And maybe that woman has been left with about 5 or 10 children and maybe you have given yours good food and those others who have been brought have not carried food similar to yours so maybe your child’s food is given to the others.” KII Village Elder

Adolescent nutrition was also considered to be poor as more attention was given to infants and young children. In some cases adolescents were considered to be adults and were therefore expected to be self-reliant. Food insecurity was reported to be common in both children and adolescents and coping strategies such as stealing, skipping meals, consumption of cheap street foods, scavenging in dump sites, borrowing money and prostitution were reported.

Public schools are currently implementing school feeding programs supported by the Ministry of Education and non-governmental organizations, but the government plans to take full ownership of the project in November 2019. Ideally, meals should be provided for free in schools, but currently most of the feeding programs have ceased thus parents are required to take up the program by contributing money. This poses a challenge to the already resource constrained households.

There was consensus among the stakeholders that school feeding programs were the main source of food for children from poor backgrounds. Some children were reported to limit their food intake in school so that they could take some food back home to their siblings. School meals mainly consisted of maize and beans “*githeri*” and were therefore considered to be monotonous. Consequently, children opted to purchase street foods such as doughnuts. In schools where feeding programs were not available or in cases where children were not enrolled in feeding programmes, children were given money by their parents, which they used to purchase street foods.

“At least them they are lucky because when they get to school they eat githeri which is balanced. There is maize and beans so at the end they have at least a meal that can contain them.There are some children whothe areas from which they come from they can’t afford food they do not have the luxury of three meals in a day .They will even take the leftovers from school to go and give to their siblings at home. There are cases where teacher`s now understand now that you know. Now this child, I know when they go home, they do not have food so whatever remains their packed and they are given to take home and that’s from Monday to Friday. Saturdays they are not in school.” KII, Stakeholder from CBO/NGO

Health care facilities found within Korogocho slum are mostly private with only one public health facility which offers services for free. Most community members therefore prefer to use this facility. However, challenges such as lack of drugs, long queues and waiting times and poor interactions with staff, most residents prefer to use private health facilities and chemists where they are required to pay for services. Access to health facilities was reported to be good among children under 5 years. This was attributed to community health volunteers who conduct community outreach programs targeting the caregivers of infants and young children.

Access to health facilities among adolescents and school going children was reported to be poor especially among boys who were only reported to access health facilities only when they were seriously ill. Lack of adolescent friendly services, lack of privacy and confidentiality, cost of services and stigma were reported as a major barriers to utilization of health facilities by adolescents. Adolescents were reported not to seek nutritional services because of lack of these services. Most services offered at the health facility mainly focused on sexual reproductive health.

Water Hygiene and Sanitation Vulnerabilities

Poor access to safe water was reported as some residents said they did not know the origin of the water they used. Water safety was further compromised because water pipes were reported to pass through open sewers. Water contamination was reported to be common especially during the rainy season. The cost of water was also reported as a major barrier to good hygiene as residents had to ration their water.

“We do buy water. When you remember that you want the children to eat plus you the mother plus the father you put water in one basin, and not even a lot of water, and soap. Whoever comes from out there having touched any dirt washes there, even one who is from the toilet washes there. You see there, there is no cleanliness you are maintaining because whoever is from the toilet brings his/her dirt there, a young child like this one, you don't pour that water, you wash him/her in that water....” FGD caregivers of children under 5

Poor access to toilets was also reported especially in schools and this was associated with infections. At community level poor access to toilets resulted in flying toilets which led to environmental contamination with faecal matter. The lack of proper sewer systems also resulted in environmental contamination with faecal matter as residents reported that faecal waste was disposed off in rivers. This was reported to negatively impact the health of children and food safety.

“So all of you, when the bell for break rings, you all run there. Now there, everyone has their own different illnesses, so it is very easy to contract illnesses.” FGD Adolescents, Aged 10-14 years

“If you go to schools, by the way, you know, when you go to school people go there to defecate and maybe they don't pour water. So, like us girls also get infections in the private parts...”
FGD Adolescents, Aged 10-14 years

Lack of a proper garbage disposal system led to clogging of drainage systems and in turn flooding during the rainy season. Poor garbage disposal was also associated with respiratory infections in children because of the fumes from the waste.

The following were recommendations on how to improve WASH in Korogocho

1. Need to improve the sewer and drainage infrastructure and ensure proper maintenance by unclogging the drains
2. Provision of soap and buckets to caregivers to facilitate hand washing practice in the households
3. Water should be made available to slum residents. This can be achieved by combined community efforts such fundraising within plots to ensure there is water

Key Actors and Programs in Korogocho Slum

Key actors in Nutrition and WASH working in Korogocho included schools, health facilities, non-governmental organizations and community-based organizations (attached excel list for a summary). The platforms used by these entities to reach the target population include: schools, health facility and community forums. Table 4 shows a summary of the number of organizations, target group in Korogocho. There were no organizations focusing exclusively on adolescent nutrition, 6 organizations provided Nutrition services to both children and adolescents all of which were schools. Most of the organizations focused on WASH.

Table 4: A summary of organizations working in Nutrition and WASH targeting children and adolescents

Focus	Children	Adolescents	Both
Nutrition	6	0	6
WASH	0	2	17
Both Nutrition and WASH	2	0	13
Total	8	2	36

Successful and Unsuccessful Programs and Interventions

Nearly all the programs which were considered to be successful mainly focused on Nutrition. These included 1) the Malezi bora campaign, which targets pregnant mothers and children under 5 years; 2) outpatient therapeutic and supplementary feeding programs for undernourished children; 3) provision of day-care facilities by employers 4) reproductive health for adolescents; 5) School health; 6) feeding programs. The Malezi bora campaign and the therapeutic feeding programs were considered successful because of the strong referral systems which enabled caregivers and their children to access health and nutrition services. Setting up of day-care centers was considered successful because it enabled caregivers to look after their children at work, which reduced the cases of malnutrition.

Unsuccessful programs included WASH programs in schools and nutrition programs. The main reason for poor success was lack of sustainability as some of the projects would end once funding was withdrawn.

Implementation Challenges

The following were identified as program implementation challenges:

1. Limited time for programs/intervention implementation
2. Limited funds allocated for interventions
3. Lack of Sustainability of programs/ intervention when a donor pulls out. This was partly attributed to lack of community sensitization about their expected role in the program.
4. Lack of transparency among donors in program implementation - donor driven initiatives
5. Lack of adequate space to support program implementation

6. Duplication of efforts among organizations/institutions
7. Lack of resources at household level to complement the knowledge received
8. Lack of coordination of programs, poor communication and over dependence on NGOs especially when it comes to WASH programs
9. Donors do not align their programs/interventions to community needs. They move with current trends forcing CBOs to shift their mandate to get funding
10. Lack of needs assessment or community consultations before program implementation, which leads to implementation of projects which are either not relevant to the target community and are therefore not taken up
11. Proper training of human resource is conducted but the implementation is poor due to lack of essential equipment/commodities to implement the training received
12. Lack of essential commodities / equipment to implement the training received

Conclusions and Recommendations

The community case study highlighted nutrition and WASH vulnerabilities faced by children and adolescents. Although various nutrition and WASH interventions have been put in place to address these challenges, most are not sustainable. There is therefore a need for sustainable programs/interventions which are designed in collaboration with target communities.

Successful programs in Korogocho were attributed to presence of a strong referral system from the community to facilities. This referral system is facilitated by community health volunteers. There is therefore a need to support community health volunteers who play an important role when it comes to creating demand for health services.

Day care centers were used as a source of alternative child care when primary caregivers were away from home and are therefore a potential platform that can be used to improve infant and young child nutrition. In order to maximize their potential, linkages between health facilities and these centers to ensure access to health services. Furthermore, the quality of care in these centers can be improved by training center owners on IYCF and WASH.

School feeding programs were reported to be a key source of food for school going children in Korogocho and can potentially be used to enhance the nutrition of children and adolescents. This can be achieved through provision of varied diets which are well prepared. The programs should also be made free to ensure that the most vulnerable children have access.

There is a high reliance on street foods in Korogocho, despite poor food handling practices by food sellers. In order to promote food safety, there is a need to train food vendors on WASH. There is also a need to improve water and toilet access within Korogocho.

There is also lack of nutrition interventions targeting adolescents. This is despite the various nutrition challenges they face. In order to improve the nutrition status of adolescents, nutrition interventions which focus promoting to access health services and food should be established with input from adolescents.

Conclusions and Way Forward

Findings from this study show that children and adolescents in urban slums in Nairobi suffer from various nutrition and WASH vulnerabilities, which have a negative impact on their health and well-being. This is despite the existence of policies and programs which aim to address some of their problems. In order to effectively address their needs, there is a need to 1) improve data which can potentially be used for decision making; 2) contextualize policies so that they address the needs of the urban poor 3) actively engage the urban poor in program design and implementation to promote ownership and sustainability 4) enhance the evidence base especially in the area of adolescent nutrition.

References

1. National Council for Population and Development Kenya, *The state of Kenya Population 2017*. 2018, National Council for Population and Development Nairobi.
2. World Bank, *Kenya Urbanization Review 2016*, The World Bank: USA.
3. APHRC, *Population and Health Dynamics in Nairobi's Informal Settlements: Report of the Nairobi Cross-sectional slum survey (NCSS) 2012*. 2014, APHRC: Nairobi.
4. Kimani-Murage, E.W., et al., *Evidence of a Double Burden of Malnutrition in Urban Poor Settings in Nairobi, Kenya*. PLoS One, 2015. **10**(6): p. e0129943.
5. Olack, B., et al., *Nutritional status of under-five children living in an informal urban settlement in Nairobi, Kenya*. Journal of health, population, and nutrition, 2011. **29**(4): p. 357-363.
6. Concern Worldwide, *Nutrition Survey Conducted in the Slums of Nairobi County*. 2017, Concern Worldwide: Nairobi.
7. Kenya National Bureau of Statistics, et al., *Kenya Demographic and Health Survey 2014*. 2015, Kenya National Bureau of Statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute, National Council for Population and Development/Kenya, and ICF International: USA.
8. UNICEF, *Improving Child Nutrition: The Achievable Imperative for Global Progress*. 2013, UNICEF: New York.
9. UN-HABITAT, *Slum Almanac 2015/2016: Tracking improvement in the lives of slum dwellers 2015*, UNHABITAT: Nairobi, Kenya.
10. Hope, K., *Urbanization in Kenya*. African J. of Economic and Sustainable Development, 2012. **1**.
11. Kenya National Bureau of Statistics and ICF Macro, *Kenya Demographic and Health Survey 08-09*. 2010, KNBS and ICF Macro: Calverton, Maryland.
12. Metcalfe, V., S. Pavanello, and P. Mishra, *Sanctuary in the city? Urban displacement and vulnerability in Nairobi*. 2011, International Rescue Committee: Nairobi, Kenya.
13. Pavanello, S., S. Elhawary, and S. Pantuliano, *Hidden and exposed: Urban Refugees in Nairobi, Kenya*. 2010, International Rescue Committee: Nairobi, Kenya.
14. UN-HABITAT, *Country Program Document, Kenya*. 2013, UNHABITAT: Nairobi, Kenya.
15. Patel, R.B. and T.F. Burke, *Urbanization — An Emerging Humanitarian Disaster*. New England Journal of Medicine, 2009. **361**(8): p. 741-743.
16. Mberu, B.U., et al., *Health and health-related indicators in slum, rural, and urban communities: a comparative analysis*. Global health action, 2016. **9**: p. 33163-33163.
17. Kimani-Murage, E.W., et al., *Trends in childhood mortality in Kenya: the urban advantage has seemingly been wiped out*. Health & place, 2014. **29**: p. 95-103.
18. Faye, O., et al., *Hunger and Food Insecurity in Nairobi's Slums: An Assessment Using IRT Models*. J Urban Health, 2011. **88 Suppl 2**: p. 235-55.
19. Kimani-Murage, E.W., et al., *Food security and nutritional outcomes among urban poor orphans in Nairobi, Kenya*. J Urban Health, 2011. **88 Suppl 2**: p. S282-97.
20. Worrell, C.M., et al., *A Cross-Sectional Study of Water, Sanitation, and Hygiene-Related Risk Factors for Soil-Transmitted Helminth Infection in Urban School- and Preschool-Aged Children in Kibera, Nairobi*. PLoS One, 2016. **11**(3): p. e0150744.
21. Fotso, J.C., et al., *What does access to maternal care mean among the urban poor? Factors associated with use of appropriate maternal health services in the slum settlements of Nairobi, Kenya*. Matern Child Health J, 2009. **13**(1): p. 130-7.

22. Ziraba, A.K., et al., *The state of emergency obstetric care services in Nairobi informal settlements and environs: results from a maternity health facility survey*. BMC Health Serv Res, 2009. **9**: p. 46.
23. Izugbara, C.O. and D.P. Ngilangwa, *Women, poverty and adverse maternal outcomes in Nairobi, Kenya*. BMC Womens Health, 2010. **10**: p. 33.
24. Harris, J.R., et al., *Unprogrammed Deworming in the Kibera Slum, Nairobi: Implications for Control of Soil-Transmitted Helminthiases*. PLOS Neglected Tropical Diseases, 2015. **9**(3): p. e0003590.
25. Egondi, T., et al., *Determinants of immunization inequality among urban poor children: evidence from Nairobi's informal settlements*. Int J Equity Health, 2015. **14**: p. 24.
26. Breiman, R.F., et al., *Population-based incidence of typhoid fever in an urban informal settlement and a rural area in Kenya: implications for typhoid vaccine use in Africa*. PLoS One, 2012. **7**(1): p. e29119.
27. Bellows, B., et al., *Increase in facility-based deliveries associated with a maternal health voucher programme in informal settlements in Nairobi, Kenya*. Health Policy Plan, 2013. **28**(2): p. 134-42.
28. Bazant, E.S., et al., *Women's use of private and government health facilities for childbirth in Nairobi's informal settlements*. Stud Fam Plann, 2009. **40**(1): p. 39-50.
29. Matanda, D.J., H.B. Urke, and M.B. Mittelmark, *Changes in Optimal Childcare Practices in Kenya: Insights from the 2003, 2008-9 and 2014 Demographic and Health Surveys*. PLoS One, 2016. **11**(8): p. e0161221.
30. Goudet, S.M., et al., *How does poverty affect children's nutritional status in Nairobi slums? A qualitative study of the root causes of undernutrition*. Public health nutrition, 2017. **20**(4): p. 608-619.
31. Zulu, E.M., et al., *Overview of migration, poverty and health dynamics in Nairobi City's slum settlements*. J Urban Health, 2011. **88 Suppl 2**: p. S185-99.
32. Kimani-Murage, E.W., et al., *Evidence of a Double Burden of Malnutrition in Urban Poor Settings in Nairobi, Kenya*. PloS one, 2015. **10**(6): p. e0129943-e0129943.
33. Abuya, B.A., J. Ciera, and E. Kimani-Murage, *Effect of mother's education on child's nutritional status in the slums of Nairobi*. BMC Pediatr, 2012. **12**: p. 80.
34. Fotso, J.C., A. Ezeh, and R. Oronje, *Provision and use of maternal health services among urban poor women in Kenya: what do we know and what can we do?* J Urban Health, 2008. **85**(3): p. 428-42.
35. Davis, S.M., et al., *Soil-transmitted helminths in pre-school-aged and school-aged children in an urban slum: a cross-sectional study of prevalence, distribution, and associated exposures*. Am J Trop Med Hyg, 2014. **91**(5): p. 1002-10.
36. Bauza, V., et al., *Soil Ingestion is Associated with Child Diarrhea in an Urban Slum of Nairobi, Kenya*. Am J Trop Med Hyg, 2017. **96**(3): p. 569-575.
37. Mbae, C.K., et al., *Intestinal parasitic infections in children presenting with diarrhoea in outpatient and inpatient settings in an informal settlement of Nairobi, Kenya*. BMC Infect Dis, 2013. **13**: p. 243.
38. Gallaher, C.M., et al., *Real or perceived: the environmental health risks of urban sack gardening in Kibera slums of Nairobi, Kenya*. Ecohealth, 2013. **10**(1): p. 9-20.
39. Eshuchi, R.C.E.A., *PROMOTING HANDWASHING WITH SOAP BEHAVIOUR IN KENYAN SCHOOLS: LEARNING FROM PUPPETRY TRIALS AMONG PRIMARY SCHOOL CHILDREN*

- IN KENYA in *CREATIVE INDUSTRIES DISCIPLINE OF JOURNALISM, MEDIA AND COMMUNICATION*. 2013, Queensland University of Technology: Queensland
40. Karanja, J.M. and E. Ng'ang'a, *Sanitation and Hygiene in Kibera Slums, Nairobi Women concern's and Nurses promotional tool*, in *Nursing*. 2008, University of Helsinki: Helsinki.
 41. Muoki, M.A., D.S. Tumuti, and G.O. Rombo, *Nutrition and public hygiene among children under five years of age in Mukuru slums of Makadara Division, Nairobi*. *East Afr Med J*, 2008. **85**(8): p. 386-97.
 42. Amendah, D.D., S. Buigut, and S. Mohamed, *Coping strategies among urban poor: evidence from Nairobi, Kenya*. *PLoS One*, 2014. **9**(1): p. e83428.
 43. Macharia, T.N., et al., *Association between household food security and infant feeding practices in urban informal settlements in Nairobi, Kenya*. *J Dev Orig Health Dis*, 2018. **9**(1): p. 20-29.
 44. Masese, M.S. and M.D. Muia, *Coping with Food Insecurity in Math are Valley Slum in Nairobi, Kenya*. *Journal of Sociology and Social Work*, 2016. **4**(1): p. 98-108.
 45. Nzuma, J. and S. Ochola, *Kenya Urban Comprehensive Food Security & Vulnerability Analysis (KU-CFSVA) and Nutrition Assessment*. 2010, World Food Programme Nairobi, Kenya.
 46. Makungu, P., *Psychosocial intervention as a tool for combating vulnerability among children orphaned by hiv/aids: a study of Mathare and Gichagi slums in Ngong town*, in *SOCIOLOGY*. 2005, University of Nairobi.
 47. Mohanty, S., *Nairobi Urban Social Protection Programme*. 2009, Oxfam.
 48. Clark, S., et al., *Balancing paid work and child care in a slum of Nairobi, Kenya: the case for centre-based child care*. *Journal of Family Studies*, 2018: p. 1-19.
 49. Mwase, I., et al., *Poor Infant Feeding Practices and High Prevalence of Malnutrition in Urban Slum Child Care Centres in Nairobi: A Pilot Study*. *J Trop Pediatr*, 2016. **62**(1): p. 46-54.
 50. Kumar, M., et al., *Mechanisms associated with maternal adverse childhood experiences on offspring's mental health in Nairobi informal settlements: a mediational model testing approach*. *BMC Psychiatry*, 2018. **18**(1): p. 381.
 51. Neervoort, F., et al., *Effect of a school feeding programme on nutritional status and anaemia in an urban slum: a preliminary evaluation in Kenya*. *J Trop Pediatr*, 2013. **59**(3): p. 165-74.
 52. Kyallo, F., A. Makokha, and A. Mwangi, *Overweight and obesity among public and private primary school children in Nairobi, Kenya*. *Health*, 2013. **5**: p. 85-90.
 53. Pickering, A.J., et al., *Access to waterless hand sanitizer improves student hand hygiene behavior in primary schools in Nairobi, Kenya*. *Am J Trop Med Hyg*, 2013. **89**(3): p. 411-8.
 54. Ochola, S.A., D. Labadarios, and R.W. Nduati, *Impact of counselling on exclusive breast-feeding practices in a poor urban setting in Kenya: a randomized controlled trial*. *Public Health Nutr*, 2013. **16**(10): p. 1732-40.
 55. Kimani-Murage, E.W., et al., *Effectiveness of home-based nutritional counselling and support on exclusive breastfeeding in urban poor settings in Nairobi: a cluster randomized controlled trial*. *Global Health*, 2017. **13**(1): p. 90.
 56. Ekirapa, A., G.S. Mgomella, and C. Kyobutungi, *Civil society organizations: capacity to address the needs of the urban poor in Nairobi*. *J Public Health Policy*, 2012. **33**(4): p. 404-22.

57. Mukiira, C. and L. Ibisomi, *Health care seeking practices of caregivers of children under 5 with diarrhea in two informal settlements in Nairobi, Kenya*. J Child Health Care, 2015. **19**(2): p. 254-64.
58. Izugbara, C.O., C.W. Kabiru, and E.M. Zulu, *Urban poor Kenyan women and hospital-based delivery*. Public Health Rep, 2009. **124**(4): p. 585-9.
59. Ziraba, A.K., et al., *The state of emergency obstetric care services in Nairobi informal settlements and environs: Results from a maternity health facility survey*. BMC Health Services Research, 2009. **9**: p. 46-46.
60. Mutua, M.K., et al., *Fully immunized child: coverage, timing and sequencing of routine immunization in an urban poor settlement in Nairobi, Kenya*. Trop Med Health, 2016. **44**: p. 13.
61. Banke-Thomas, A., et al., *Maternal health services utilisation by Kenyan adolescent mothers: Analysis of the Demographic Health Survey 2014*. Sex Reprod Healthc, 2017. **12**: p. 37-46.
62. Kamau, W.A., *FACTORS INFLUENCING ACCESS AND UTILISATION OF PREVENTIVE REPRODUCTIVE HEALTH SERVICES BY ADOLESCENTS IN KENYA. A CASE STUDY OF MURANG'A DISTRICT*, in *Faculty of Health Sciences 2006*, University of Bielefeld, Germany: Germany.
63. Izugbara, C., A. Ezeh, and J.C. Fotso, *The persistence and challenges of homebirths: perspectives of traditional birth attendants in urban Kenya*. Health Policy Plan, 2009. **24**(1): p. 36-45.
64. Bakibinga, P., et al., *The effect of enhanced public-private partnerships on Maternal, Newborn and child Health Services and outcomes in Nairobi-Kenya: the PAMANECH quasi-experimental research protocol*. 2014. **4**(10): p. e006608.
65. Suchdev, P.S., et al., *Soil-transmitted helminth infection and nutritional status among urban slum children in Kenya*. Am J Trop Med Hyg, 2014. **90**(2): p. 299-305.
66. Corburn, J. and C. Hildebrand, *Slum Sanitation and the Social Determinants of Women's Health in Nairobi, Kenya*. Journal of Environmental and Public Health, 2015. **2015**: p. 6.
67. Corburn, J. and I. Karanja, *Informal settlements and a relational view of health in Nairobi, Kenya: sanitation, gender and dignity*. Health Promot Int, 2016. **31**(2): p. 258-69.
68. Blanton, E., et al., *A rapid assessment of drinking water quality in informal settlements after a cholera outbreak in Nairobi, Kenya*. J Water Health, 2015. **13**(3): p. 714-25.
69. Schneider, L., et al., *Is competence enough to enable Kenyan mothers to make good infant and young child feeding decisions?* 2017. **13**(4): p. e12422.
70. Debela, B.L., et al., *Maternal nutrition knowledge and child nutritional outcomes in urban Kenya*. Appetite, 2017. **116**: p. 518-526.
71. Thuita, F.M., R.K. Mwadime, and J.K. Wang'ombe, *Child nutritional status and maternal factors in an urban slum in Nairobi, Kenya*. East Afr Med J, 2005. **82**(4): p. 209-15.
72. Wanjohi, M., et al., *Sociocultural factors influencing breastfeeding practices in two slums in Nairobi, Kenya*. International breastfeeding journal, 2017. **12**: p. 5-5.
73. Ministry of Health, World Food Programme, and Anthrologica, *Formative research to inform adolescent programming in Kenya. Engagement for health, nutrition and sustainable development*. 2018, Ministry of Health: Nairobi, Kenya.

74. Madeghe, B.A., et al., *Postpartum depression and infant feeding practices in a low income urban settlement in Nairobi-Kenya*. BMC Res Notes, 2016. **9**(1): p. 506.
75. Osok, J., et al., *Adversities and mental health needs of pregnant adolescents in Kenya: identifying interpersonal, practical, and cultural barriers to care*. BMC Womens Health, 2018. **18**(1): p. 96.
76. Kimani-Murage, E.W., et al., *Vulnerability to food insecurity in urban slums: experiences from Nairobi, Kenya*. J Urban Health, 2014. **91**(6): p. 1098-113.
77. Odeny, B.M., et al., *The Stigma of Exclusive Breastfeeding Among Both HIV-Positive and HIV-Negative Women in Nairobi, Kenya*. Breastfeed Med, 2016. **11**: p. 252-8.
78. Oxfam, *Urban Poverty and Vulnerability in Kenya The urgent need for co-ordinated action to reduce urban poverty*. 2009, Oxfam: Nairobi Kenya.

Appendices

Appendix 1

Table A1: Literature Review Methods

	Methods
Key words	“vitamins”, “diarrhea”, “parasitic infections”, “wasting”, “stunting”, “malnutrition”, “health care”, “infant feeding”, “HIV/AIDS”, “dietary diversity”, “nutrition services/programs”, “diabetes”, “feeding practices”, “cultural factors”, “food access”, “coping strategies”, “food security”, “day-care centers”, “environment”, “housing”, “schools”, “gender”, “poverty”, “labor”, “employment”, “diet”, “schools”, “child care practices”, and “maternal nutrition”
Inclusion criteria	<ul style="list-style-type: none"> • Studies which included adolescents as a sub-population along with other population groups were deconstructed to isolate the evidence on the adolescent age group (ages 10-19 years) • Studies that were not limited to urban areas were also disaggregated to isolate evidence of populations from urban areas • In multi country studies, only data from urban Kenya was selected
Exclusion criteria	Papers that had aggregated data from the national surveys because of lack of disaggregated data for urban informal settlements

