INTRODUCTION

There is evidence that the general condition of Tanzanians’ nutritional status is poor [1-3] and malnutrition primarily affecting infants, young children and women of reproductive age is widely spread in the country. The Tanzania Malnutrition Fact Sheet 2016, for instance, showed 57% of babies 0-6 months are not exclusively breastfed for at least 6 months, 57% of children under five years are anemic, 45% of women of reproductive age (15-49) are anemic and 37% of urban women aged between 15-49 are overweight. In addition, 34% of children aged less than 5 are stunted (low weight for age), 14% are underweight (low weight for age) and 5% are wasted (low weight for height). Furthermore, of these children, 33% have insufficient vitamin A and 36% of women 15-49 have iodine deficiency. Cameroon [3] report that about 3 million children under the age of five in Tanzania lack adequate nutrition and the URT [4] showed that 7% of the under-fives are born with low birth weight (below 2,500 gm). Stunting, a chronic under-nutrition indicator is common among children born small (51%), with a thin mother (40%) and those from poor households [4]. All these indicators imply that Tanzania has the third largest number of children who are stunted in Africa [3]. Low nutrition status, therefore, remains a key public health concern to health personnel and policy makers in the country.

There are, however, regional variations of malnutrition levels in Tanzania. The prevalence of under-weight among under-fives in six regions with high agricultural produce, for example, is Mbeya (1.2%), Iringa (3.5%), Rukwa (3.8%), Ruvuma (4.8%), Kagera (5.0%) and Morogoro (5.3%) [3, 5]. Kagera region, with a population of about 2.5 million [6] despite being among the regions with high agricultural produce faces poverty and chronic malnutrition among its residents [7]. The region has an annual population growth of 3.2% and 82% of the residents engaged in agriculture contributing to about 45% of the GDP and 60% of export earnings [8]. The region has the lowest (45%) per capita Gross Domestic Product (GDP) [9]. The National Bureau of Statistics (NBS) [10] reported Kagera one of the last 10 poor regions in the country and according to PEI [11-12], Kagera is among the regions with highest levels of poverty, gender disparities and trends of environmental degradation and climatic change impacts [8]. It is against this background that we conducted a qualitative study with the...
Tanzania-Uganda borderlanders to understand, among others, the perceived causes of low nutrition status reported among Kagera Region residents.

MATERIALS AND METHODS

Data analyzed and presented in this paper are part of a bigger qualitative study conducted in four border districts of Kagera Region, Tanzania: Bukoba Rural, Bukoba Urban, Missenyi and Kyerwa between September 2017 and September 2018. We conducted in-depth interviews (IDIs) with key informants (KIs) including: males and females aged 18 years and above; the District Medical Officers (DMOs), the Medical Officers In-Charge, regional, district and village officials, healthcare providers and influential members of the community. The interview guide sought, among others, KIs’ understanding of the link among okwelokola, government interventions and low nutrition status reported among Kagera Region resident. We also reviewed relevant literature on Bahaya’s history particularly on Bahaya social, political and economic organizations and transformations during the pre-colonial, colonial and independence and after.

The Muhimbili University of Health and Allied Sciences Institutional Review Board (MUHAS IRB), granted research clearance for this study – Ref. No. 2017-09-29/EAC/Vol.XII/73). We also sought and obtained permission to conduct the study from regional, district, division and ward authorities. Due to the borderlands context, study participants granted oral informed consent. Data analysis continued throughout the process of data collection following three stages of qualitative data analysis: data reduction, data display and conclusion drawing and verification [13]. The main aim was to understand, from the study participants’ perspectives, the perceived link among okwelokola, government interventions and low nutrition status recorded among Kagera residents.

RESULTS

During the IDIs we asked our study participants to report on perceived factors behind low nutrition status reported among Kagera residents. We further asked participants to select two perceived key factors for this public health problem in their areas. The analysis of data generated three categories of perceived key factors influencing low nutrition status in the study area. In this paper, however, we focus on one category indicated by some participants: the perceived link among okwelokola, government interventions and low nutrition in Kagera region.

Okwelokola

Our study participants defined the term okwelokola as “ones audacity and ability to use internal and or external resources available to solve perceived social or economic hardships s/he is facing” (IDIs, Kagera, 2017/2018). Social and economic hardships referred to as ekyemba or okukwatawa in Ohuhaya, the Bahaya’s first language, include: clearing debt or kumala ebyaama; soliciting money to pay for healthcare (biomedical or African therapy) for a sick family member or relative or okukwatawa; request for money to buy food in case of food shortage or famine or enjala; seeking for money to pay school fees or buying school materials for the children and getting money to meet any need in the (nuclear or extended) family. In addition, our study participants reported on different forms of okwelokola practiced by the Bahaya perceived directly contributing to low nutrition in the study area:

Borrowing money and or bonding some properties or Okwehoza cum okukwataiza: explaining on how borrowing or okwehoza and bonding or okukwataiza work among Bahaya, a KI reported, “A poor person in need of money or in economic hardship of some kind would approach a businesspersons or an educated persons [the elite] for support … He[she] pledges to pay the debt on the agreed or set [by the elite] day … The borrower would bond some of his/her family’s property: animals, crops or land to guarantee hope to the lender … The majority fail meeting the promise … They end up losing bonded property including their developed lands [eibanja]” (IDI, Bukoba rural, February 5, 2018).

Another study participant interviewed in Missenyi expressed her concern as follows, "Potential borrowers are on the rise … single parents, orphans, a household/family heads, the elderly and street children … Relapse into illiteracy is aggravating the problem … Iliterate borrowers do not understand what is written in the credit contracts leading them signing falsified figures [200,000 instead of 20,000, for instance for instance]" (IDI, Missenyi, December 18, 2017).

Another participant commented, “Uncontrolled moneylenders charge high interest rates that leave the poor poorer … In turn, this practice could make poverty a common feature for many of our communities” (IDI, Missenyi, December 18, 2017).

Study participants reported some businessmen and moneylenders give loans to civil servants on monthly bases at high interest rates between 50% and 300%. The borrower’s perceived ability to repay or the borrower’s salary scale, amount borrowed and ‘credit history’, determine the interest rate set. It was reported, for example, a businessman and moneylender in Muleba district was lending money at an interest rate between 100% and 300% to the rural poor borrowers, the teachers and the health personnel, who bond their bank debt/credit cards as guarantee and trust assurance to the moneylender.

Women’s social groups or ebyaama: an old lady and a retired civil servant interviewed in Missenyi stated, "Women in this area spend much time on ebyaama income generating activities … Some are too lazy to cook for their children and families … They leave their children under the care of the house girls/helpers, siblings, neighbors or the elderly whenever they go to ebyaama … Some feed their children on semi-cooked, cold or somehow contaminated food … All this contributes to low nutrition status among our people” (IDI, Missenyi, February 6, 2018).

Commenting on women’s engagement in social groups, ebyaama, a male interviewee in Bukoba Rural alleged women’s engagement in social groups or ebyaama was profoundly contributing to low nutrition among Kagera residents, the U5s in particular, stating,

"The women [including mothers of the U5s] must be at the working site, say weeding, as early as 6 am, latest 7 am … Some groups have set a minimum of two pieces per working day … This is about 6-8 hours … The women, thus come back home around 2 or 3 pm, tired … A child, a sick or elderly family member, would miss care and love for eight plus hours
just like that … What do you expect if the mothers work for five days a week four weeks a month …. Some women cannot maintain their farms or take care of their babies and families … All they care for are annual groups’ shares and pairs of vitenge or khanga” (II, Bukoba Rural, December 18, 2017).

Obutura system: A male participant aged 73 interviewed in Bukoba Rural reported,

"The term obutura stems from entura or traditional spice vegetable [mainly green when ripe] used by Bahaya from time immemorial … Entura are small in size [of a medium size peas or smaller], grown in ekibanja [developed land], cooked with ebitude [bananas] and empelege [beans] or ensholo [bambara nuts] mixed with meat or fish … Small, immature coffee fruits look similar to entura, hence; the Bahaya saying ‘emwani zaba butura’ … Selling and buying unripe coffee on trees at obutura stage are referred to in Oluhaya as okuguzo obutura and okugura obutura respectively” (II, Bukoba Rural, December 27, 2017).

All of our study participants reported that many poor household members fail to consume what they produce due to obutura system practices. In the view of a Ward Executive Officer interviewed in Missenyi,

"Some families sell immature crops on trees [bananas, coffee, and fruits] or in the ground [potatoes, yams, legumes, or cassavas] in order to solve the perceived immediate problem like paying debt, paying school fees, healthcare or buying food … In a long run, such a situation could ruin the family members’ health due to lack of necessary food nutrients” (II, Missenyi, February 6, 2018).

Commercialization of every crop and farm products in Kagera has led to a situation where families and households produce what they do not consume and consume what they do not produce. A female member of the village government in Missseyeni, for instance, reported,

"Kagera is blessed with a variety of food rich in nutrients than many of the regions … However, with the commercialization of every crop, everything we produce is sent on legal or illegal markets … The residents have become money maniacs selling all bananas, fruits, goats, milk, chicken, vegetables or eggs, leaving nothing good [nutritious] for family members to eat … They use the money to buy non nutritious food from shops to feed the families or use the same money to treat a sick child or relative … We are now producing what we do not consume and consuming what we do not produce leading to low nutrition outcomes among our people” (II, Missenyi, February 6, 2018).

A Regional Official interviewed in Bukoba observed,

"Kagera residents are the same with similar livelihoods … Okwelokola in its all forms is a challenge in every part of the region … The big challenge is that the borrowers do not recognize abuse involved. [Instead], they view the moneylenders as saviors whom they would not report to the crime control machinery” (II, Bukoba, January 19, 2018).

In the Regional Official’s view, “Implementing interventions raising Abahaya’s awareness of exploitation embedded in okwelokola, would facilitate curbing okwelokola and its discontents in Kagera” (II, Bukoba, January 19, 2018). Another study participant recommended, “Individuals, families and households should save and invest in children’s health and education to alleviate nutrition status in Kagera” (II, Bukoba Rural, January 3, 2018). In the view of the study participants, Okwelokola, as currently understood and practiced among the Bahaya and the forces behind it, obscure exploitation it entails. As a result, the poor Bahaya will remain and continue swimming in the pond of poverty and exploitation (IIs, Kagera, 2017/2018).

Government interventions

Study participants cited three government interventions in Kagera and the Lake Zone that negatively affected their nutrition status: control over coffee prices and markets, establishment of government-supported fish factories and illegal fishing control or ‘Operation Sangara’.

Coffee price and market controls

An old man interviewed in Bukoba Rural, informed, "Abahaya grew and used Robusta coffee before encounters with the external world … The colonialist, the Germans and later the British, introduced and forced Bahaya to grow Arabic and Robusta coffee on a commercial scale … Coffee production and prices were high up to the late 1950s … Beginning in the 1960s, coffee production in Buahaya declined as market prices fell … However, coffee prices in Uganda have always been two times higher than in Tanzania … The government has now waged war against illegal coffee trading but keeping price quite low … TShs 1030 per kilo of amaganda [unhulled coffee] … It [the government] will not succeed unless they raise the price to or above that fetched on illegal trade system” (IDI, Bukoba Rural, December 27, 2017).

A coffee and other crops businessman in his early seventies interviewed in Missenyi reported,

"My father was a coffee businessman … He sold coffee grew on his farms and that bought from small scale farmers in this area and beyond [Karagwe, Bukoba and Muleba districts] in Uganda … Uganda offered and is still offering better prices compared to our unions [Coffee Cooperatives] since the colonial era … That is why we sell [smuggle] coffee across the border … I tell you, we cannot stop smuggling coffee into Uganda until our government adjusts the price to or above that offered by the Ugandans” (IDI, Missenyi, March 19, 2018).

Another coffee and other crops trader interviewed in Kyerwa noted,

"[Illegal] coffee trading between Tanzania and Uganda has been going on in this area from the colonial times despite costly but unsuccessful on-and-off cross border coffee [illegal] trade crackdowns conducted by the police [government] … Don’t they know why we sell coffee across the border? … If they want to have all coffee grown in this area sold to the cooperatives, the government should increase the price to or above that fetched on Ugandan markets (IDI, Kyerwa, March 17, 2018).

A coffee farmer interviewed in Bukoba Rural narrated,

"Coffee cooperatives in this region offer prices that do not cover production costs, let alone profits to the farmers …. While it costs a farmer about TShs 3000/ to produce a kilo of coffee, the cooperative offers TShs 1030 per kilo of amaganda [unhulled coffee] that is not paid on the spot … Farmers are
given receipts … required to return when cash is available … Often it takes some months before payment is made, which compromises the farmers’ expectations … caring for the family [food and healthcare], sending kids to school, paying debts or buying farm supplies and implements … Poor and small scale farmers turn to okvelokola, which in turn pushes them into a poverty vicious cycle” (IDI, Bukoba Rural, February 5, 2019).

**Establishment of government-supported fish processing factories**

Majority of the study participants recalled the impact of fish factories established in the Lake Zone in the late 1990s and early to 2000s. In their view, the factory owners or their agents bought the fish from the fishermen on the lake, not ashore, leaving the residents to feed on immature fish or fish remains or mapanki. A fisherman interviewed in Bukoba Rural, for example, stated, “Beginning in 1998, the government through fish factory owners and their agents, took control over fishing activities … Much of the catch is sold to fish factories in the lake not on markets ashore” (IDI, Bukoba rural, February 5, 2018). An old lady and a retired civil servant in her late sixties interviewed in Bukoba Rural recalled,

“Beginning in the 1990s the government allowed the establishment of private fish factories in the Lake Zone … Several factories were established in Mwanza, Bukoba and … I think Musoma [Mara region] … The factory owners invaded the lake buying all the fish on water [fish buying booths offshore, in the lake] … Not at ashore markets … By the early 2000s, no mature fish reached our markets [fish and open markets] … We had to feed on ‘Mapanki’ [fish remains after removing fillet] or immature and small in size fish, which deprived us of nutrients adding to poor nutrition status recorded in our region” (IDI, Bukoba Rural, March 5, 2018).

A fish vendor interviewed at Lake Ikimba shore shared his experience with mapanki as follows,

“Ahaa, mutai wange tulugile alai [Ohoo, my friend, we have come a long way] … Beginning in the late 1990s, you could not get a [sangara] fish of this size [half of his arm] on the markets … Why? … Because the government had sold Lake Victoria to the fish factory owners and suspended fishing activities on other lakes [Ikimba and Burigi] … The fish factory agents bought the whole catch for their factories leaving us without fish to sell or feed our families … We survived on mapanki [fish remains after factory processing] that have no nutrition value to the consumers … The situation is still the same to-date … You may need to research on the ‘mapanki movie’ that caused controversy in the country” (IDI, Bukoba Rural, February 17, 2018).

A male taxi driver in his mid-forties interviewed in Bukoba Town reported,

“Fish factories were established in Kagera in the early 2000s at Nyamukazi and Kemondo … They [fish processors] damped fish remains in an area off the [Kemondo] port on the way to Kanyinya … However, as sangara catch declined and prices escalated, ‘mapanki’, dagaa [sardines] and immature fish became affordable and popular among poor people … Operators of fish remains trucks sold ‘mapanki’ to fish vendors on the way to Kemondo dump … The vendors sun-dried or smoked ‘mapanki’ before selling them to the consumers at home or at open markets … Mapanki, that we ate for several years contain no nutrients, which could have led to high levels of malnutrition in our region … Nowadays, buyers collect [fish frames] from the [fish] factories for human consumption or producing animal feeds” (IDI, Bukoba Urban, February 7, 2018).

Describing mapanki, a Kagera-born fish trader at Kirumba (Mwaloni) fish market in Mwanza interviewed in Bukoba Town, stated,

“Mapanki, kifulu kitainao munofu; shana bigufa bishai … ekitewe, olutongongo n’omukika or mapanki are fish born remains without any flesh … All you get is the head, main borne/skeleton and the tail … In Mwanza, the fish factory owners used to dump this trash mainly in Kanyama village in Magu district and other areas, where the ‘diggers’ found fortune of rotten fish remains, which they sorted, dried or smoked before selling them to middlemen who transported the ‘cargo’ to markets in Mwanza and other regions … The Congolese fish traders were the major mapanki buyers/clients, which they sold dearly on markets back home … You may not believe this story … Ask our officials why Tanzania government, the then President [Phase 4] in particular, had to battle with the British ‘mapanki movie’ director” (IDI, Bukoba Urban, February 6, 2018).

A fish vendor interviewed at Nyakabanga open market showed our team member a ‘new’ form of fish remains sold to community members in the region commonly known as ‘eibomu’, explaining,

“Nowadays ‘mapanki’ are expensive and difficult to get at fish factories due to high demand from [animal, poultry and fish] feed production industry … What we can afford is making ‘mabomu’ [plural] … ‘Eibomu’ is made of ground/pounded fish remains [gills, bones, heads and tails], then rolled in a fish skin and finally smoked or sun-dried to give it long shelf life … The price ranges between TShs 500 and TShs1,500 [sometimes more] depending on size and availability … Majority of Kagera residents are feeding on ‘mabomu” (II, Bukoba Rural, January 16, 2018).

Our team observed fish collecting booths offshore at Nyamukazi (Bukoba Urban), Bumbiile (Lushanga) and Kerebe Islands (Muleba districts) and the Bukoba District Council-owned fish landing cum market at Malehe. At the time of the visit (February 5, 2018), the Malehe fish market was closed due to the then ongoing operation Sangara in Lake Victoria. An ex-human trafficking for labor victim interviewed reported working for a successful fisherman who had five big camps on islands in Lake Victoria with around 200 laborers, about 70 boats, 90 boat engines and about 300 fishing nets who sold his catch to factory agents in the lake (II, Muleba, February 9, 2018).

‘Operation Sangara’

Majority of the study participants reported the government-led anti-illegal fishing campaign commonly known as ‘Operation Sangara’ in the lakes in Kagera that started in 1994 and intensified in the 2000s, drastically affected the nutrition status of many Kagera residents. However, an old, retired civil servant and a (retired) fisherman and boats owner recalled that government interventions began after the Ugandan police
officers patrolled Lake Victoria, including Rubafu Peninsular, stating, "By the end of 1999, the Ugandans deployed patrol boats on the lake ... We were informed we have been living and fishing on the Ugandan lake ... They claimed Rubafu Peninsular was Ugandan territory ... They [Ugandan squads] would round us in the lake, take all the catch we had and sometimes the engines, nets, boats or threatening shooting us" (II, Bukoba Rural, February 5, 2018).

Explaining the Ugandans' motive for patrolling the lake, the same KI stated, "The Ugandans are so smart ... They had established [fish] fillet factories in Jinja a long time ago ... Uganda leads in East Africa in exporting fish to Europe ... They needed more fish to meet market demands ... They had to use any means to achieve this goal ... They chose invading Tanzania’s fishing zones ... As a result, the Tanzanian fishermen were pushed out of business, which left them without income to support their families ... Since then, we have not recovered ... We have been pushed into poverty that has jeopardized our nutrition status" (II, Bukoba Rural, February 5, 2018).

Believing fish is the main source of protein in Kagera, an interviewee in Missenyi, for example, claimed, "The lakes and the rivers [Lakes Victoria, Ikimba and Burigi and Kagera River] are our main sources of protein in the lakeshore line ... We used to get enough catch for sale and home use ... They started by suspending fishing activities in the lakes in 1998 ... Last year, 2017, our president completely pushed us out of the business ... We have neither income nor fish for our use at home for 10 consecutive years now ... We are progressively getting malnourished" (II, Bukoba Rural, February 6, 2018).

A fisherman in Bukoba Rural reported, "We have been pushed out of the lake [following illegal fishing campaign] ... We no longer have income and source of nutrients for our families ... In this scenario, how would you expect us to have good health?" (II, Bukoba Rural, February 5, 2018). A fisherman in his mid thirties interviewed in Kashenye, pointed at his colleagues and said, "Just look at us ... No one is healthy amongst us ... We are starving ... We cannot be healthy" (IDI, Missenyi, February 6, 2018).

A brother-based FSW in her late thirties interviewed in Bukoba Town reported on unintended consequences of ‘Operation Sangara’ as follows, "For good reasons, the operation stated in 1998 but intensified in 2017/2018 ... The police on patrol confiscate illegal fishing nets and boat engines, burn illegal fishing nets, batter down or auction boats and arrest fishermen for trial, which has left many of them bankrupt ... Majority of fishermen have left the fishing camps for other possible alternatives off the lake" (II, Bukoba Urban, February 5, 2018).

Residents in Rubale Division, Bukoba Rural reported the government had suspended fishing activities in Lakes Ikimba and Burigi for the past three years to allow fish regeneration. The fisheries officials threatened putting on trial anyone who would violate the burn. The residents, therefore, missed fresh fish from the lakes, which they claimed denied them nutrients needed to sustain their health status (IIIs, Bukoba Rural, March 5, 2018).

A bother-based FSW interviewed in Bukoba Town reported the unexpected ‘Operation Sangara’ aftermath as follows, "Women who survived from prostituting in the fishing camps in the lake [Victoria] have now invaded some towns on the mainland forming ‘new’ categories of FSWs, the streetwalkers and the semi-streetwalkers, in particular ... You should conduct observation in Bukoba [town] at night to get a sense of what is happening" (II, Bukoba Urban, February 5, 2018).

Commenting on the presence of street-walkers and semi-streetwalkers in Bukoba Town, the government official interviewed in Bukoba Rural observed, "These groups [of FSWs] have surfaced in the past three of four years ... However, their numbers has increased following ‘Operation Sangara’ [illegal fishing] going on in Lake Victoria ... Women who prostituted in the fishing camps have now shifted to this town [Bukoba], Kemondo, Kyaka, Bunazi and Mutukula ... Some are found in the villages" (II, Bukoba Rural, January 12, 2018).

However, an interviewee in Bukoba Town had an opinion that, “The fishermen used to harvest immature fish to give our bodies required nutrients ... All we got was just ‘fish smell’ at high prices ... Not nutrients ... Thanks to [President] Magufuli’s efforts to end illegal fishing in Lake Victoria” (II, Bukoba Urban, February 5, 2018).

We observed and experienced surprise inspections conducted by the anti-illegal fishing squad in Muleba and Bukoba districts, at Muleba fish market, Kyetema junction (along Muleba-Bukoba highway), along Bugabo-Bukoba road, at open markets in Bukoba Rural district and at households in the villages in Bukoba Rural and Muleba districts. On our visit at Malehe fish market on February 5, 2018, for example, we observed village officials distributing confiscated catch to villagers free of charge. The Malehe sub-village chairperson reported, “The district and regional officials have directed us to distribute seized fish to villagers for free” (II, Bukoba Rural, February 5, 2018). A team member boarding a Bukoba-Dar-es-Salaam bus in March 2018 witnessed the anti-illegal fishing squads at Bukoba and Muleba Bus stands checking all suspected-fish containing luggage and parcels onboard and before loading. A similar scenario was observed at Nzega where squad members inspected buses from Bukoba, Mwanza and Kigoma to different parts of the country. On March 24, 2018, we observed at the Bulambizi village center, Bukoba Rural, a squad from Bukoba Town harassing and finally arresting three fish vendors alleged selling immature fish that were restricted.

**DISCUSSION**

Malnutrition results from critical inadequate intake of proteins and energy foods for the body needs mainly among the children and the USs in particular. Our study participants associated high malnutrition levels recorded among Kagera residents with 1) okwelokola, practiced in different forms among the Bahaya including: borrowing money, forming and participating in social groups or ebhyaama and obututu system; and 2) government’s interventions including coffee pricing and
marketing controls, establishment of government-supported fish processing factories around Lake Victoria beginning in the late 1990s and ‘Operation Sangara.’

Kamazima, et al., [14] provided a comprehensive understanding of okwelokola as it is understood and practiced in contemporary Buhaya or the country of Bahaya in Kagera Region, Tanzania. Okwelokola takes different forms but not limited to: borrowing money, bonding private or family properties, forming/joining social groups (ebyaama) and obutura system. Social, psychological and economic consequences of okwelokola practices among Bahaya in Kagera Region on nutrition status in Kagera are well presented by Rald & Rald, [15] and Kamazima, et al., [14]. Okwelokola, or using internal and or external resources available to solve social or economic hardships is a deep-rooted practice and means of deciphering difficulties among Bahaya. Traditionally, Omuhaya in need approached a relative, a friend, a neighbor or anybody trusted for help, mainly kwehoza or borrowing money on a word of mouth contract that rarely involving the third party. However, following colonial-triggered social, economic and political transformations that took place in Buhaya and beyond, the meanings, forms and practices of okwelokola progressively changed. Okwelokola as known and practiced in contemporary Buhaya, is a modern form of slavery, exploitation, human rights violation and mother of poverty in Kagera.

Hydén [16], Mutahaba [17], Kamugisha, [18], Rald & Rald, [15] and Kilaini [19] observed that in the early 1940s, coffee price in Uganda was twice higher than in Tanganyika encouraging competing Bahaya and Asian businesspersons to sell the crop across the border, in Uganda. Coffee price differences between the two countries have remained the same to the present creating opportunities for a few smugglers to become rich and richer on the expense of poor smallholder farmers [14-15, 20-21].

Okwelokola, operates in favor of the elite (businesspersons, moneylenders and men and women with formal employment), pushing the poor smallholders into ‘severe’ poverty reflected in high levels of malnutrition recorded among Kagera residents. It is also clear that internal (disintegration of social ties and networks or social capital) and external forces (government interventions) precipitated and sustain okwelokola practices in Buhaya that require combined effort, and the political will in particular, to end this legitimized exploitation and human rights violation in Kagera.

Available literature demonstrates that Nile perch processing in the most productive freshwater fishery in Africa Kleih, et al., [22], the Lake Victoria basin, started in Kenya in the early 1980s [23, 24, 25], Uganda followed soon and later Tanzania [26, 27]. By 2004, the number of fish processing factories had reached 35 around the lake: 4 in Kenya, 19 in Uganda and 12 in Tanzania (in Mwanza, Musoma and Bukoba towns) with an annual processing capacity of about 120,000 tons [27-29]. According to Odongkara [30] and Kleih, et al., [22], between 2000 and 2006, the number of (powered) fishing vessels increased from 4,108 to over 12,700 or 21%; the number of fishers rose from 129,305 to 196,246 or 52%. As a result, the fish catch from the lake increased from 800,000 to 1,000,000 tons worth $350 – 400 million p.a. The major fish species from the lake are Nile perch (Lates niloticus, Sangara in Kiswahili or Empunya in Oluhaya), Rasbrounebola argentea (sardines or Daga in Kiswahili or Obukena/Obudagaa in Oluhaya) and Nile Tilapia (Oreochromis niloticus Sato in Kiswahili or Engege in Oluhaya).

Fillets, white or with red meat, chilled or frozen, skinless or skin-on and or deep skinned (where fat, dark skin and pin bone are completely removed [31] form the bulk of fishery from Tanzania, Kenya and Uganda exported to the European Union (EU), mainly Germany, Belgium, Portugal, Italy, United Kingdom, France, and the Netherlands; the Far East, Australia, the United States, Israel and to emerging markets like Venezuela, Brazil, Hungary, Solvenia, Poland and the United Arab Emirates [28, 31-32]. Nile Tilapia fillet is increasingly being exported to the same markets. A few companies in Uganda and Tanzania “land their catches and export their products in Kenya [31]. Generally, fillet of exportable quality are too expensive for local markets [27, 33].

Nile perch processing started in Kagera in 2005 with two factories: Vicfish Ltd (Bukoba) at Nyamukazi followed by Kagera Fish at the Kemondo Bay. Between 2006 and 2008, the number of (powered) fishing boats increased from 6,799 to 8,146 and the number of fishers shot from 18,953 to 23,220 with majority of the activities conducted in Muleba district [22]. By November 2010, Vicfish Bukoba Ltd and Kagera Fish operated for six days a week, processing 15-20 and 10 tons per day respectively.

According to Kabahenda & Hüsken [25] in the early 2000s, "Nile perch was considered ‘the saviour’ because of the lucrative business it brought to the region, but perch has also been called “bane” because perch is associated with declines in indigenous fish species and the associated marginalization of artisanal fisherfolk and processors …The growth of Nile perch fishery, coupled with the decline in both biomass and catches of indigenous species, wiped out the artisanal fishery which was a major means of subsistence in the Lake Victoria region up to the 1970s … Consequently, the decline in artisanal fishery is believed to have had major impacts on livelihoods and food security of artisanal fisherfolk and local populations that depended on these indigenous species for food and income. “Some of the artisanal processors that had lost business due to lack of fish (resulting from increased fish exports) diverted to processing by-products at wholesale and retail basis” [28].

An auditing by surveying and mapping the fish processing industries conducted along the lake estimated that fish processing industries generated approximately 36,000 tons of solid waste and 1,838,000 m³ of wastewater annually [28]. The processors used undersized stabilization ponds and direct discharge of raw or semi-treated wastewater into the lake or channels that emptied in the lake, while solid wastes were disposed by dumping on the ground or burying underground and fish waste utilization method used was selling of solid fish residues (fish frames) to whole sale or retailers who processed them for local communities’ consumption (known as ‘mapanki’) or processed fish meal [28].

There is evidence that processing of and trade in Nile perch by-products for human consumption started in Kenya in the 1990s and spread clockwise to Tanzania and Uganda. ‘Factory owners’ need to dispose of waste products from fish filleting.
operations” [34] and “artisanal processors’ need for raw materials to support their business, which was to process and avail fish at local markets in Lake Victoria region” [28] boosted by-product processing and trade in the lake region. Filleting, therefore, resulted into a new economic activity involving fish by-product traders (wholesalers and retailers) and processors [35].

As our study participants reported and as accounted by other researchers, fish frames or mapanki comprise of the head, skeleton, tail, fins and guts (offals). The amount of meat on mapanki varied among factories and with “improvements in filleting technology, the frames [got] bonier” [25]. The lake basin residents considered mapanki of low nutrition value. Some years later, smoked and dried fish frames found market in the Democratic Republic of Congo (DRC) and Southern Sudan through informal channels [36]. The consequence is that the availability of formerly accessible fish and fish products decreased and fish frames prices increased thus unaffordable especially to poor and food insecure households and those affected by HIV and AIDS.

However, the reported public health problem is not unique to Kagera residents. A study conducted in Homa Bay County, Kenya on ‘Food Insecurity and Coping Strategies of Fishing Communities Living in Lake Victoria’ [37], showed that of 399 participants, 94.7% and 83.2% attributed food insecurity to unstable fish prices and seasonal fishing bans by the government respectively. Poor health (especially among HIV infected), malnutrition and diseases (39.1%), loss of property (85.2%) and substantial fluctuation in food prices (96.5%) were reported the major impacts of food insecurity on the respondents. Respondents reported coping strategies developed including skipping meals especially lunch (96.0%); sending their children to work at their neighbors’ farms for pay (90.0%) and practicing farming (50.9%).

Abila [38] observed that changes in the processing and marketing of Nile perch frames (known as Mgongo wazi) in Kenya had negative implications to local food security: 1) increased use of frames in the fishmeal industry means that most of it is now not available for direct human consumption; 2) the factories remove much more flesh off available frame, thus, reducing its value as food; and 3) competition has caused a rise in ex-factory, and consequently, retail prices of frames. Consequently, though described as a "poor man's food" that many people would not consider to consume, the mgongo wazi (frames) have increased in price so much that poor consumers often cannot afford it.

The okvelokola-government intervention-malnutrition link: a synthesis

Historians prove that by 1890s, when the Arab/Swahili traders and the Europeans came to Buhaya, the Bahaya had formed independent Kingdoms: Kiziba, Bugabo, Maruku, Ilangiro, Kihanja, Kyanutwara, Karagwe (the largest and most powerful under King Rumaniyika 1855-1878), Bugufi and several Kingdoms in Buha, Ufipa, Usukuma, Ukereve, and the present Rwanda and Burundi. For generations, production (agricultural and fisheries, for example) in Buhaya was mainly subsistence with limited bater trading at open markets or enkungu, to secure items that could not be locally produced [19, 20, 39]. The Bahaya grew and used Robusta coffee and bananas for households’ consumption [40]. However, the colonialist, the Germans (1884-1916) and later the British (1916-1961) introduced Arabica coffee production on a commercial scale [15-16] exporting coffee (Robusta and Arabica) for the first time in 1898 [19]. By the 1940s, both Africans and Asians were competing in buying coffee and selling it in Uganda where prices were twice higher compared to that offered in Tanganyika [17-18]. Unquestionably, differences in coffee market prices in Tanganyika and Uganda encouraged both formal and informal border crossing and cooperation, a situation that has remained the same to date [14, 18].

Beginning in the 1960s, coffee price on world markets fell and production in Buhaya declined [14, 15, 18] reducing the farmers’ income and ability to care for their families. To cope with this situation, Buhaya farmers started producing food/subsistence crops that had high market demand in Kagera and beyond on a commercial scale [14-15]. Government-led anti-illegal coffee trade in Kagera had been on-and-off since the 1970s but intensified in the 1990s. At the time of field work in Kagera, coffee farmers were being directed and required to sell their harvest through Primary Cooperative Unions at a price of TShs 1,030 per kilo of unhauled coffee or amaganda, and in most cases on credit [14], which further compromises farmers’ livelihoods.

Similarly, fishing in Buhaya remained at subsistence level with limited butter and commercial features during colonialism and post independence periods. However, the introduction of fish processing factories in the Lake Victoria Basin two decades ago, transformed trade in Lake Victoria fish to domestic, regional and international levels [30]. Domestic fish trade enabled non-fishing communities, the farmers, within Buhaya/Kagera and beyond access to fish at affordable prices that improved their diet. “However, with increasing fish trade, fishing households have tended to suffer reduction in their consumption to below desirable levels, due to desire to maximize earnings from fish sale ... In most cases, the best fish was sold for cash” [30]. Sale of obukena and fish remains/frames to fishmeal (poultry/animal/fish) producers deprived local consumers of an affordable source of fish and export of fish has adversely affected local consumers by diverting supply away from them and increasing fish prices to levels unattainable by many locals [30].

Three factors limited Kagera residents’ access to fish from the lake. First, processing factory owners paid relatively high prices making fish, whole or fillet, unaffordable to poor resident consumers. Second, the export market took nearly all good-quality Nile perch (fillet); hence, the poor residents could only get and afford fish by-products after filleting including fish frames and skins or factory-rejected immature, undersize or poor quality Nile perch. Finally, with increased needed capital to harvest fish in deep waters (expensive boats and nets) only a few fishermen could afford such resources that alienated majority of potential fishermen from their entitlement to the fish resources. Many of them left fishing activities for other alternatives on the mainland, including farming. Women and girls who worked in the entertainment facilities in the fishing camps, including providing sexual services, left for urban centers in Kagera including Bukoba Town, Muleba, Kyaka, Bunazi, Mutukula and other rural areas [41].
Reduced income from coffee sales and increased commercialization of Lake Victoria fish coupled with government’s crackdowns on illegal coffee trade and fishing beginning in the 1970s, adversely impacted many of the Kagera region residents’ quality of life. In addition, impacts of climatic change, HIV and AIDS endemic, crop (coffee, cassava, potatoes, yams) diseases (Banana Xanthomonas Wilt, BXW and Coffee Wilt Disease, CWD), change in land use, commercialization of every crops, poor food storage and preservation methods further undermined Kagera residents’ quality of life and food security in particular. To date, Kagera that used to be one of the honey and milk plenty regions in terms of production, is one of the 10 poverty-stricken regions with the lowest (45%) per capita Gross Domestic Product (GDP) [48], with the highest levels of poverty [10, 12] and one of the regions with high malnutrition levels in Tanzania (5.0%) [4, 8, 42].

Study participants reported facing poverty due to reduced income from accustomed economic activities that has negatively affected their livelihoods in various ways: food insecurity, could not afford at least two meals a day (some skipping lunch), failure to send children to school, unable to meet treatment costs for healthcare (modern and African) needed by family members or relatives and experienced increasing levels of malnutrition among children and the adults. Others reported that some relationships and families had shaked or fallen apart due to economic hardships or maisha mgumu/uchumi mgumu [43]. It is from this background that Bahaya women faced with economic hardships and living from hand to mouth, opted (and still are) forming social groups or ebyama. However, some critiques (males and females) blamed ebyama for consuming much of the women’s time over caring for their families: children, husbands, the elderly or sick family members. Some women were reported leaving their homes at around 6 am and returning by 3 pm five or six days a week that deprived their families proper care and (breast) feeding for the infants and young children that undermined their nutrition status.

According to Bahaya traditions, caring for the family, including cooking and deciding what the family eats the year around, is considered a feminine responsibility. In the critiques’ view, frequent mothers’ absence from home to participate in ebyama activities and without adequate replacement arrangements, greatly contributed to low nutrition status recorded among Kagera residents [42]. Nevertheless, these findings are not unique to our study. Similar qualitative studies conducted among women living in poverty-stricken areas indicated they have poor child breastfeeding and feeding practices, have poor eating styles mainly choosing wrong foods during pregnancy that impact the mothers’ and their babies’ health [44]. In the developing countries, families in slums tend to engage female labor in cash-earning activities as a survival strategy; hence, a higher percentage of mothers stay at work affecting the feeding practices for infants and young children that become malnourished [45-49].

Post-research changes/observations

It is worth reporting that by the time of writing this paper the situation had changed in Kagera. Observations on fish markets in Bukoba Urban, Bukoba Rural and Muleba districts revealed that fish of legal size were abundant and affordable that residents attributed to the success of the government-engineered ‘Operation Sangara.’ However, it was not clear if the government had uplifted a ban on exporting fish outside the region for consumption or marketing by individuals and petty traders.

CONCLUSION

Indeed, qualitative findings from this study and similar studies conducted in other parts of Lake Victoria Basin extend our understanding of factors influencing low nutrition in the region beyond and above the biomedical model. Low nutrition levels recorded in the region and among Kagera residents in particular, could be attributed, but not limited to an interplay between experienced poverty indicated by okwelokola initiatives undertaken by Kagera residents and government interventions including coffee price and marketing controls, seasonal fishing bans and poorly managed illegal fishing ‘operations’. The implication is that interventions intended to improve Kagera residents’ nutrition status should take a holistic approach, going beyond the biomedical understanding of malnutrition and its causes to recognizing, incorporating and addressing other perceived factors inhabitants considered cardinal to this public health problem in their areas. Further qualitative and quantitative studies are recommended to ascertain the perceived linked factors presented and discussed in this paper.

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