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Social norms as influencers of type 2 diabetes risk-taking behaviours: a qualitative deep-dive diagnosis in two high-burden districts in Uganda

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ABSTRACT

Background Social norms are often implicit informal rules that most people accept and abide by, and can influence how people behave, sometimes based on perceived rewards and/or sanctions. Social norms are propelled by some reference or population groups who exert a considerable amount of influence on behaviour because people value their approval or disapproval. Despite these observations, little research exists on the influence of social norms on diabetes risk-taking behaviours. We explored diet-related social norms and their influence on risk-taking behaviours for type 2 diabetes (T2D).

Methods We conducted a multi-method qualitative study guided by the Social Norms Exploration Toolkit participatory tools. A total of 45 participants were interviewed for this study, including (10) T2D patients, (10) caregivers of T2D patients, (10) healthcare providers, (2) village health teams, (4) diabetes-free community members; (4) community influencers like cultural leaders and (5) family members. The study was conducted in eastern Uganda in the districts of Bugiri and Busia. Data were collected on health workers, caregivers, patients and community members using focus group discussions, in-depth interviews and non-participant observation. Data were manually analysed to identify emerging social norms and other information of interest following a thematic framework approach.

Results Most participants were aware that frequent consumption of fatty foods and sugary refined foods could increase one's risk of getting T2D. The study highlights three themes: general awareness of T2D risk factors, common social norms influencing dietary behaviours and behavioural risk factors that are influenced by the social norms. The study highlights significant behavioural and social drivers of T2D, which include consumption of high-fat, high-sugar diets, limited exercise and stress. Gendered and cultural norms strongly influence dietary behaviours, with women preparing unhealthy foods to meet societal expectations, fearing sanctions like divorce or community stigma, while men's dietary preferences were linked to respect and social status. Norms around staple food preferences and respect linked to weight further perpetuate T2D risk behaviours. Community influencers, family dynamics and cultural traditions reinforce these practices, underscoring the need for gender-transformative, culturally sensitive and community-centred interventions. However, healthcare providers and village health teams are critical for promoting healthier behaviours and reducing T2D prevalence.

Conclusion Our deep-dive social norms diagnosis has revealed that even when people know the risk factors for T2D, they will still follow the social norm influence regarding lifestyles. Inclusive strategies that actively engage and reshape norms are therefore vital to reduce the prevalence of T2D.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Focused on a high-risk, cross-border trading region.
⇒ Involved community beneficiaries in validating results.
⇒ Used various tools for a deeper understanding of dietary norms.
⇒ Did not measure the exact level of social norms' influence on diet.

INTRODUCTION

Type 2 diabetes (T2D) is increasingly contributing to the global burden of disease. Of all individuals with T2D worldwide, 80% live in low-income and middle-income countries (LMICs).[1] Among adults >18 years old, diabetes is projected to rise from an estimated 415 million (prevalence of 8.8%) in 2015 to 642 million (prevalence of 10.4%) by 2040.[2] The most dramatic change is expected to come from sub-Saharan Africa (SSA) from 14.2 million in 2015 to 34.2 million, an increase of more than 100%.[3]

Health systems in most parts of the world are struggling to diagnose and manage T2D effectively, especially in LMIC, and among disadvantaged populations in high-income countries.[1] At 46.5%, almost half of all individuals with diabetes globally are undiagnosed.[2] Compared with high-income regions

like Europe, where 39.3% are undiagnosed, about 66.7% of all individuals with diabetes in low-income countries in Africa are undiagnosed.[1] In SSA, 69% of people with T2DM aged 20–79 years are undiagnosed, significantly higher than the global figure of 50%. As such, most Africans with T2DM are diagnosed only after presenting with substantial health complications, resulting in loss of productivity, morbidity and mortality.[4] Findings from a systematic review show that the association between combined central obesity and T2DM was stronger for East Africans than for West was the only moderating effect observed. It is unclear why that relationship would differ by region, with the risk of developing T2DM being otherwise independent of age and urban/rural location in Africa.[5] In 2021, the prevalence of diabetes was estimated at 3.6% among adults in Uganda, equating to approximately 716 000 cases.[6] In Eastern Uganda, which includes Busia and Bugiri districts, the prevalence is notably higher. A study conducted in eastern Uganda, where Bugiri and Busia districts are located, reported a high prevalence of diabetes, standing at 7.4% among people older than 35 years.[7] High diabetes prevalence has also been reported by studies conducted in parts of western (9.0%) and central Uganda (8.1%).[8 9] This difference in prevalence underscores the complex interplay of contextual factors resulting in diabetes risk variance in different communities.

Faced with uncertainty regarding the right behavioural choices, individuals often rely on the guidance of prevailing social norms. Sociocultural norms significantly influence behaviours that increase the risk of T2DM. These are the perceived informal rules for acceptable and appropriate actions within a group or community.[10] Social norms are thought to shape behaviour by either providing a heuristic of the ideal, sanctioning choices or facilitating social identity.[11] In Busia and Bugiri, certain dietary practices and lifestyle choices are deeply rooted in tradition. For instance, norms such as 'people who don't prepare fried food are poor people' and 'taking tea without adding sugar is mistreatment to your husband' promote the consumption of unhealthy foods. Additionally, the perception that 'fat people, especially men, are respected in the community' may discourage weight management efforts. For there is a saying in traditional culture that bigger is beautiful. These social norms contribute to the rising incidence of T2DM by encouraging high-calorie diets, physical inactivity and other risk behaviours. High intake of traditional diets rich in carbohydrates, fats and refined sugar, coupled with sedentary lifestyles that majorly arise from social norms that do not prioritise healthy dietary habits and physical activity, significantly contribute to the increased risk of T2D.[12] Moreover, cultural beliefs and practices may hinder effective diabetes prevention and care, often leading to delays in seeking appropriate medical care.[13]

Addressing this escalating public health crisis underscores the need for tailored interventions that leverage and reshape prevailing social norms. Henceforth, community-led initiatives aimed at integrating local customs and values are necessary for promoting healthy dietary choices, increasing physical activity[14 15] and disseminating accurate information about diabetes prevention in rural communities. However, it is important to note that there is hardly any existing literature on the sociocultural dimensions of T2D patients. Hence, our study objective aimed at the need to explore the sociocultural perspectives that lead to the risk of T2D to prevent and influence policy and decision making. Furthermore, to assess how to prevent T2D, as it was on the increase within the general population. It was noted that there is evidence for effective interventions to improve management of diabetes and to reduce its modifiable risk factors, but there are significant gaps in the knowledge base. The WHO prioritised research agenda for prevention and control of non-communicable diseases outlines key areas of diabetes-related research. We therefore conducted a multi-method qualitative study guided by the Social Norms Exploration Toolkit (SNET) participatory tools, among T2D patients, their caregivers, healthcare providers, village health teams and reference groups identified, in order to explore the social norms around T2D risk factors around diet. Hence, the research questions for the study focused on understanding the socio norms that influence risk-taking behaviours for T2D.

METHODS

Study design

To address the specific objectives, the research project applied a qualitative participatory method to conduct the exploratory study on T2D. We needed to understand how people perceive what the risk factors are and how their norms influence their behaviour to be able to suggest behaviour change to prevent T2D. By employing a qualitative participatory method, the study gained deep insights into the local context, uncovering nuanced perceptions of risk factors and understanding how social norms drive behaviours. We therefore adapted the Passages social norms exploration (SNE) approach combined with Experienced Based Co-design (EBCD), which was reinforced by a multi-method qualitative inquiry method by way of focus group discussions (FGDs) and in-depth interviews (IDIs). The adoption of the Passages SNE tool, a validated framework, ensures methodological rigour while remaining adaptable to local cultural dynamics.[16] This tool provides a structured yet flexible approach, enabling the study to maintain reliability while addressing the unique needs of the target communities. By combining this framework with EBCD, the study captures both normative influences and experiential insights, offering a multi-dimensional understanding of behaviours.[17] The main tools used in the study were adopted from the Passages SNET, which was developed and tested in several countries including Uganda.[16] We followed its structured approach and tools detailed in figure 1.

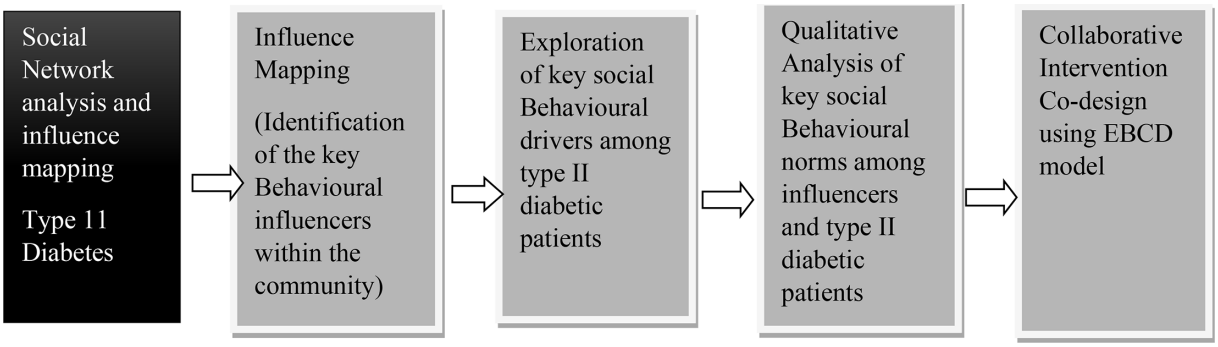

Figure 1 The social norms exploration process. EBCD, Experienced Based Co-design.

Study participants

We purposively sampled sites with high T2D cases based on HMIS reports from the high incidence districts of Busia and Bugiri. Six sites were selected in Busia district and six sites in Bugiri district. The study participants were purposively selected to have a mixed equivalent number by sex, having another pre-existing chronic health condition (like high blood pressure or obesity) and religion. As such, we conducted 12 FGDs with T2D patients (6 Busia and 6 Bugiri), 12 FGDs with diabetes-free community members (6 Busia and 6 Bugiri), 12 IDIs with community influencers (6 Busia and 6 Bugiri), 6 IDIs with healthcare providers (3 Busia and 3 Bugiri) and 6 IDIs with community development officers (3 Busia and 3 Bugiri) as shown in table 1.

The primary beneficiaries of this research are T2D patients. However, T2D care-givers and the health system stakeholders benefited from the study since the research aimed at designing interventions that promote health, co-design implementable solutions that address the sociocultural norms surrounding T2D, and generally promote quality of health which benefits the entire health system. The secondary beneficiaries comprise the families of the T2D patients since they directly benefit from the lives saved.

Data collection methods and SNE tools

The study adapted the SNET methods (my social network, influence mapping, vignettes, pocket chart, problem tree and 5 whys) in the data collection process. Data were collected qualitatively through FGDs and IDIs tools in online supplemental file. The data collection process was conducted by the research assistants with direct technical support from two senior researchers who have expertise in facilitating the social-norms exploration approach. The team clearly explained to the respondents the nature of the exploratory process before each step of the study. FGD and IDI guides were developed to guide data collection interviews. The tools of the SNE toolkit were explained to respondents during the data collection process. Male and female respondents were interviewed separately, as shown in table 2.

Table 1 Showing the facilities that were part of the study and the number of FDGs and IDIs involved

Study area	FDGs	IDIs
Nankoma Health Centre IV	1 FGD male patients 2 FGD female patients 2 FGD influencers	7 IDI patients 1 IDI health worker
Bugiri Hospital	1 FGD male patients 1 FGD female patients 1 FGD influencers	5 IDI health workers
Masafu Health Centre IV	2 FGD male patients 1 FGD influencers	3 IDI health workers 3 IDI community health workers
Lumino Health Centre III	1 FGD male patients 1 FGD female patients	2 IDI health workers 2 IDI community

FGDs, focus group discussions; IDIs, in-depth interviews.

Study procedure

The following is an elaboration of the data collection tools used during the focus group interviews.

My social network analysis

This tool was used to collect information from each of the sub-populations, allowing us to profile the behavioural social network and reference groups for the target sub-population. We were able to understand who the key players are, in relation to the risky behaviours around T2D. Because behaviour is highly affected by social interactions, we identified all the relevant reference groups.

Influence mapping

This tool was used to rank the key influencers per sub-population and gain a deeper understanding of who to target in designing interventions that address T2D risk factors. These key influencers helped in the sociocultural transformation of the social norms. The key community influencers were identified by the community members and the patients through the various interviews and FGDs.

Vignettes

The research team developed short stories about T2D and its risk factors in the context of the target sub-populations. This method allowed participants to think about T2D in the real world, and in community-centred ways that bring out underlying societal norms. We ensured that the stories are culturally appropriate and acceptable for the community and sub-populations by pretesting them on non-participants in the same community.

Table 2 An Exploratory to Intervention Co-design innovative study in two high incidence districts of Eastern Uganda showing the participants' social demographics

Health facility	Males	Females	Married	Not married	Widowed
Buhehe	7	7	14	0	0
Masafu	8	7	12	1	1
Nankoma	8	7	13	1	1
Bugiri Hospital	8	8	10	6	0
Lumino	8	7	12	3	0
Bugiri HC IV	7	7	13	1	0
Total					

Health facility	20–30	30–40	40–50	50–60	Primary	Secondary	Tertiary	No education
Buhehe	0	2	6	6	4	2	1	0
Masafu	2	9	2	1	9	5	1	0
Nankoma	0	0	11	3	11	0	0	2
Bugiri Hospital	0	0	0	5	5	4	0	6
Lumino	0	5	9	1	0	0	0	8
Bugiri HC IV	0	0	5	2	0	0	0	6

Problem tree analysis tool

The problem tree tool was used to understand the reasons why people stick to T2D risky behaviours and was helpful in giving the target population and influencers the opportunity to take part in problem analysis and identifying the deep-rooted causes. The research team was then able to identify normative influences based on the responses.

5 whys

Like the problem tree, this tool was used to help the research team focus much more deeply on the socio norms around the risky behaviours that were identified. The difference was that it went deeper to explore the 'below the water line' normative influences around T2D risk factors. It was very instrumental in bringing out the normative aspects of factors reported, thereby making it easy to identify which factors to rank on the pocket chart.

Pocket chart

The pocket chart tool was used to classify and rank emerging social norms by strength and was vital in the final stage of the exploration process. Participants were asked to vote on cards with key normative factors arising, that are related to T2D risk factors, to ascertain if they are just beliefs, attitudes, perceptions and/or if social norms, by what degree, frequency of mention and accompanying sanctions was the basis for the research team to determine whether it was a social norm or not.

Data management and analysis

Once the data collection process was completed, the research team reviewed, cleaned and transcribed all data. Transcripts were carefully examined and manually analysed to identify emerging social norms and relevant information. This manual approach was essential due to the inquiry's nature, as norms were not identified thematically but through deep immersion in the data. Researchers collaborated closely with participants, who validated the findings using SNET tools, ensuring their active involvement in the analysis process. The analysis focused on categorising data based on T2D risk factors. Interpretation served as an additional analytical layer, complemented by content analysis. Research analysts (JK and TO) applied qualitative reasoning and simulation to draw comparative conclusions for immediate use. To enhance clarity, qualitative data were counted by calculating code frequencies or the frequency of mentions for specific factors. These metrics were used to create visuals that highlighted patterns and the severity of each factor studied.

Patient and public involvement

Patients were selected from the hospital and health facility settings while the public were the community members and volunteer village health team members.

RESULTS

General awareness of T2D risk factors

The main behavioural risks that influence T2D reported were consuming processed and added sugar products, consuming high cholesterol fatty foods, routine alcoholism, smoking (traditional pipes and contemporary smoking), mental/psychosocial stress and lack of exercise. This study helped us to get deeper insights and identify the most prominent factor that accounts for high levels of T2D. This also shows what people know about the factors that are behind T2D. Analysis shows that dietary factors, that is, consuming processed/added sugar products and consuming high cholesterol fatty foods are responsible for T2D among most patients.

In the study context, gendered social norms mean that food preparation in homes is predominantly the role of wives/women. It was noted that although most wives/women understood that oily, high cholesterol and fatty foods increase the risk of acquiring T2D, they still went ahead and prepared such foods daily for their husbands because if they do not conform to this expectation, the sanction is that the husband may leave her and/or go to eat, stay at a co-wife's house "because the food is not tasty" (IDI-06-descriptive norm). Sometimes, it even insinuates gender-based violence like wife battering. Because oily/fried foods are perceived as savoury and tastier than non-oily foods, there is a pervasive social norm that making a man/husband eat unfried oily food is a form of mistreatment to him. To reduce T2D at the family and community level, these social normative influences should be addressed.

Common social norms influencing dietary behaviours

The most frequently mentioned dietary risk factors influencing T2D are consuming high cholesterol and/or fatty foods, and consuming processed drinks that contain high amounts of added sugars. Two social norms of "people who don't prepare fried, oily food are seen as poor people by community members" (FDG-01-injunctive norm) and "you must fry food in our community" (FGD-04-descriptive norm) are widespread and practiced at the family level across the local communities in Busia and Bugiri districts. Although wives know that eating fried and oily foods poses a health risk, they still prepare such food because they fear the negative sanction of being labelled as a poor home/family by other community members; thus conformity bias influences their action. Sanctions are a sign that social norms exist and are influencing an undesirable behaviour or practice. The result is the current widespread T2D among the people.

The results indicate the existence of social norms strongly linked with gender and power, and they fall under gender norms. Two such gender norms that emerged are "preparing tea without sufficient sugar is mistreatment to your husband" (IDI-04-injunctive norm) and "serving greens/vegetables is mistreatment to your man/husband … he can leave you for another woman" (IDI-10-injunctive norm). These gender norms bring to light how silent power dynamics at household level influence T2D-related risky feeding habits and the relationship between gender and health outcomes. While the need to maintain peace, retain husband approval and prevent violence (IPV, intimate partner violence) by wives at the family level is vital and important, it increases the vulnerability of women as wives and leads to long-term negative health outcomes. Additionally, marriage is normatively treasured by women, and they will not do anything that could affect their marriage for fear of stigmatisation, discrimination and their associated labels such as being called 'left-overs'. As such, they would rather prepare unhealthy food but retain their husbands. This suggests an urgent need for a family-level multi-sectoral approach in addressing health and gender issues that are evidently linked. It is challenging to change this social norm that helps in propelling T2D risk behaviour if interventions do not apply a gender-transformative programming lens.

The two descriptive social norms of "Bwita/kalo (traditional maize meal or 'posho') is our staple food, we have to eat it daily" (IDI-02-descriptive norm) and "A true Samia meal must contain meat or fish daily" (IDI-15-descriptive norm) show a linkage between culturally sensitive norms and T2D dietary risk factors. T2D has an interface between culture and nutrition, and this suggests a need to analyse cultural influences on food systems, particularly the effect of 'staple food syndrome/disorder' and T2D health outcomes among culturally attached/sensitive communities. Cultural institutions have a role to play in mitigating and/or eliminating T2D-related risk behaviours because people may conform to a norm for fear of sanctions or for their own self-interest. Convincing a community bonded by 'cultural food' to abandon or moderate the consumption of potentially T2D risky foods is an endeavour that may require working with cultural institutions and structures to change the mindset of their communities. Social norms that are related to staple-food syndrome are intergenerational, deeply rooted in culture and can be difficult to transform. Macro-level changes in food systems may be required as part of the norms transformation strategies.

Behavioural risk factors that are influenced by the social norms

The influence mapping exercise showed that the main reference groups through which T2D diet-related risk factors are entrenched are: female parents/wives, co-wives, children, husbands and traditional herbalists. Male parents use their influencing power and sanctioning capacity to determine what type of food is to be prepared and how it should be prepared. Wives/female parents who have the capacity to prepare healthy food are made vulnerable by the potential sanctions of preparing food that may not be preferred by their husbands. The sanctions range from violence to divorce or getting a co-wife.

Norms around respect and social status related to T2D risky behaviours also emerged. One such norm was; "fat people especially men are respected in the community" (FDG-03-descriptive norm). On the part of some wives, they have to make sure that their husbands are eating well (food that gives weight) to gain community respect. It is also linked to the desire to get approval from peers as being a good wife. One wife noted thus "… if you don't feed your husband well to gain weight, other women can laugh at you, because don't know how to cook and feed your husband …. why is he all bones …" (Female patient, Busia). Therefore, this social expectation amplifies women's (as wives) desire to disregard the risk of T2D with a preference to conform to social expectation.

These are non-conventional health stakeholders by their traditional or informal functions, and thus understanding them in relation to their influence on T2D risky

behaviours is very vital for programmes trying to address these risky behaviours and practices, but also promoting positive behaviours that help to address T2D. Thus, interventions targeting to address T2D need to adopt a multi-stakeholder, collaborative, family and community-centred approach to be effective.

DISCUSSION

The study emphasised the subtle social and behavioural interplay within the risk and management of T2D among the local communities in Busia and Bugiri districts of Uganda. The study highlights three themes: general awareness of T2D risk factors, common social norms influencing dietary behaviours and behavioural risk factors that are influenced by the social norms. This reveals how gendered, cultural and social norms drive unhealthy dietary behaviours that increase T2D risk across population groups in Busia and Bugiri districts. Consumption of red meat is directly related to T2D,[18 19] yet it is considered a staple by some communities. The results are congruent with the socioecological model of health that posits individual health behaviours as a function of several domains from the biological and environmental to policy.[20] The study also contributes to the fast-growing literature on social determinants of diabetes as well as health, focusing on assessing how numerous social factors at multiple levels, such as income, education, occupation, neighbourhood, food environment, healthcare, as well as social contexts, can affect diabetes risk and outcomes.[20] However, the research equally provides unique information on the cultural and situational nature of Ugandan contextual factors that can influence dietary practices, including polygamy, traditional herbalists and social norms for food preparation and consumption.

The study identified awareness of behavioural risk factors for T2D that are common in many populations, such as consuming processed and added sugar products, consuming high cholesterol and fatty foods, routine alcoholism, smoking, mental/psychosocial stress and lack of exercise. This is similar to a study conducted in Kanungu District, Uganda among T2D in patients aged 45–80 years that identifies alcoholism, smoking, body mass index (BMI), and family history as the most common risk factors.[21] In addition, another study on the epidemiology of T2D mellitus and treatment utilisation patterns in India reported similar risk factors of a sedentary lifestyle and a higher BMI. However, the study also reports on the non-working status as a higher risk factor for T2D.[22]

The risk behaviours are often influenced by the prevalent social and environmental factors in the communities.[23 24] Dietary habits were largely determined by the social norms and expectations of the community, especially among women and men in polygamous marriages. Women are expected to cook fried and oily foods for their husbands, who have the authority and power to decide what to eat. If women do not comply, they may face sanctions such as violence, divorce or abandonment. Similarly, men are expected to eat fried and oily foods to show their masculinity and affluence. Men/husbands will opt for foods that will give them weight so that the community with whom they interact gives them respect.[25] These norms and expectations create a barrier to adopting healthier dietary practices and prevent the participants from recognising the link between their food intake and T2D. This is true because men hold influence and decision-making on the choices of meals and dietary diversity.[26–28]

These gender norms bring to light how silent power dynamics at the household level influence T2D risky feeding habits and the relationship between gender and health outcomes.[29] While the need to maintain peace, retain husband approval and prevent violence by wives at the family level is vital, it increases the vulnerability of women as wives and leads to long-term negative health outcomes. In addition, marriage is treasured by women, and they will not do anything that could affect their marriage for fear of stigmatisation and discrimination as leftovers, thus they would rather prepare unhealthy food to retain their husbands.[30] Therefore, men/husbands will opt for foods that will enable them to rapidly gain weight so that the community with whom they interact gives them respect.[25] This suggests an urgent need for a family-level multi-sectoral approach in addressing health and gender issues that are linked. It is challenging to change this social norm that helps in propelling T2D risky behaviour if interventions do not apply a gender-transformative programming lens. Restrictive gender norms reinforce gender inequalities and negatively affect health outcomes.[31]

The study also found the complex and multifaceted role of social norms and reference groups in shaping the dietary behaviours of people with T2D in Uganda. The influence mapping exercise identified five main reference groups that affect the food choices and preparation methods of the participants: female parents/wives, co-wives, children, husbands and traditional herbalists. These reference groups exert various forms of pressure, persuasion and sanctioning on the participants, influencing their adherence to or deviation from the recommended diet for T2DM. The findings confirm the theoretical framework of social norm theory, which posits that social norms are acquired and learnt from cultural peers and parents, and that they can be changed by engaging the key influencers in the social network.[32] The study also supports the notion of gendered power dynamics in food systems,[30] which shows that male parents/husbands have more authority and control over the type and quality of food that is consumed in the household, while female parents/wives have more responsibility and burden for preparing and serving the food. The study further highlights the role of non-conventional health stakeholders, such as co-wives, children and traditional herbalists, who have

a significant influence on the dietary behaviours of the participants, either positively or negatively.

Study strengths and limitations

This is the first study in Uganda that has dived deep into the invisible issues and norms around T2D. In addition, the study was conducted in a cross-border trading region of the country where the incidence of T2D is very high, and results could be used to address this problem. Intended beneficiaries of this innovative social norms study were involved in validating the results, and thus research utilisation potential is high. In addition, this study used various SNE tools to collect data, providing a deeper understanding of the influence of social norms around T2D dietary risk factors. Our study, however, did not determine the level of influence of social norms on diet among T2D patients.

Implications for policy, practice and theory

Understanding social norms around T2D risk factors is very vital if this disease can be reduced and/or curbed. Beyond talking about the lifestyle factors, it is important to follow a deep exploration and diagnosis of social norms around the risky factors as a basis for designing community and family-centric behaviour change interventions that can continuously and sustainably reduce T2D. This approach may prove to be advantageous in resource-limited settings like Uganda and elsewhere. This study reveals how deeply ingrained gender roles and social pressures drive dietary risks for T2D, demonstrating that effective interventions must address household power dynamics rather than just individual patient choices.

CONCLUSIONS

T2D risk factors are known but have often been assessed and attempted to be addressed from the surface, which could explain the persistent rise in the incidence of T2D cases. A deeper social norms diagnosis has revealed that even when people know the dietary risk factors and behaviours of T2D and have a positive attitude towards healthy diet and lifestyle adjustment, they will still follow the social norm influence.

Addressing dietary factors that precipitate T2D requires family-centred and gender-sensitive approaches because most of the risks are related to the family power dynamics. When social norms conflict with attitudes and beliefs, people will always follow the norm because it is stronger and externally motivated than their personal beliefs. A woman may have a good attitude towards healthy feeding (greens, fish, vegetables—with a balance), but if the harmful social norm is that the healthy food is a punishment to the husband, she will follow the social norm (cook deep fried, high cholesterol or oily foods) to keep her husband, and not be condemned by the community. Single and barren women are greatly stigmatised and masculinised.

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Contributors JK, RWM, RK, JN, FXK and GN conceived and designed the study including designing study tools. JK is the guarantor of this study. RK, JN and RK over saw implementation of the study. JK, JKBM, AH, FXK, RK, JMW, TO, NLR and GN conducted the analysis and write-up. All authors read and approved the manuscript (after reviewing and refining).

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval This study involves human participants and was approved by Makerere University School of Health Sciences Research Ethics Committee; reference number #MAKSHSREC REF: 2020-59 and Uganda National Council of Science and Technology # HS1269ES. Additionally, administrative clearance was obtained from the office of The District Health Officers of Bugiri and Busia districts. Written informed consent was also obtained from each study participant prior to enrolment in the study. The data collected was stored on drives that were only accessed by the principal investigator and data manager. Participants gave informed consent to participate in the study before taking part.

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Data availability statement Data sharing not applicable as no datasets generated and/or analysed for this study. The data and materials used in this study are available on reasonable request.

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