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Abstract

Introduction: Diabetes Mellitus remains a major public health problem in Africa in the last two decades. A new conceptual framework for studying and understanding trajectories of experiences of people with diabetes mellitus in Africa is presented. Objective: The paper examines all known factors influencing the trajectories of lived experiences of persons with diabetes and how these factors interact with each other at micro and macro levels. Methods: A systematic mapping of peer reviewed literature (n=61) conducted in Africa and published between 01/01/1990 and 31/12/2020 was utilised. Results: Using a conceptual framework, we synthesised the factors influencing trajectories of lived experiences of diabetes in Africa, grouped into six domains: diabetes risk factors, socio-demographic characteristics, individual level experiences, household/family level experiences, community/society level experiences and national level experiences. Conclusion: This framework can be used to test hypotheses about facilitators and barriers to health care-seeking behaviour. As well as understand how trajectories of lived experience of diabetes might be influenced by policy or practice. Research based on understanding of trajectories is expected to improve diabetes patient’s experiences and outcome in diabetes management and care in Africa.

Keywords: People with diabetes, conceptual framework, systematic mapping, Africa
1. Introduction

Diabetes Mellitus remains a major public health problem in Africa in the last two decades [1,2]. By 2045, about 41.6 million people are estimated to be living with diabetes in Africa up from 15.9 compared to 15.9 million people in 2017 [3, 4]. In the Africa region, about 70% of people do not know they have diabetes as such the region has been classified as one with the highest percentage of undiagnosed people [3]. In terms of cause of mortality, in 2017, 312,000 people were reported to have died of diabetes in Africa [3]. The fast rise observed in the prevalence and burden of diabetes (especially type 2 diabetes) in the Africa region have been attributed to major changes in lifestyle and rapid urbanisation of cities [1,4,5].

Diabetes is a chronic condition with no specific cure that demands self-management regimen [3,6]. However, the success in the care and management of diabetes in Africa has to do with patients’ individual characteristics, beliefs and perception about the disease, support from patients’ family, community, health care system and health policies. Empirical evidence from the African setting suggest that people with living with diabetes experiences physical changes in their bodies [7-16], psychological [7,13,16-19, 21] and social changes to their identities [7,13,14, 17, 20, 21] after diagnosis. Again, medical adherence and non-adherence among diabetes patients also depends on their beliefs and lay representation of the illness [7-9, 14, 16, 20, 25,26], financial and social support from relatives and friends [15,18,20 - 24] , cost and type of treatment [7, 9, 11, 14, 16, 18, 20, 22, 24, 27- 29,30, 31] health system issues [16,18, 24, 28, 30] and health policies and programmes [25, 30]. Within the African region, people with diabetes experience multiple, intersecting dimensions in the process of treating and managing the disease [7,20]. Drawing together these body of literature of the ‘Lived Experiences’ of people living with diabetes in Africa is to inform effective policy formulation and assist in identifying salient knowledge gaps is a significant effort. There is a lack of synthesis of the known-time and context specific influences on trajectories of ‘lived experiences’ of people with diabetes within the African region. Previous, conceptual frameworks of diabetes experiences within the African context have only dealt with issue of medication adherence [32].
The conceptual framework we proposed considers all possible factors influencing the ‘lived experiences’ of people living with diabetes mellitus in Africa. In this paper, we define ‘lived experience’ trajectory as the processes and transitions occurring from the time of diagnosis of diabetes through to care and management of diabetes. The term ‘trajectory’ was used because it incorporates the concept of time and process which is critical for understating the care and management of diabetes. Diabetes is distinct from other morbidities since (i) It is chronic meaning once diagnosed, a person had to live with the diseases for the rest of his/her life, (ii) there is disruption in the normal way of life in terms of change in dietary patterns, (iii) diabetes management requires regular visit to the health centre and medication, (iv) diabetes leads to changes in the body, (v) diabetes leads to psychological issues such as frustration, stress, worries, guilt and anxiety.

The main health-related theory applied in understanding and explaining ‘lived experience’ of diabetes is the socio-ecological model. We argue that this theory has hardly been used to frame research on obtaining lived experiences on diabetes and the factors affecting the care and management of the illness also involves multiple levels. The socio-ecological models considered multiple levels (individual, community and structure) of influence on behaviour and reciprocal causation between behaviour and social environments, unlike determinant models that largely conceptualise healthcare decision-making and use an individual-level process.

2. Methods

An inductive method was used to build this conceptual framework: initial drafting was based on research by experts and practice knowledge, as well as consequent orderly evidence plotting of peer-reviewed literature. Thematic analysis of issues reported in the studies from Western, Eastern, Northern and Southern Africa (n=61) were used to develop this framework.

To ensure that the conceptual framework was comprehensively captured, a systematic evidence mapping of English-language peer-reviewed literature of all documents on “lived experiences” on diabetes mellitus was conducted. Evidence mapping is considered an evidence synthesis methodology that is a modification of the systematic review [33]; it is an orderly search of an extensive field that describes as broadly as possible all of the literature connecting to the subject
matter without limiting to studies that assess the strength or direction of relationships. It methodologically recognises and creates a map of the literature [34] and is progressively used in a range of social sciences [33]. Evidence mapping can be much more inclusive than a systematic review: our quality criteria were the studies should be published in a peer-reviewed journal and conducted in the Africa region. Also, we did not exclude studies that used multiple references based on the same sample were included. Because, data obtained from one study population might examine different issues of importance.

An electronic search was conducted (guided by PRISMA Flow Diagram) on relevant databases including PubMed, Scopus, ScienceDirect, EBSCO, MEDLINE and JSTOR. These electronic databases of peer-reviewed literature were search for studies conducted in Africa and published in English between January 1990 and December 2020. These databases were selected because of their biomedical and social sciences research coverage. Amalgamations of relevant search terms were developed and tested for sensitivity. The final combination of search terms using Boolean Operator were (lived experience* OR experience*) AND (Diabetes Mellitus* OR Diabetes*OR Gestational Diabetes* OR Type I diabetes OR Type 2 diabetes*). Fig 1 illustrates the process.

After duplicates were removed, all papers identified by the search were screened on their title and abstract to establish their inclusion. Papers were included if: conducted in Africa and published in full text in English in a peer-reviewed journal between January 1990 and December 2020, and the abstract included factors contributing to the lived experience of diabetes. All non-peer reviewed papers (research articles, comments, book review, letters) were not included. In circumstances where it was difficult to include or exclude papers based on their abstract or titles, the full text papers were screened. Papers were included if they were considered trajectories or influences on trajectories to the experiences of living with diabetes mellitus in Africa. Details of included articles are available (see Appendix A: Data extraction and review summary). A comparison was made between each full text article and the draft conceptual framework. Components that were identified not to be adequately captured by the draft conceptual framework were merged in ensuing iterations. These included an additional component “experiences of diabetes” such as lay knowledge and beliefs about diabetes, risk factors
associated with diabetes, cost of treatments and access to health care for diabetes management. All additions of concepts on diabetes to the conceptual framework were made as a team, based on our reading, expertise, and other discussions we had about the framework with experts during the development of the framework. We included 33 qualitative related studies, 26 quantitative studies and 2 mixed method (both quantitative and qualitative) on diabetes experiences in Africa. There were some limitations during our search methodology. Language, geography, and date limits meant that the inclusion of additional language or years might have yielded extra information; however, our search for articles provided evidence from all African geographic regions, including studies done in non-English language but published in English. By focusing on publications on diabetes mellitus over three decades, our framework truly reflects a comprehensive summary of the field of experiences of diabetes mellitus evidence. We searched six databases, selected for their range; extra databases might include other evidences. Our search only included diabetes-related terms (diabetes mellitus, type 1 diabetes, type 2 diabetes, gestational diabetes); our search will not have yielded papers that discuss other co-morbidities such as hypertension, stroke without making specific mentioned of diabetes. Our mapping method shows that the relative weight and rigour of evidence on the factors recognised remain unfamiliar. The final conceptual framework represents all aspects of trajectories of Lived Experiences of People with Diabetes Mellitus in Africa as evidenced by practice knowledge and in peer-reviewed articles.

3. Conceptual framework of trajectories of lived experiences of people living with diabetes mellitus in Africa

A conceptual framework is defined as a set of ideas, presented in a structured means to assist in understanding a phenomenon [35]. The conceptual framework (Fig. 2) represents “the subjects” to be studied [36] with respect to trajectories of lived experience of people living with diabetes mellitus. It creates influences shaping these trajectories, grouped into six main levels of experiences to highlight the micro and macro context of living with diabetes mellitus:
• Individual level experiences: comprising socio-demographic and economic characteristics of people living with diabetes, lay knowledge and beliefs about diabetes, changes in biological system, dietary and nutritional changes, and psychological changes

• Household/Family level experiences: involving support from household/family members and neglect of household family members towards people living with diabetes

• Community/Societal level experiences includes social support for people living with diabetes, community perception and definition of diabetes, stigmatisation, and diabetes patient’s participation in social activities

• Health system level experiences: involved health seeking behavioural/therapeutic experiences, health governance, policies and structures and health system challenges affecting people living with diabetes

• Risk factors associated with diabetes mellitus comprises heredity, presence of other comorbidities, body mass index, physical inactivity, smoking and alcohol consumption, consumption of fatty and sugary foods and ageing.

• Socio-demographic characteristics of people with diabetes include sex, age, educational attainment, marital status, occupational type, wealth index

To fully comprehend the trajectories of living with diabetes and its impact, authors situated it within the micro and macro-contexts; all six domains are interconnected. For instance, a male/female (demographic) because of heredity (diabetes risk factors) is diagnose of diabetes could start experiencing changes in the body such as general body weakness and pain (biographical disruption), reduce the consumption of high carbohydrate, salty, sugary and fatty food (dietary and nutritional changes). The person also goes through stress, anxiety, and depression (psychological changes) and this shapes the beliefs and knowledges about the disease. A diabetes patient also receives support/neglect from family/household members (household/family level experiences) and also support/neglect from the community or social environment (community/societal level experiences) and might influence their health seeking behaviour and care they receive from the health system (health system level experiences). The framework is applicable especially with the African region, capturing concepts that are pertinent across space and time. For readability, our conceptual framework comprises brief phrases or
simple words for each factor. This comprehensive visual overview is the contribution of our article to knowledge. To illustrate its relevance across settings, we expound the conceptual using illustrations in the following sections.

We begin with how experiences at the individual level is influenced by socio-demographic characteristics and risk factors influences their experiences at the individual, household/family, community, and health system levels when diagnosed with diabetes. Our evidence-based illustration of each factor is preceded by points that provides further instances.

4. **Diabetes Risk Factors**

The presence of some risk factors such as presence of comorbidities, heredity of diabetes body mass index (BMI), smoking and alcohol consumption, intake of fatty and sugary food and physical inactivity have been highly associated with people with diabetes in Africa [50,70-72]. Other risk factors identified in Africa include obesity and overweight, cigarette smoking [71], Ageing [50], and hypertension [72].

5. **Socio-demographic characteristics of persons with diabetes**

The demographic and social characteristics of persons with diabetes mellitus plays a critical role in there lived experiences with the disease from diagnosis through to its management of the disease. Studies reviewed clearly show that in Africa, diabetes is more prevalent among females [ 5, 10,12. 29, 37, 38] relative to males [39, 40]. Sex-related differences in lifestyles may contribute to being diagnosed with diabetes mellitus. For instance, in some African countries, obesity or overweight (risk factor) are reported more in women compared to men. This may explain the higher diabetes prevalence among women [41,42]. Physical inactivity and low socioeconomic status among women in Africa are associated with higher prevalence of diabetes mellitus [43,44]. The lowest age one was diagnosed with diabetes in the region is 20 years [13,45] and highest at 70 years [23,46]. However, the average age at which diabetes is more prevalent is 50 years [5,39,40]. The review of studies on diabetes in Africa reveal that it is more prevalent among the married [12,14,23, 47, 48] relative to the unmarried counterparts. These findings are
contrary to two basic hypotheses that explain the beneficial effect of marriage on health. The first hypothesis states that healthier individuals tend to get married and remains married. The second hypothesis matches with post-marriage effect: stress reduction and the adoption of healthy lifestyle [49]. Diabetes is most prevalent among educated individuals (secondary and tertiary levels) [38,39,48,50] than the uneducated in Africa. Higher education is often associated with higher income levels and unhealthy lifestyles and highly susceptible to diabetes mellitus [27-29]. High Prevalence of diabetes in Africa has been identified among people with sedentary work (involve mostly sitting or standing while working) compared to occupational types that involve being actively mobile [51]. High diabetes prevalence is also associated with people with high wealth index [50,52] in Africa relative to those in the low wealth index [10,12].

6. Individual Level Experiences of Diabetes Mellitus in Africa

The experiences of an individual after been diagnosed of diabetes are shaped by factors in their individual or intra-personal context. We consider in this section the multiple events that individuals may experience after been diagnosed with diabetes. The trajectory starts with the individuals becoming aware of their health status, discovering a disruption in biological make-up [7-9,11] changes in dietary and nutritional patterns [13,15,38,24,53] and changes in psychological thoughts [7,16,18,19,21] which are likely to shape the knowledge and beliefs about diabetes. These intrapersonal diabetes-related experiences of individuals may differ depending on their socio-demographic and economic characteristics. Thus, these trajectory of events may not be linear; for example, a woman diagnosed of diabetes might not experience any changes in her body such as weight loss, might not change her dietary patterns and will not express any emotional thought such as worry and anger. The concept of biographical disruption, dietary and nutritional changes, psychological changes and individual lay knowledge and beliefs about diabetes are addressed in the subsequent sections.

6.1 Biographical disruption

Bury’s [54] concept of biographical disruption refers to the disruption chronic illness causes to both the physical body and life trajectory of the sufferer and the meanings ascribed to such
disruption. Studies in Africa have revealed that people with diabetes lived with range of experiences with regards to their bodies from general body weakness and pain [7,10], dizziness [7,10,15], headaches [8,12], wounds [7, 14, 20] to visual impairment [7,12,14], sexual organ dysfunction (erectile problem, virginal itching) [7, 9,13], frequent urination [8-12,55] and fatigue [8,16,55,56]. It has been reported that diabetic patients often evaluate their health status based on the severity and duration of the disease’ disruption to their physical body. These individual experiences inform their illness actions to overcome these physical body disruptions to regain more stable and permanent strength and mobility. It is also argued that the severity of the disruption on the physical body may impact one’s social identity within their family, community and society depending on their social status [7]. This physical disruption has been reported to negatively impacts the personal agency of a diabetic patient’s illness experience at two levels: inability to work effectively and to perform social roles.

### 6.2 Dietary and Nutritional Changes

Changes in dietary and nutritional patterns of persons with diabetes is found in some studies in Africa. Some of these changes comprises high consumption of sugar-free food [9,38,53,55], reduced consumption of high carbohydrate, salty and fatty food intake [15, 53, 56], more consumption of vegetables [12, 15, 53], and consumption of natural fruits [30, 38,56]. These studies argued that persons with diabetes find it difficult to adjust to newly recommended dietary preference by dieticians. Because, they are used to the “normal” food they consume before being diagnose of diabetes. Diabetic patients are observed to consume more “home cooked’ foods with low or no sugary additives, consumes less or no prepared packaged foods, sweet-sweetened beverages and other processed foods. They also eat less of meat that have high concentration of fats, less of food that contain high carbohydrates and now put less salt in their food before they eat. Their soup and stew are now concentrated with more vegetables such as cabbage, carrots, cucumber, green leafy vegetables, and broccoli. Studies also revealed that persons with diabetes especially those with low socio-economic status find it challenging to consume these vegetables on daily and regular basis [57,58]. With regards to fruit consumption,
diabetic patients generally do not adhere to the recommended intake as prescribed by dieticians in Africa [59,60]. However, there are inconsistency with regards to the beliefs about the health effect of fruit consumption among persons with diabetes and their impact on blood sugar levels [7,38]. Dietary changes, intervention and adherence is an important factor in the management of diabetes mellitus in Africa because of its implications on the blood sugar and glycaemic control. However, the cost of purchasing these items on regular is a challenge preventing strict adherence to the recommended dietary patterns within the African context.

6.3 Psychological Changes

Being diagnosed of diabetes imposes a significant psychological and psychosocial burden on people with the disease. They undergo thought processes and express emotions on lifestyle and behavioural change considering their new health status. These psychological changes include stress, fear of death and infertility, depression (suicidal ideation), guilt, anxiety, worry, anger, frustration, and confusion [16,18,21]. Studies have indicated that adverse emotional and psychosocial experiences of people living with diabetes significantly contribute to burden of the disease, physical deterioration, and mortality rates in Africa [21,61]. Other studies argued that in the care and management of diabetes, psychosocial issues are often neglected by health professionals notwithstanding the fact that the emotional experiences and challenges of people with diabetes appear to be overwhelming for them [18, 21]. Psychosocial therapy is of importance in the care and management process for diabetic persons.

6.4 Lay knowledge and beliefs about diabetes

The lay knowledge and beliefs about diabetes are dependent on a diabetic individual’s level of experience in Africa. Studies on lay knowledge and beliefs about diabetes in Africa have revealed that people with diabetes often refers to the disease as ‘sugar disease’ [7,8] thus its causes are linked to the high consumption of sugary foods and drinks. Others also believe diabetes is a ‘disease of the rich/wealthy’ [7] and intrinsically associated it with the kind of food (sugary and fatty) consumed by high income earners. Across the Africa region diabetic patients also ascribe supernatural and superstitious reasons to the diseases. They believe that diabetes is caused by witchcraft [9,16,30] and punishment from God or deities because of an offence [24,53]. Heredity
is also ascribed to the causes of the diabetes among studies done in Africa. Persons with the
disease usually had knowledge about their family history of diabetes and this shaped their belief
system of getting the disease at a particular age. This is because, per observation other family
members had the disease at a particular age. Thus, they perceive that, irrespective of their
lifestyle and behaviours, they will surely have the disease when they reach that particular age [7,
9,53]. It is also documented in the African literature on diabetes that, the sources of knowledge
through biomedical, ethnomedical and spiritual practitioners shape the knowledge and beliefs
systems surrounding diabetes and influence the health seeking behaviour for diabetes
managements among persons with the disease in Africa [27,29, 30].

7. Household/Family Level Experiences

This framework describes the household/family level experiences of diabetic persons in Africa. It illustrates how the intra-personal experiences of diabetes patients affect the inter-personal
experiences with other members within the household or family. These interactions had
implication for care and management of diabetes. Literature on diabetes especially among older
population in Africa has revealed that, primary caregivers and other household/family members
play significant role in the care and management of diabetes [22, 29,62]. Therefore, the lived
experiences of persons with diabetes and their significant others is crucial in the management of
the disease.

7.1 Household/family members Support

Experience associated diabetes mellitus especially among the aged requires some active support
such as involvement of partners, children, caregivers, and other family members in its
management. Studies on family support for persons with diabetes in Africa found that household
members provide various forms of assistance to diabetic patients [21,63-65]. These are
acquisition of medicines, accompanying patients to health facilities, ensuring medical and dietary
adherence, financial support, encouragement, and other forms of emotional support. Strong
family support has been found to be a predictor of good quality of life among diabetes patients
[65]. Family members usually eat the same healthy food that diabetes patient eat to identify and
sympathize with them, laugh and walk with them. These forms of support have been observed to reduce the psychological burden of the disease [65].

7.2 Household/family members Neglect

Living with diabetes can be a challenging experience not only to the patients but the entire family/household members. Studies on diabetes in Africa has indicated that people living with diabetes, their primary caregivers and other household members face day-to-day challenges with regards to dietary adherence, stress, medical adherence, drug purchase and other self-management practices [13,16, 66]. There are disagreements often between diabetes patients and their family members when managing the disease. This may lead to total or partial neglect from family members. Studies have indicated that family members sometimes offer no financial or emotional support, such as complains about and teases people with diabetes [13, 16,17]. Family members who also serves as caregivers in the long run neglect persons with diabetes because of the burden of care and cost associated with it. Some cost details include disruption in family members domestic routine and social activities, huge financial spending, and loss of productive hours.

8. Community/Societal Level Experiences

Community/societal perception of persons with diabetes disrupts their social identity. Thus, the social/community knowledge of diabetes such as the causes, symptoms and consequences of the disease determine the care and management of diabetes in Africa. Most African societies are generally communal in nature and studies have showed that persons with diabetes go through negative societal experiences such as stigmatisation, social isolation, inability to participate in social activities, negative social judgement, loss of friends and acquaintances [13,21,67]. Other studies on the other hand found that diabetes patients experience positive societal outcome such as social support, financial supports from friends, working colleagues, advice and motivation from peers and health professional [18, 22].
9. **Health System Level Experiences**

Living with diabetes involves a regular contact with the health care system in the management of the disease. Within this framework, the health system level experiences of diabetic patients are categorised into three namely (i) Health seeking behaviour (ii) Health governance, policies, and structures (iii) Health system challenges

9.1 **Health seeking behaviour**

Studies on diabetes care and management in Africa documented three major means through which persons with diabetes seek care and manage the diseases. These are biomedical therapeutic, ethnomedical (herbal) therapeutic and faith/spiritual therapeutic experiences [10, 11, 15, 22, 27, 29, 53]. Studies further reported that while some adopt a pluralistic approach of combing the use of biomedical, ethnomedical and spiritual treatment for diabetes [11, 27], others only use one form of therapy for managing the disease [29, 53].

9.1.1 **Biomedical therapeutic experiences**

Biomedical treatment sources serve as the first point of call to persons with diabetes. It starts from diagnosis of the disease to medical education and counselling by health professionals on living with the disease to routine medicine in-take. Studies on biomedical treatment of diabetes in Africa indicates that many diabetes patients must take medication for the rest of their lives. This is to improve their insulin uptake to avoid the emergence of complications and sudden death [11, 27, 30, 67, 68]. However, non-adherence to medication is endemic among diabetes patients in Africa [29, 53, 67]. The knowledge diabetes patients have on the disease were drawn through direct interaction with biomedical professionals, reading biomedical books and experiencing biomedical treatment and its efficacy of its medicines. Biomedical treatment is considered by many diabetes patients in Africa very expensive considering the cost of medication and payment of other hospital bills on a regular basis. This offers an explanation to the concept of “non-adherence” to biomedical drug intake and seeking other alternative sources (herbal and spiritual) of treatment to complement the biomedical drugs [27, 30, 67, 68].
9.1.2 Ethnomedical therapeutic experiences

Research in the African region suggest that medical pluralism is pervasive and an essential component of non-communicable disease experiences [29, 27, 53, 68] and there is evidence of persons with diabetes accessing pluralistic medical care [27, 67, 68]. Persons with diabetes often use ethnomedicines as a complement to biomedicines or as a complete replacement of biomedicine. Studies provided some plausible explanations for the use of ethnomedical therapy that both herbal and pharmaceutical drugs had similar plants origins, and in effect ethnomedical drugs has the same efficacy in controlling diabetes [67]. Another explanation is that ethnomedical drugs are relatively less expensive and affordable than pharmaceutical drugs [22, 67]. The failed expectations of the rapid efficacy of biomedical drugs to control diabetes give many persons with diabetes to opt for herbal medicines. The motivation for the use of herbal medicine is based on the testament of earlier users, perceived potency, and ability to cure diabetes [25].

9.1.3 Faith healing/spiritual diabetes therapeutic experience

Studies on diabetes management and care in Africa highlighted the important role of religion and faith in God [20, 53, 68]. These studies have suggested that the lay knowledge and perception of causes of diabetes as witchcraft and punishment from God by persons with diabetes in Africa, influence their faith and belief in God for diabetes treatment and cure through prayers. While some diabetes patients combine biomedical therapy with spiritual therapy [67], others solely depend on faith healing therapy [20].

10. Health governance, polices, structures and Health system challenges

Cost of diabetes treatment and care at health facilities, subsidies on medication and insurance cover, communication between health provider and diabetes patients, regulation of ethnomedical practitioners and access to health care facilities for diabetes management play important role in the lived experiences of persons with diabetes in Africa. Studies on diabetes in Africa has revealed high cost of biomedical drugs (insulin)[7], absence of health insurance cover of diabetes care [14, 24, 29], inability of diabetes patients to afford consultation fees and laboratory services, high cost of transportation to nearby health facilities [11] are health system
challenges persons with diabetes experiences. Other health care system challenges identified in the literature were the unavailability and shortage in supply of diabetes medication in remote health facilities [15, 24] and delay (long waiting hours) in treatment of diabetes at health facility, inability to afford diabetes monitoring devices (glucometer and glucose strips) [11,14-16]. Literature on structural health challenges of diabetes care in Africa found misdiagnosis of diabetes, poor/negative attitude of health care providers [18, 24, 63] and side-effects of antidiabetic medication [10,23, 25, 27, 56, 69] as major bottlenecks persons with diabetes experience in seeking care.

11. Conclusions

We present a conceptual framework of trajectories of lived experience of people living with diabetes mellitus in Africa (Fig. 2). This integrative framework helps develop understandings of diabetes related care trajectories and lived experiences of living with diabetes in a way that identifies distinct components while at the same time representing the integration of components operating at individual, household, community and national levels. Previous studies on trajectories of lived experience with diabetes has tended to focus on specific aspects of trajectories. In assembling for the first time, all identified explanatory factors that influence the trajectory of lived experience of persons with diabetes in Africa. Our framework can be used to test theories and generate hypotheses relevant to understanding diabetes care and management in Africa.

Our inductive approach to framework construction developed a conceptual framework from evidence. The conceptual framework builds on features of other models of health seeking behaviour. The six domains- diabetes risk factors, socio-demographic characteristics, individual level experiences, household/family level experiences, community/societal level experiences and health system level experiences have features like a socio-ecological model. However, our conceptual framework differs from the simple socio-ecological model for a reason that our framework additionally incorporates risk factors that are specific to diabetes experience. The start of diabetes trajectory begins with the presence of risk factors of the individual.
Our framework is built on systematic literature mapping. The systematic approach used is sufficiently robust and comprehensive to assert that the framework includes the known universal factors affecting the trajectories of lived experience of persons with diabetes in Africa. This framework could be modified to reflect future empirical and theoretical evidence generation.

Our conceptual framework marks an important step in how researchers might conceptualise and understand trajectories to diabetes experiences. By specifying and connecting influences, this framework can be used to inform the design of research and conduct analyses across contexts, methodologies, and epistemologies. Each component of our conceptual framework can be studied separately; and by considering the means through which each component may be affected by other components, to fully understand the trajectories of lived experiences of persons with diabetes mellitus in Africa. This framework situates the trajectory of diabetes experience highlighting the important role played by diabetes risk factors, and how that interacts with socio-demographic characteristics of individuals, to individual, household, community and national level of experiences of people with diabetes in an attempt to manage diabetes in Africa. This suggests testable hypotheses about how trajectories of lived experience of diabetes might be influenced by policy or practice.

This conceptual framework can be used to assess how, why and with what consequences, trajectories of lived experience of persons with diabetes are shaped. Every component of the framework allows for hypotheses testing about how trajectories of diabetes experiences might be impacted by changes to, for example the health system, policy environment or individual behaviour. Such interventions have the potential to affect diabetes-related mortality outcomes.
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Declaration of interest
None.

Contributions
DK drafted the initial manuscript. RA and DK discussed the study and decided on the search strategy and wrote the methodology. DK, RA, SOA, MAD and PTD reviewed the manuscript. All authors have approved the final manuscript before publication

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Figure: 1 Systematic evidence mapping process (PRISMA 2009 Flow Diagram)

Identification
- Records identified through database searching (n = 1,610)
- Additional records identified through other sources (n = 108)

Screening
- Records after duplicates removed (n = 308)

Eligibility
- Records screened (n = 157)
- Records excluded (n = 151)
- Full-text articles assessed for eligibility (n = 61)
- Full-text articles excluded, with reasons (n = 96)

Included
- Studies included in qualitative synthesis (n = 33)
- Studies included in quantitative synthesis (meta-analysis) (n = 26)
- Studied included in both quantitative and qualitative synthesis (n = 2)
Figure 2: A conceptual framework for understanding trajectories of lived experience of people living with diabetes mellitus in Africa

### Diabetes Risk Factors
- Presence of comorbidities
- Heredity
- Body Mass Index
- Smoking and Alcohol consumption
- Intake of Fatty and Sugary food
- Physical Inactivity

### Socio-Demographic Factors
- Sex
- Age
- Marital status
- Educational attainment
- Occupational type
- Wealth Index

### Individual Level Experiences

#### Biological Disruption
- General body weakness & pain
- Dizziness
- Headaches
- Wounds/sores
- Visual Impairment
- Sexual organ dysfunction
- Frequent urination
- Fatigue

#### Dietary and Nutritional Changes
- Consumption of sugar-free food
- Reduced consumption of high carbohydrate, salty and fatty food
- Consumption of more vegetables
- Consumption of natural fruits

#### Psychological Changes
- Fear (of death, infertility)
- Depression (suicidal thoughts)
- Guilt & Anxiety
- Stress

#### Lay knowledge and beliefs about diabetes
- Sugar disease
- Caused by witchcraft
- Punishment from God
- Incurable
- Heredity

### Household/Family Level Experiences

#### Household/family members Support
- Acquisition of medicines
- Accompanying patients to clinics
- Dietary adherence
- Financial support
- Encouragement/Motivation

#### Household/family members Neglect
- Teasing
- Complains
- No support

### Community/Societal Level Experiences

### Health System Level Experiences

#### Health seeking behaviour
- Biomedical diabetes therapy experiences
- Ethnomedical/herbal diabetes therapy experiences
- Faith healing/spiritual diabetes therapy experience

#### Health governance, polices and structures
- Cost of treatment and care at health facilities
- Subsidies on medication and insurance cover
- Communication between health provider and diabetes patients
- Regulation of Ethnomedical/herbal practitioners
- Regulation of biomedical and ethnomedical diabetes medication
- Access to health care facilities for diabetes management

#### Health system challenges
- Attitude of health providers
- Side Effects of medication
- Supply for and Demand of medication
- Delays in seeking diabetes care

### Lived Experiences of Diabetes Mellitus

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### Supplementary File: Appendix A

<table>
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<th>Author(s)</th>
<th>Year of Publication</th>
<th>Title</th>
<th>Method</th>
<th>Country of study</th>
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<td>Akanji et al.,</td>
<td>1996</td>
<td>Clinical Experience with Adolescent Diabetes in a Nigerian Teaching Hospital</td>
<td>Quantitative (follow-up)</td>
<td>Nigeria</td>
<td>Journal of the National Medical Association/Elsevier</td>
<td><strong>Socio-demographic:</strong>&lt;br&gt;a. Higher proportion of adolescent female diabetes patients (63.3%) relative to adolescent male (36.7%)&lt;br&gt;b. Average age of adolescent diabetes patients was 17.8±2.3 yrs (range 10 to 20 years)&lt;br&gt;c. 17% of adolescent living with diabetes had a positive first degree family history of diabetes&lt;br&gt;<strong>Psycho-social, economic challenges faced by Adolescent diabetic patients</strong>&lt;br&gt;a. Inability (parents) to afford medications&lt;br&gt;b. Withdrawal from school/trade due to frequent illness&lt;br&gt;c. Neglect by parents and other family members</td>
</tr>
<tr>
<td>Aikins</td>
<td>2002</td>
<td>Exploring Biomedical and Ethnomedical Representations of Diabetes in Ghana and the Scope for Cross-</td>
<td>Qualitative</td>
<td>Ghana</td>
<td>Publications: Social Science Information/SAGE</td>
<td><strong>Sources of knowledge (Biomedical practitioners)</strong>&lt;br&gt;a. Fat and sugar-rich diet&lt;br&gt;b. Sedentary lifestyles&lt;br&gt;c. Basic training</td>
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<tr>
<td>Biomedical treatment process &amp; goals</td>
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<td>Sources of knowledge (Ethnomedical practitioners)</td>
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<tr>
<td>a. High level of sugar in the blood</td>
<td>b. Sugar-rich diet</td>
<td>c. Lifestyle</td>
<td>d. Heredity</td>
<td>e. Malfunction pancreas</td>
<td>f. Basic ethnomedical training</td>
<td>g. Local and continental conferences and workshops</td>
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<td>Ethnomedical treatment process &amp; goals</td>
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</tr>
<tr>
<td>a. Taking down patients’ histories and observing symptoms</td>
<td>b. Confirms the diabetes status from hospital records</td>
<td>c. The goal to provide a cure</td>
<td>d. Herbal drug treatment</td>
<td>e. Diet restrictions</td>
<td>f. Confirmation of cure evident through absence of physical symptoms such as tiredness, frequent urination and weight loss</td>
<td></td>
</tr>
</tbody>
</table>
g. Late diagnosis of condition negatively affects the ability of ethnomedicine to cure

**Challenges of biomedical health system**

a. Poor geographic access to biomedical services especially in rural settings
b. Cumbersome hierarchical structures of the biomedical health system
c. Frequent use of scientific and technical language in explaining diabetes and its management process
d. High cost biomedical treatment
e. Lack of institutionalised economic support (subsidised/health insurance cover) for diabetes patients
f. Problematic side-effects led to discontinuation of biomedical drugs treatment

**Challenges of ethnomedical health system**

a. Ethnomedical practitioners lacked objectivity in their treatment processes
b. The medication prescription are often largely based on their beliefs devoid of their clear knowledge of their efficacy and possible side effect.
c. Inability of practitioners to learn from their mistake and acknowledge lacking expertise in areas of diabetes treatment

**Biomedical perspectives on improving diabetes care**

a. More diabetes centres
b. Mandatory diabetes testing
### Ethnomedical perspectives on improving diabetes care

<table>
<thead>
<tr>
<th>Aikins</th>
<th>2003</th>
<th>Living with Diabetes in Rural and Urban Ghana: A Critical Social Psychological Examination of illness Actions and Scope for Intervention</th>
<th>Qualitative</th>
<th>Ghana</th>
<th>SAGE Publications: Journal of Health Psychology</th>
<th>Lay representation (knowledge) and perception &amp; beliefs about the disease</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>a. Diabetes referred to as ‘sugar disease’</td>
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<td></td>
<td>b. Associated with high sugar diets</td>
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<td>c. Diabetes referred to as disease of the rich/wealthy (sugary and fatty foods were the preserved of the rich/high income group)</td>
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<td>d. Heredity (Family history of diabetes)</td>
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<td></td>
<td>e. Diabetes caused by pancreas malfunctioning</td>
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<td>f. Insulin irregularities</td>
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<td>g. Belief the diabetes is curable</td>
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</tbody>
</table>

c. Free diabetes care
d. Longer consultation times to facilitate better doctor-patient relationships
e. Focus on general public education about diabetes
f. Improved quality of communication and information provided during patient consultations.
g. Standardisation of ethnomedical/herbal drug
h. Educating ethnomedical/herbal practitioners on diabetes symptoms recognition, dealing with complications and referring diabetes patients to biomedical practitioners
h. Diabetes associated with poor quality food due to dangerous farming methods
i. Diabetes referred to as ‘mysterious illnesses with it roots from the supernatural realm

**Biological Disruption**
- General weakness
- Dizziness
- Headaches
- Wounds
- Visual impairment
- Sexual dysfunction

**Comorbidities (Living with diabetes and other chronic conditions)**
- Hypertension
- Asthma
- Gout
- Prostate cancer

**Disruption of social identity**
- Effect of weight loss on community/social perception of diabetes patients (stigmatisation)
- Social perceptions of diabetes and other chronic illnesses as punishment from evil forces
- Visible changes in body image
- Inability to engage with social roles because of disruption to mobility.
- Inability to carry out physical daily routine activities

**Cost of treatment, care and management**
- High cost of biomedical drugs
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Country</th>
<th>Journal/Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beran et al.,</td>
<td>2005</td>
<td>Access to Care for Patients with Insulin- Requiring Diabetes in Developing Countries</td>
<td>Qualitative</td>
<td>Mozambique &amp; Zambia</td>
<td>Diabetes Care</td>
</tr>
</tbody>
</table>

**Changes in nutrition and diet**

- **a.** Adopted

**Diabetes Prevalence**

- **a.** In Zambia, the prevalence of diabetes was 12.0 per 100,000 population
- **b.** In Mozambique, the prevalence of diabetes was 3.5 per 100,000 population

**Health system (issues)**

- **a.** Existence of both short acting insulin (Actrapid) and prolonged acting insulin (Insulatard) in the hospitals
- **b.** In some health facilities (especially in remote areas), there is lack of familiarity and lack of tools for proper diagnosis

**Cost of treatment, care, and management**

- **a.** Cost of insulin purchased by both national health systems was between $4.30-$4.60 in Zambia
- **b.** Cost of insulin purchased through local private wholesaler was between $5.47-$9.91
- **c.** Average cost to a diabetes patient $ 1.13 (Mozambique) and $2.00 (Zambia)
- **d.** Diabetes patients in Zambia paid from $ 0.15 to $ 1.50 per syringe
<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Title</th>
<th>Study Design</th>
<th>Location</th>
<th>Journal/Platform</th>
<th>Findings</th>
<th>Lay representation (knowledge) and perception &amp; Beliefs about the disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiawi et al.,</td>
<td>2006</td>
<td>Knowledge, attitudes and behaviour relating to diabetes and its main risk factors among urban residents in Cameroon</td>
<td>Qualitative</td>
<td>Cameroon</td>
<td>Ethnicity &amp; Disease/ResearchGate</td>
<td></td>
<td>a. Hereditary</td>
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<tr>
<td></td>
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<td>b. High consumption of sugar and sugar-related products</td>
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<td>c. Diabetes can be transmitted sexually</td>
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<td>d. Diabetes referred to as ‘sugar disease’</td>
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<td>e. Drinking local soft drinks perceived causative agent of diabetes</td>
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<td>f. Belief that diabetes can be cured by ethnomedical therapy</td>
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<td>g. Belief that threat to health posed by diabetes</td>
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<td>h. Belief that diabetes can be neutralised by drinking very bitter herbal liquids</td>
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<td>i. Belief that diabetes patients should take honey in place of sugar</td>
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<td>j. Belief that diabetes has no relationship between obesity, physical inactivity, poor diabetes and diabetes</td>
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<tr>
<td>Awadalla et al., 2006</td>
<td>Diabetes Mellitus Patients' Family Caregivers' Subjective Quality of Life</td>
<td>Quantitative</td>
<td>Sudan</td>
<td>Journal of the National Medical Association</td>
<td>k. Belief that the ideal place to seek diabetes treatment is hospital (biomedical therapy)</td>
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</tbody>
</table>
| **Biological Disruption** | | | | | a. Frequent urination  
b. Thirst  
c. Headache  
d. Fatigue  
e. Malaise |
| Awah et al., 2008 | Cure or control: complying with biomedical regime of diabetes in Cameroon | Qualitative | Cameroon | BMC Health Services Research/BioMed | **Findings** | a. Social support from family members and caregivers of people living with diabetes  
b. |
| Aikins 2007 | Ghana’s neglected chronic disease epidemic: a developmental challenge | Systematic Review | Ghana | Ghana Medical Journal | **Socio-demographic:** | a. Diabetes prevalent among people 65 years and above  
b. More prevalent among male relative to females  
c. Are mostly married |
| **Health seeking behaviours (Biomedical & Ethnomedical)** |  | | | | d. Simultaneous use of biomedical and ethnomedical therapy will produce efficacy  
e. Preference of ethnomedical therapy over biomedical due to perceived efficacy  
f. Failure of biomedical therapy to ‘cure’ diabetes  
g. Ethnomedical practitioners often ascribed diabetes to misfortune, witchcraft, punishment from God/evil spirit  
h. Ethnomedical (herbal) used as complement the biomedical therapy |
<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Location</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motala et al.,</td>
<td>2008</td>
<td>Diabetes and Other Disorders in a Rural South Africa Community: Prevalence and associated risk factors</td>
<td>Quantitative-cross sectional survey</td>
<td>South Africa</td>
<td>Diabetes Care</td>
</tr>
<tr>
<td>Hjelm &amp; Nambozi</td>
<td>2008</td>
<td>Belief about health and illness: a comparison between Ugandan men and women living with Diabetes Mellitus</td>
<td>Qualitative-semi-structured interview</td>
<td>Uganda</td>
<td>International Nursing Review</td>
</tr>
</tbody>
</table>

**Cost of treatment, care and management**
- a. High cost of biomedical medicine
- b. Inability to purchase drugs
- c. Absence of health insurance to cover cost of diabetes care and treatment
- d. Highly dependent on children, friends, family members for financial support which sometimes are not forth coming

**Socio-demographic**
- a. Diabetes prevalent among people age 55-64 yrs
- b. Diabetes prevalent in females relative to males

**Risk Factors of Diabetes**
- a. Family history of diabetes
- b. History of Alcohol ingestion
- c. Systolic blood pressure
- d. Obese/Overweight

**Lay representation (knowledge) and perception & Beliefs about the disease**
- a. Frequent urination
- b. Coldness
- c. Feeling thirsty
- d. Drinking a lot of water
- e. Feeling hunger
- f. Lost of appetite
- g. Diabetes caused by witchcraft, punishment from God, heredity, increased weight (obesity), improper diet, disease of pancreas

**Biological Disruption**
- a. Weakness
- b. Sexual dysfunction (weak male organ)
- c. Urinary infection
- d. Gastrointestinal infection
- e. Burning sensation in the foot
- f. Spasm in the calf
### Impaired glycaemic control

**Cost of treatment, care and management**
- Huge financial cost on drug and food
- High cost of SMBG machine ($30)

**Self-care and management practices**
- Regular medical check-ups
- Care for your feet (daily cleaning of your feet, avoid walking barefoot)
- Avoid any form of injury
- Avoid overdose of medication
- Regular physical exercise

**Changes in nutrition and diet**
- Consumption of sugar-free food
- Reduced consumption of high carbohydrate and fatty food

---

**Kolling et al., 2010**

| Insight from Tanzania on diabetes health-seeking and medical pluralism among Dar es Salaam’s urban poor |
|---|---|---|---|
| Qualitative-Ethnography | Tanzania | Globalization and Health |
| “For someone who’s rich, it’s not a problem”. | Health seeking Behaviour (Biomedical-structural issues) |
| a. Increase in patients across diabetes clinic |
| b. Concentration of diabetes clinics in urban areas |
| c. Shortage of qualified personnel |
| d. Low quality of services given to diabetes patients |
| e. Nationwide shortage of insulin |
| f. High cost of insulin at private pharmacy |
| g. Shortage of insulin and oral medication in health facilities |
| h. Unsustainability of biomedical treatment due to its cost |
| i. Emergence of Ethnomedical health (herbal) clinics |
| j. | Herbal treatment serving as complement and alternative to biomedical treatment |
| k. | Simultaneous use of herbal and biomedical medicines |

**Family & Social Support/Networks**

a. Provision of care and treatment by family members through
   1. Acquisition of medicines
   2. Accompanying diabetes patients to health care centres
   3. Diet adherence
   4. Financial support from friends, work colleagues

**Ethnomedical/herbal treatment**

(reasons for use)

a. Less expensive relative to biomedical
b. Perceived ability to cure diabetes
c. Highly recommended by ‘significant’ others
d. Temporal relieve and easing of diabetes symptoms

<table>
<thead>
<tr>
<th>Akins et al., 2010</th>
<th>Developing effective chronic disease interventions in Africa: insights from Ghana and Cameroon</th>
<th>Systematic Review: Case studies</th>
<th>Ghana &amp; Cameroon</th>
<th>Globalization and Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Poor patient knowledge on diabetes</td>
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<td>2. Diabetes attributed to spiritual causes</td>
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<td>3. Sources of knowledge on diabetes</td>
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<tr>
<td>a. Social (friends &amp; families)</td>
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<tr>
<td>b. Cultural (traditional handed-down knowledge)</td>
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<td>c. Cross-cultural (regional &amp; international travels)</td>
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<td>d. Institutions (health professionals, mass media)</td>
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<td>e. Self (unique experiences of self in health and disease)</td>
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</tbody>
</table>
| 4. Multiple health seeking behaviour  
   a. Biomedical  
   b. Ethnomedical  
   c. Faith healing system  
   d. Medical inaction  
  5. Risk Factors  
   a. Smoking (high among men)  
   b. Alcohol intake (high among men)  
   c. Physical inactivity (high among urban dwellers)  
   d. Insufficient fruits and vegetables intake  
   e. Obesity & Overweight (high among women)  
  6. Policy & Programme Response  
   a. Attempted establishment of NCD Control Programme in 1970s  
   b. Establishment of another NCDCP in 1992 (advocacy and training, workshops on NCD)  
   c. Implementation of NHIS to cover medications on diabetes  
   d. Establishment of the Regenerative Health and Nutrition Programme (RHNP)  
  7. Cost of Diabetes treatment  
   a. In 2006, monthly cost of treating diabetes ranges between $106 and $638  
   b. Monthly cost of treating complicated diabetes (dialysis for endstage renal failure) was $1383  
  8. Diabetes prevention strategies |
9. **Health System challenges**
   a. Poorly equipped health facilities to treat diabetes
   b. Poor infrastructure
   c. Inadequate training of health workers on special knowledge on diabetes and communicating to lay people
   d. High cost of care
   e. Unapproved treatment drug and pharmacologically unsafe diabetes medications

**Main findings (Cameroon)**
   a. Lay knowledge on diabetes is poor
   b. Attribute cause of diabetes to witchcraft
   c. Reliability on traditional source of knowledge on diabetes

2. **Policy & Programme response**
   a. Initiation of the Cameroon Burden of Diabetes (CAMBoD)
   b. Department for Disease Control
   c. Establishment of diabetes clinics
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Location</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adeniyi et al.,</td>
<td>2010</td>
<td>Diabetic patients’ perspectives on the challenges of glycaemic control</td>
<td>Qualitative semi-structured interview</td>
<td>South Africa</td>
<td>African journal of primary health care &amp; family medicine</td>
</tr>
<tr>
<td>Keter &amp; Mutiso</td>
<td>2011</td>
<td>Ethnobotanical studies of medicinal plants used by Traditional Health Practitioners in the management of diabetes in Lower Eastern Province, Kenya</td>
<td>Quantitative survey questionnaire</td>
<td>Kenya</td>
<td>Journal of Ethnopharmacology</td>
</tr>
</tbody>
</table>

### 3. Diabetes Prevention Strategies
- a. Faith-based organisation & religious institutions advocacy role in diabetes prevention
- b. Creation of fitness tracks called ‘parcours vitas’.
- c. Bi-annual free health screening exercise

### 4. Health system challenges
- a. ill-equipped health facilities to deal with diabetes
- b. poor training of health workers

### Lay knowledge/beliefs on diabetes
- a. Incurable but can be managed

### Other experiences
Quality health care from health professionals
- Poor medical adherence to treatment such as forgetfulness in taking medication, fatigue from taking drugs, side effects of medication

### Lay knowledge in diabetes control
- a. Avoiding fatty foods
- b. Eating more fruits and vegetables
- c. Regular physical exercise
- d. Good medical adherence
- e. Regular check-ups

### Health system issues
- a. Unavailability of medication at health centres

### Traditional knowledge of diabetes and practice
- a. Sources of knowledge from grandparents and parents, apprenticeship and dreams
- b. Place of practice were house of residence, herbal clinics and marketplaces

### THP lay knowledge on diabetes

### Symptoms
<table>
<thead>
<tr>
<th>THP causes of diabetes</th>
<th>THP causes of diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Alcohol</td>
<td>a. Smelly breath</td>
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<tr>
<td>b. Sugary food and beverages</td>
<td>b. Frequent thirst</td>
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<tr>
<td>c. Fatty foods</td>
<td>c. Frequent urination</td>
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<td>d. Body weakness (fatigue)</td>
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<td>e. Smelly urine</td>
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<tr>
<td>Several herbal concoctions and plant species used to treat diabetes in Kenya</td>
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</table>

<table>
<thead>
<tr>
<th>Socio-demographics: (Diabetes Prevalence)</th>
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<tbody>
<tr>
<td>a. More prevalent on females compared to males</td>
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<tr>
<td>b. More prevalent among married women</td>
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<tr>
<td>c. More prevalent among people with tertiary education</td>
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<td>d. More prevalent with people in the low SES</td>
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<td>e. More prevalent among people who are currently unemployed</td>
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<td>f. Eye and Heart problems are most reported complications associated with diabetes</td>
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<thead>
<tr>
<th>Health seeking behaviour</th>
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<tbody>
<tr>
<td>g. Widely use biomedical services for treatment of diabetes</td>
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<td>h. Shortage of diabetes medicines at health facilities</td>
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<table>
<thead>
<tr>
<th>Biological Disruption</th>
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<tbody>
<tr>
<td>a. Vaginal itching</td>
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<tr>
<td>b. Dizziness</td>
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<td>c. Dry tongue</td>
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<td>d. General weakness</td>
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<td>e. Collapse</td>
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<td>f. Abdominal muscle pain</td>
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<td>g. Leg pains</td>
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<td>h. Joint pains</td>
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<td>i. Frequent urination</td>
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<tr>
<th>Hjelm &amp; Atwine</th>
<th>2011</th>
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<tr>
<td>Healthcare seeking behaviour among persons with diabetes in Uganda: an interview study</td>
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<tr>
<td>Qualitative semi structured interview</td>
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<tr>
<td>Uganda</td>
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<tr>
<td>BMC International Health and Human Rights</td>
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<tr>
<td>Kratzer</td>
<td>2012</td>
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</tbody>
</table>
|  |  |  |  |  |  | a. Opted for herbal after failed biomedical treatment  
|  |  |  |  |  |  | b. Use of local herbs from herbalist  
|  |  |  |  |  |  | c. Expensive using herbal treatment  
|  |  |  |  |  |  | d. Lack of trust in the efficacy of herbal medicines  
|  |  |  |  |  |  | e. Side effects  

<table>
<thead>
<tr>
<th>Cook-Huynh et al.,</th>
<th>2012</th>
<th>Prevalence of Hypertension and Diabetes Mellitus in Adults from a Rural Community in Ghana</th>
<th>Quantitative</th>
<th>Ghana</th>
<th>Ethnicity &amp; Disease</th>
<th>Structural Barriers</th>
</tr>
</thead>
</table>
|  |  |  |  |  |  | 1. Primary care facilities challenges  
|  |  |  |  |  |  | a. Misdiagnosis of diabetes  
|  |  |  |  |  |  | b. Poor attitude of health workers  
|  |  |  |  |  |  | 2. School challenges  
|  |  |  |  |  |  | a. Poor management by teachers  
|  |  |  |  |  |  | b. Lack of proper school management system  
|  |  |  |  |  |  | 3. Financial Burden  
|  |  |  |  |  |  | a. High cost of insulin  
|  |  |  |  |  |  | b. High cost of glucometers and test trips (glucose testing devices)  
|  |  |  |  |  |  | 4. Lack of formal support  
|  |  |  |  |  |  | a. No financial support from diabetes organisation  
|  |  |  |  |  |  | 5. Lack of access to reliable diabetes information  

| Semenya et al., | 2012 | Ethnobotanical survey of medicinal plants used by Bapedi healers to treat diabetes mellitus in the | Quantitative: semi-structured questionnaire | South Africa | Journal of Ethnopharmacology | Prevalence of DM-7.7%  
| --- | --- | --- | --- | --- | --- | Risk Factor  
|  |  |  |  |  |  | a. Family history  
|  |  |  |  |  |  | b. Use of other medications  

|  |  |  |  |  |  | Diagnostics criteria by traditionalist  
|  |  |  |  |  |  | 1. Low sex drive in men  
|  |  |  |  |  |  | 2. Loss of body weight  
|  |  |  |  |  |  | 3. Short tempered  
|  |  |  |  |  |  | 4. Swollen legs  

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<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Study Design</th>
<th>Country</th>
<th>Journal</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limpopo Province, South Africa</td>
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</tbody>
</table>
| Ayah et al., 2013 | A population-based survey of prevalence of diabetes and correlates in an urban slum community in Nairobi, Kenya | Quantitative | Kenya | BMC Public Health | Diabetes Prevalence 3.2%  
Socio-demographic  
1. Diabetes prevalence was more in females compared to males  
Risk Factors  
1. Cigarette smoking  
2. Alcohol consumption  
3. Obesity & Overweight  
4. Hypertension  
Diabetes management practices  
1. Rigorous physical exercise |
| Doherty et al., 2014 | Type 2 diabetes in a rapidly urbanizing region of Ghana, West Africa: a qualitative study of dietary preferences, knowledge and practices | Qualitative -FGD | Ghana | BMC Public Health | Socio-demographic  
1. More females living with diabetes relative males  
2. Higher proportion of diabetes patients living in urban areas than rural areas  
3. Higher proportion had secondary level of education compared to others  
Changes in nutrition and diet  
1. High consumption of home-cooked food  
a. Maize or millet porridge  
b. Yam and plantain coupled with vegetable-like stew  
c. Dried/smoked fish  
2. Preference of local home-cooked food over packaged food (sugar-sweetened beverages, highly seasoned street-foods)  
3. Avoidance of added sugar and sweet-tasting foods (fruit juices, biscuits, cookies, candies, soft drinks, sugar bread) |
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Title</th>
<th>Study Type</th>
<th>Country</th>
<th>Journal</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Oti et al.,       | 2013 | The magnitude of diabetes and its association with obesity in the slum of Nairobi, Kenya: results from a cross-sectional survey | Quantitative-c cross sectional survey | Kenya     | Tropical Medicine and International | 1. Diabetes prevalence in females =4.81%  
2. Diabetes prevalence in males =3.99%  
3. Diabetes more prevalent among males and females 60 yrs and above  
4. Diabetes more prevalent among males currently consuming alcohol  
5. Diabetes more prevalent among males and females who are obese (female at higher risk)  
6. Diabetes more prevalent among males and females who are hypertensive |
| Belue et al.,     | 2013 | A cultural lens to understanding daily experiences with type 2 diabetes self-management among clinic patients in M’Bour, Senegal | Qualitative         | Senegal   | Applied Research and Evaluation      | Financial challenges related to accessing medical care and adhering to the prescribed diabetes diet were the main barriers to diabetes management.  
Family dynamics serve as both supportive and inhibiting forces that influence these barriers. |
| Romdhane et al.,  | 2014 | Prevalence of diabetes in Northern Africa countries: the case of Tunisia | Quantitative        | Tunisia   | BMC Public Health                    | High prevalence of Type 2 diabetes in urban area than rural.  
Hereditity the most risk factor  
Knowledge and Awareness with diabetes increase with age, economic level and family history with type 2 diabetes |
| Liani et al.,     | 2014 | How Type 2 Diabetes patients perceive and manage their illness in Kenya | Qualitative: In-depth intervention | Kenya     | Journal of Sociology                 | Lay representation (knowledge) and perception  
1. Stress as a cause of diabetes |
2. Heredity is a cause of diabetes
3. Poor dietary habits as a perceived cause of diabetes
4. Presence of other diseases (malaria, typhoid, and goitre) as a cause of diabetes
5. Witchcraft and punishment of God as a perceived cause of diabetes

**Diabetes Management Experiences**
1. Use of both biomedical and folk management practices
2. Regular use of insulin injections and oral tablets (Glucomet/Metformin & Glibenclamide)

**Changes in nutrition and diet**
- a. Avoidance of sugar and sugary foods
- b. Limited consumption of high carbohydrate foods
- c. Avoidance of too much salt and fatty foods
- d. Consumption of more vegetables
- e. A lot of physical exercise

**Health seeking behaviour (faith healing system)**
- a. Prayers and fasting
- b. Consulting religious leaders

**Ethnomedical**
- a. Use of herbal remedies
- b. Seeking the services of traditional herbalist
- c. Use of home remedies (drinking a lot of water and eating raw chicken liver)

<table>
<thead>
<tr>
<th>Kpozehouen et al., 2015</th>
<th>Prevalence and Associated Factors of Diabetes</th>
<th>Quantitative-cross sectional</th>
<th>Benin</th>
<th>Open Journal of Epidemiology</th>
<th>Socio-demographic Diabetes prevalence-1.4%</th>
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</thead>
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<td></td>
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<td>Higher risk of diabetes was among the following</td>
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<td></td>
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<td>a. Age 55-64 years</td>
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<td></td>
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<td>b. Secondary level of education</td>
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<td>c. Urban area</td>
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<td>d. People living with hypertension</td>
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<td>Higher risk of diabetes was among the following</td>
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<td></td>
<td></td>
<td>a. More males living with diabetes compared to females</td>
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<td>2. Minimum age 17 yrs-Maximum age 86 yrs</td>
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<td><strong>Cost of treatment care and management</strong></td>
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<td></td>
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<td>a. Mean financial cost per diabetes patients per annum was GHS 540.35 ($372.65)</td>
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<td>b. Cost of insulin 1000 LU was GHS 19.25 (US $13.28)</td>
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<td></td>
<td>c. Cost of hospitalisation per diabetes patient in a day was estimated at GHS 32.78 (US $22.61)</td>
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<td>d. The total financial cost of diabetes management to Cocoa clinics in 2009 was estimated at GHS 420,087.67 (US$300, 062.62)</td>
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<td>e. Higher cost of managing type I diabetes relative to type II diabetes</td>
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<td>f. Higher cost of managing diabetes with complication than managing diabetes without complications.</td>
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<tr>
<td>Mendenhall &amp; Norris</td>
<td>2015</td>
<td>Diabetes care among urban women in Soweto, South Africa: a qualitative study</td>
<td>Qualitative: In-depth interview</td>
<td>South Africa</td>
<td>BMC Public Health</td>
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**Socio-demographic:**
- Most diabetes patients had no health insurance
- Most sought healthcare from government health facilities
- Most had some co-morbidity conditions (hypertension, arthritis and depression).

**Health system (structural issues; sources)**
- Health providers providing information on nutrition, diabetes through the distribution of magazines, booklets, newsletters
- Other sources of diabetes information include television, newspapers
- Information from other ‘diabetes’ patients
- Negative attitude of health providers towards diabetes patients
- Traditional healers ascribe diabetes to witchcraft attack.

**Changes in nutrition and diet & physical exercise**
- Difficulty in avoiding ‘unrecommended’ diets
- High cost of purchasing ‘recommended’ diets
- Regular exercise (doing house chores, walking to work)

**Disruption of family relationship (family care and support)**
- Stress among other family members complying with recommended/new lifestyle of diabetes patients.
- Emotional support from family members (walking...
<table>
<thead>
<tr>
<th>Metta et al.,</th>
<th>2015</th>
<th>“It is the medicines that keeps us alive”: Lived experiences of diabetes medication use and continuity among adults in Southeastern Tanzania</th>
<th>Qualitative-In-depth interviews</th>
<th>Tanzania</th>
<th>BMC Health Services Research</th>
<th>Lay representation (knowledge) and perception and Beliefs about the disease</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>a. Diabetes not a curable disease and long term</td>
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<td>b. Use of biomedical and ethnomedical medicine will only help in managing the disease</td>
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<td></td>
<td>Biological Disruption</td>
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<td></td>
<td></td>
<td>a. Frequent urination</td>
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<td>b. Fever</td>
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<td>c. Fatigue</td>
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<td>Health seeking behaviour</td>
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<td>(Cost of treatment care and management)</td>
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<td></td>
<td></td>
<td>a. Inability to afford consultation, laboratory and medication cost</td>
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<td></td>
<td>b. Average monthly cost on diabetes treatment ($3.2- for consultation &amp; lab; $2.9-$33.7-for medicines)</td>
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<td>c. Non-inclusion of diabetes in Tanzania cost-sharing policy</td>
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<td></td>
<td>d. Sale of personal assets and belongings to treat and manage diabetes</td>
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<td>e. Spent less on ‘other’ family needs</td>
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<td>f. Borrowing cash from friends to treat and manage diabetes</td>
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<td></td>
<td></td>
<td>g. Inability to purchase the recommended dosage of biomedical medicine</td>
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<td>h. Medical inactions due to inability to afford diabetes medicines</td>
</tr>
</tbody>
</table>
### Health Seeking behaviour (Accessibility)
- Inadequate access to diabetes medications and services especially in rural areas
- Unreliable means of transport
- High cost of transportation to nearby health facilities

### Health Seeking behaviour (Availability)
- Unavailability and shortage in supply of diabetes medication in remote health facilities
- Delay in treatment of diabetes at health facility (long waiting hours)

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Country</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bagonza et al.,</td>
<td>2015</td>
<td>Adherence to anti-diabetic medication among patients in eastern Uganda; a cross sectional study</td>
<td>Quantitative: cross sectional study</td>
<td>Uganda</td>
<td>BMC Health Service Research</td>
</tr>
</tbody>
</table>

### Socio-demographics:
- More male (50.3%) diabetes patients relative to females (49.7%)
- More prevalent among people above the age of 55
- Was high among people with no formal education
- High among married people
- High among people in the agricultural sector (farmers)

### Health seeking Behaviour (Factors associated with Adherence to anti-diabetes medication)
- Being on anti-diabetes drugs for at least three years
- Availability of anti-diabetes medication
- Not using any alternative medicine
- Having ever had diabetes education
- Having no reminders to take medication
- Those who take only insulin injections
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Study Title</th>
<th>Methodology</th>
<th>Country</th>
<th>Journal</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murphy et al.,</td>
<td>2015</td>
<td>A qualitative study of the experiences of care and motivation for effective self-management among diabetic and hypertensive patients attending public sector primary health care services in South Africa</td>
<td>Qualitative interview</td>
<td>South Africa</td>
<td>BMC Health Services Research</td>
<td>Diabetes patients not receiving adequate information, counselling, or support from health providers. Experiences of anxiety and frustration.</td>
</tr>
</tbody>
</table>
| Atwine et al., | 2015 | Healthcare seeking behaviour and the use of traditional medicine among persons with type 2 diabetes in south-western Uganda: a study of focus group interviews | Qualitative: focus group interviews | Uganda | PanAfrican Medical Journal | **Socio-Demographic:**

- a. More prevalent among women compared to men
- b. Average diabetes age 59 yrs
- c. Most use of Oral agent in treating diabetes
- d. Mostly married people have diabetes
- e. High prevalence of diabetes among people with primary education
- f. High diabetes prevalence among people with low socio-economic status

**Biological Disruption**

- a. Eye problems (sight problems)
- b. Heart problems (Cardiac problem)
- c. Feet pain (coldness of feet)
- d. Dry throat
- e. Headache
- f. Abdominal pain
- g. Backache
- h. Painful Limbs
- i. Numbness in my limbs
- j. Vomiting
- k. Lose appetite
<table>
<thead>
<tr>
<th>Health Seeking Behaviour (Reasons for ethnomedical treatment)</th>
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<tbody>
<tr>
<td>a. Symptoms related to diabetes, either poor glycaemic control, pain sensitivity</td>
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<tr>
<td>b. Failure of efficacy of biomedical medicines</td>
<td></td>
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<tr>
<td>c. Perceived effect of diabetes symptom reliefs by use of herbal medicines</td>
<td></td>
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<tr>
<td>d. Reducing blood sugar after taking herbal medicines</td>
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<tr>
<td>e. Restoration of body functionalism after consuming herbal medicine</td>
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</tr>
<tr>
<td>f. Contents of herbal medicines used (aloe vera, eucalyptus leaves, avocado guava and mangoes, onion, garlic)</td>
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<table>
<thead>
<tr>
<th>Socio-demographics</th>
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<tbody>
<tr>
<td>a. More in female adolescents relative to males</td>
<td></td>
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<tr>
<td>b. Among adolescent 12-17 years</td>
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<tr>
<td>c. Majority of them live with their biological parents</td>
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<tr>
<th>Psycho-Social Disruption (identity &amp; family relationship)</th>
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<tbody>
<tr>
<td>d. Stigmatization (laugh at)</td>
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<td>e. Lack of family support (neglect)</td>
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<td>f. Feeling of depression (suicidal thoughts)</td>
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<td>g. Social segregation (exclusion)</td>
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<td>h. Body shaming</td>
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<tr>
<td>i. Fear of death</td>
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<td>j. Fear of infertility</td>
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<thead>
<tr>
<th>Biological Disruption</th>
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<tbody>
<tr>
<td>a. Infection of sexual organ (vaginal thrush)</td>
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<th>Changes in nutrition and diet</th>
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<td>Source</td>
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</table>
  b. Failure of biomedical products  
  c. Less costly used herbal product relative to biomedical                                                                 | a. Recommended diets (local fruit, vegetables)  
  b. Counselling |
| Abdulrehman et al.,            | 2016 | Exploring Cultural Influences of Self-Management of Diabetes         | Qualitative: Ethnography | Kenya     | Global Qualitative Nursing Research                |                                                                 |                                           |
on Coastal Kenya: An Ethnography

2. More females having diabetes relative to males
3. Diabetes prevalent among married people
4. Diabetes prevalent had no formal education
5. Most people using Oral anti-diabetes agents
6. Half (50%) of diabetes patients using herbal remedies

Lay representation (knowledge) and perception & beliefs about diabetes
7. Causes of diabetes were family history, aging, weight and diet
8. Causes of diabetes due to consumption of ice water, living a stressful life, the increased presence of toxic chemicals in food such as pesticides and vaccinations
9. Beliefs that diabetes can be transmitted through mosquito bites and sexual intercourse
10. Beliefs that diabetes can lead to damages of internal organs, limb amputation
11. Locally refers diabetes to ‘sugar’

Health seeking behaviour
12. Most of them using biomedical (taking oral diabetes medications such as Metformin & Glyburide
13. Regular use of herbal remedies
14. Use of both oral diabetes, insulin and herbal
15. Illness inaction (No treatment)

Biological Disruption
16. Dryness of feet and cracking
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<td>17.</td>
<td>Sores</td>
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<td>18.</td>
<td>Eye problem (poor vision)</td>
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<td><strong>Diabetes Management</strong></td>
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<td>19.</td>
<td>Regular physical exercise (walking, swimming, or jogging)</td>
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<td><strong>Cost of treatment care and management</strong></td>
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<td>20.</td>
<td>Inability to afford oral anti-diabetes medications (high cost)</td>
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<td>21.</td>
<td>Inability to afford diabetes monitoring devices (glucometer &amp; glucose strips)</td>
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<td>22.</td>
<td>Inability to afford the recommended diet</td>
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<tr>
<td>23.</td>
<td>No health insurance cover</td>
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<tr>
<td><strong>Disruption of family relationship</strong></td>
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<tr>
<td>a.</td>
<td>Inability for the other members family to sacrifice to eat the recommended food</td>
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<tr>
<td><strong>Disruption of social identity</strong></td>
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<tr>
<td>a.</td>
<td>Inability to regularly attend social events such as marriage ceremonies, funerals, naming ceremonies, birthday parties.</td>
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<td>b.</td>
<td>Inability to build connections with other attendees during feasting</td>
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<td>c.</td>
<td>Feeling of social alienation</td>
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<tr>
<th>Gatimu et al., 2016</th>
<th>Prevalence and determinants of diabetes among older adults in Ghana</th>
<th>Quantitative-Cross sectional</th>
<th>Ghana</th>
<th>BMC Public Health</th>
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<tr>
<td><strong>Socio-demographics</strong></td>
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<td><strong>Diabetes prevalence of 3.95%</strong></td>
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<td>a.</td>
<td>Prevalence of diabetes higher among females relative to males</td>
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<td>b.</td>
<td>Higher prevalence of diabetes among people aged 60 and above</td>
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<td>c.</td>
<td>Higher diabetes prevalence among respondents living in the urban areas compared to rural areas</td>
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<td>d.</td>
<td>Higher diabetes prevalence among respondents with</td>
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<td>Authors</td>
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<td>Title</td>
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<tr>
<td>Osei-Yeboah et al.,</td>
<td>2016</td>
<td>Quality of Life of People Living with Type 2 Diabetes in Ho, Ghana: A Cross-Sectional Study</td>
<td>Quantitative: Hospital-based cross sectional study</td>
<td>Ghana</td>
</tr>
<tr>
<td>Nielsen</td>
<td>2016</td>
<td>Diabetes Treatment as “Homework”: Consequences for Household Knowledge and Health Practices in Rural Uganda</td>
<td>Mixed method: Quantitative and Qualitative</td>
<td>Uganda</td>
</tr>
<tr>
<td>Habte et al.,</td>
<td>2016</td>
<td>Explanatory model of adults patients with type 2 diabetes mellitus from urban centers of central Ethiopia</td>
<td>Qualitative method</td>
<td>Ethiopia</td>
</tr>
<tr>
<td>Ogunrinu et al.,</td>
<td>2017</td>
<td>A qualitative study of health education experiences and self-management practices among patients with type 2 diabetes at Malamulo</td>
<td>Qualitative: Key informants interviews &amp; focus group discussions</td>
<td>Malawi</td>
</tr>
</tbody>
</table>
Adventist Hospital in Thyolo District, Malawi

However, they find it challenging to adhere to medication and nutritional/dietary patterns. They also indicate having limited knowledge when dealing with diabetes complications.

<table>
<thead>
<tr>
<th>Author et al.</th>
<th>Year</th>
<th>Study Title</th>
<th>Methodology</th>
<th>Country</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owiredua et al., 2018</td>
<td>Living with diabetes: An exploratory study of illness representation and medication adherence in Ghana</td>
<td>Quantitative</td>
<td>Ghana</td>
<td>Cogent medicine</td>
<td></td>
</tr>
</tbody>
</table>

**Mean age of diabetes patients**: 46.5±14.6 yrs

**Socio-demographic**
1. Majority are 50 yrs and above
2. More diabetes female relative to male
3. Most diabetes patients are married
4. Most diabetes patients had attained primary level of education
5. Most diabetes patients are unemployed

**Institutional factors affecting diabetes medication**
1. Health insurance cover for diabetes medication
2. Easy access to prescribed diabetes medication
3. Good knowledge on diabetes, types and signs
4. Reporting no side effects of diabetes medication

**Factors affecting non-adherence**
1. Knowledge of medication
2. Medication availability
3. Education level

**a. Beliefs about the disease**
   a. Beliefs that personal engagement in activities could change the course of diabetes
   b. Beliefs that diabetes has serious negative impact on their lives
| **Waari et al.,** | 2018 | Medication adherence and factors associated with poor adherence among type 2 diabetes mellitus patients on follow-up at Kenyatta National Hospital Kenya | Quantitative-Cross sectional | Kenya | Pan-African Medical Journal | **Socio-demographics:**
a. Diabetes prevalence more in females relative in male 
b. More people living with diabetes are married 
c. Have secondary level of education 
d. Are unemployed 
e. Most are obese 
f. Most are on Oral Glucose Lowering Agents (OGLA) and Insulin 
g. Most have other co-morbid conditions 
**Health-seeking behaviour (Factors affecting Low-medium medical Adherence)**
a. Injection/Insulin medication 
b. 2-10 duration of living with diabetes 
c. Ever had diabetes related admission 
d. Dissatisfaction with family support 
e. Dissatisfaction with clinician 
f. Difficulty in accessing drugs |
| **Matima et al.,** | 2018 | A qualitative study on the experiences and of public sector patients in Cape Town in managing the workload of demands of HIV and type 2 diabetes multimorbidity | Qualitative: In-depth interview | South Africa | PLoS ONE | **Health-seeking behaviour (Biomedical-structural issues)**
a. Development of diabetes club system 
b. Visit to diabetes clinic based on manually assigned appointment by a doctor 
c. Overcrowding in the club room 
d. Unbalanced allocation of patients 
e. Long waiting times 
f. Delay in seeking care 
g. Inadequate supply of insulin 
**Medical Adherence**
a. Side-Effects of drug use 
**Biological Disruption (signs & Symptoms)**
a. Dizziness |
<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Country</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chineny &amp; Ogbera</td>
<td>2018</td>
<td>Socio-cultural aspects of diabetes mellitus in Nigeria</td>
<td>Review</td>
<td>Nigeria</td>
<td>Journal of Social Health and Diabetes</td>
</tr>
<tr>
<td>Hushle</td>
<td>2019</td>
<td>Exploring the barriers and facilitators of dietary self-care for type 2 diabetes: a qualitative study in Ghana</td>
<td>Qualitative: In-depth interview and non-participant observation</td>
<td>Ghana</td>
<td>Health Promotion Perspective</td>
</tr>
</tbody>
</table>

### Changes in nutrition and diet
- Drink more water
- Eat less carbohydrates
- Using less salt
- Eating less fatty meat
- Eating more fruit and vegetables

### Care and Maintenance of diabetes
- Support from family support
- Support from health workers

### Socio-cultural
- Use of traditional practitioners in diagnosis of diabetes
  1. Use of magic stones, cowries, coins, kola-nuts seeds, divining rods, key or sticks
- (Faith healing system) Use of traditional practitioners in treatment of diabetes
  1. Involvement of patient and their family in the treatment process (sacrifice a chicken at midnight in a shrine)

### Socio-demographic
- More females with diabetes relative to males

### Motivators to medical adherence
- Good patient-provider rapport

### Barriers to medical adherence
- Lack of acceptance of diabetes as a chronic illness
- Feeling of limited control over the disease
- Barriers to change in diet and nutritional patterns
e. Difficulty in switching from their favourite food to dietician recommended food

**Disruption of social identity**

f. Limited attendance to social functions such as weddings, funerals, naming ceremonies and birthday parties to avoid the temptation of consuming ‘unapproved’ food and drinks.

g. Limited outings and visit to friends

h. Fear of becoming a burden to the family

i. Fear of not obtaining the needed family support

**Disruption of family relationship (facilitators & barriers)**

j. Support from spouses, children and extended family members (helping with preparation of recommended meals, reminds them to check their blood sugar level)

k. Family members finding it difficult to adjust to the dietary needs

**Health seeking behaviour**

l. Faith-healing system (prayed to God)

**Perception and Beliefs about the disease**

a. Fear of developing complications such ulcerc wounds, general malaise, renal damage

b. Fears that diabetes will negatively affect their sexual performance/drive (men)

c. Fears that diabetes will lead to infertility (women)

**Medical non-Adherence (routine visit)**

a. Long-waiting times
<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Study Title</th>
<th>Methodology</th>
<th>Location</th>
<th>Journal</th>
<th>Socio-demographic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminde et al.,</td>
<td>2019</td>
<td>Adherence to antidiabetic medication and factors associated with non-adherence among patients with type-2 diabetes mellitus in two regional hospitals in Cameroon</td>
<td>Quantitative: cross sectional</td>
<td>Cameroon</td>
<td>BMC Endocrine Disorders</td>
<td><strong>Socio-demographic</strong>&lt;br&gt;&lt;br&gt;Mean age: 60.5±13.6yrs&lt;br&gt;Prevalent among females&lt;br&gt;<strong>Comorbidities:</strong> Hypertension, chronic renal disease, heart failure and stroke&lt;br&gt;<strong>Reasons for non-adherence to antidiabetes medication</strong>&lt;br&gt;1. Forgetfulness&lt;br&gt;2. Lack of finances&lt;br&gt;3. Disappearance of symptoms&lt;br&gt;4. Being too busy&lt;br&gt;5. Drug not effective&lt;br&gt;6. Side effect of drug&lt;br&gt;7. Multiple medication&lt;br&gt;8. Age (younger age)&lt;br&gt;9. Placement of insulin therapy&lt;br&gt;10. Alcohol consumption</td>
</tr>
<tr>
<td>Karinja et al.,</td>
<td>2019</td>
<td>Care-Seeking Dynamics among Patients with Diabetes Mellitus and Hypertension in Selected Rural Settings in Kenya</td>
<td>Quantitative: Cross sectional</td>
<td>Kenya</td>
<td>International Journal of Environmental Research and Public Health</td>
<td><strong>Socio-demographics:</strong>&lt;br&gt;a. Diabetes more prevalent among people age 60-79&lt;br&gt;b. Diabetes more prevalent among females relative to males&lt;br&gt;c. Diabetes more prevalent among married&lt;br&gt;d. Most of them are household heads&lt;br&gt;e. Most had attained primary level of education&lt;br&gt;f. Most diabetes patients are unemployed&lt;br&gt;g. Most people had no comorbidity&lt;br&gt;h. Majority are using the biomedical/Allopathic treatment</td>
</tr>
<tr>
<td>i.</td>
<td>Most were diagnosed of diabetes in Public facility</td>
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<td>j.</td>
<td>Most diabetes patients go for regular clinic visits</td>
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<tr>
<td>k.</td>
<td>Most diabetes patients are not on health insurance</td>
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</tbody>
</table>

**Health Seeking behaviour (Reasons of medical illness inaction)**

- a. No money for medication
- b. Feeling better, don’t think I need treatment anymore
- c. Disease not serious
- d. Treatment place too far
- e. No hope of cure
- f. Not satisfied with treatment program
- g. Negative side effects of medicines

**Antidiabetes Drug used by diabetes patients**

- a. Metformin
- b. Glibenclamide
- c. Insulin
- d. Saxagliptin
- e. Pioglitazone
- f. Gliclazide
- g. Sitagliptin
- h. Glimepiride

**Factors associated with health-seeking behviour (medical adherence)**

- a. Receiving social support
- b. Average & Good health status
- c. Admitted in the last one year
- d. Alcohol in-take

**Educational topics during diabetes clinics**

- a. Education on diabetes disease
- b. Education on lifestyle change
- c. Education on nutrition
- d. Education on adherence to medication
<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Setting</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dhada &amp; Blackbeard</td>
<td>2019</td>
<td>Caregivers of children with diabetes mellitus: challenges of caring for and perceptions of consultations in a South African public sector context</td>
<td>Qualitative: semi-structured</td>
<td>South Africa</td>
<td>South African Family Practice</td>
</tr>
<tr>
<td>Muhwava et al.,</td>
<td>2019</td>
<td>Experiences of lifestyle change among women with gestational diabetes mellitus (GDM): A behavioural diagnosis using the COM-B model in a low-income setting</td>
<td>Qualitative: In-depth interviews</td>
<td>South Africa</td>
<td>PLoS ONE</td>
</tr>
</tbody>
</table>

**Diabetes Caregivers experiences**

- **Emotional (Stress)**
  1. Sadness
  2. Fear
  3. Grief
  4. Feeling of uncertainty
  5. Frustration
  6. Boredom

- **Practical (Learning new things)**
  1. Injecting insulin
  2. SMBG reading
  3. Recommended food preparation
  4. Physical assistance to the hospital

- **Financial**
  1. Excessive use of money on diet, medication,
  2. Loss of job

- **Social**
  1. Loss of friends and acquaintances
  2. Social isolation
  3. Social support (support from other family members)

**Health system issues**

- Need for more education and counselling on diabetes by health workers
- No time to ask questions on diabetes
- Not much education on physical activities

**Treatment and Care patients**

- Engage in physical exercise such as walking, yoga, attending gym

**Psychological Effects**

- Feeling of fear
- Worry
<table>
<thead>
<tr>
<th>Challenges</th>
<th>Social Support</th>
<th>Socio-demographic:</th>
<th>Factors hindering diabetes patients’ adherence to biomedical medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Exposure to unhealthy food environment</td>
<td>a. Support (motivation, advice, encouragement) from their partners, family, peers and health professionals</td>
<td>a. Mean age = 55.9 ±10.9 years</td>
<td>a. Side effects of antidiabetes medication</td>
</tr>
<tr>
<td>b. Costly recommended healthy diet</td>
<td></td>
<td>b. Diabetes more prevalent among females relative to males</td>
<td>b. Consumption of herbal medicine</td>
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<tr>
<td>c. Difficulties in adjusting to the recommended diet</td>
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<td>c. Most diabetes patient are married</td>
<td>c. Unavailability of the medication</td>
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<tr>
<td>d. Negative attitude of health care providers</td>
<td></td>
<td>d. Relatively higher proportion had attained primary education</td>
<td>d. Unaffordability of the medication</td>
</tr>
</tbody>
</table>

Badi et al., 2019

Adherence to Antidiabetic Medications Among Sudanese Individuals with Type 2 Diabetes Mellitus: A Cross-Sectional Survey

Quantitative: cross-sectional

Sudan

Journal of Patient Experience

Sudan Journal of Patient Experience
<table>
<thead>
<tr>
<th>Experiences and challenges of adults living with type 2 diabetes mellitus presenting at the University Teaching Hospital in Lusaka, Zambia</th>
<th>Qualitative: In-depth interview</th>
<th>Zambia</th>
<th>BMJ Open Diabetes Research &amp; Care</th>
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<tbody>
<tr>
<td><strong>Socio-demographic:</strong></td>
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<td>a. More women with diabetes compared to men</td>
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<td>b. Most were married</td>
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<td>c. Most of them had attained secondary level</td>
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<td><strong>Biological Disruption</strong></td>
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<td>d. Weakness</td>
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<td>e. Difficulty in breathing in night</td>
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<td>f. Numbness on hands &amp; legs</td>
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<td>g. Fatigue</td>
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<td>h. Sight problems</td>
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<td>i. Swelling legs</td>
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<td>j. Abdominal pains</td>
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<td>k. Bloated stomach</td>
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<td>l. Vaginal itchiness &amp; discharge</td>
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<td>m. High blood sugar levels</td>
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<tr>
<td><strong>Health system challenges</strong></td>
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<tr>
<td>n. Inadequate information, education and communication message about diabetes</td>
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<tr>
<td><strong>Beliefs about diabetes</strong></td>
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<td>o. It is caused by witchcraft</td>
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<tr>
<td><strong>Changes in nutrition and diet</strong></td>
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<td>p. Difficulty in adjusting to new recommended diet</td>
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<tr>
<td><strong>Disruption of family relationship</strong></td>
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<td>q. Lack of emotional family support (teasing, complains from family members)</td>
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<td><strong>Psycho-social Experiences</strong></td>
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<td>r. Feeling of anger</td>
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<td>s. Frustration</td>
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<td>t. Stress</td>
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<td>u. Depression</td>
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<td>Study</td>
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<td>Description</td>
<td>Methodology</td>
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<tr>
<td>Okop et al.,</td>
<td>2019</td>
<td>Low intake of commonly available fruits and vegetables in socio-economically disadvantaged communities of South Africa: influence of affordability and sugary drinks intake</td>
<td>Quantitative: Cross sectional study</td>
</tr>
<tr>
<td>Kretchy et al.,</td>
<td>2020</td>
<td>The Association between Diabetes-Related Distress and Medication Adherence in Adult Patients with Type 2 Diabetes Mellitus: A Cross-Sectional Study</td>
<td>Quantitative: cross sectional</td>
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</tbody>
</table>

**Findings**

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<tr>
<th>Study</th>
<th>Year</th>
<th>Description</th>
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<th>Journal/Source</th>
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<td>Quantitative: cross sectional</td>
<td>Ghana</td>
<td>Journal of Diabetes Research</td>
</tr>
</tbody>
</table>

**Cost of treatment, care and management**

- Financial burden/difficulty in buying medicines and recommended food as part of their nutritional therapy
- Challenges of getting transports to routine check-ups at the health centres

**Socio-demographic**

- Diabetes prevalent in females relative to males
- 50% of diabetes patients also has at least one comorbidity
- High distress among females living with diabetes
- Poor medical adherence is a result of distress

**Perception and Beliefs about diabetes (psycho)**

- Scared about the taught of living with diabetes
- Worry about the future and complications
- Guilt and anxiety when off-track management of diabetes

**Disruption of family relationship**

- Feeling deprived of food and meals by family members
- No clear or concreate goals for meals
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Title</th>
<th>Methodology</th>
<th>Setting</th>
<th>Study Object</th>
</tr>
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<tbody>
<tr>
<td>Bonger et al.,</td>
<td>2018</td>
<td>Adherence to diabetic self-care practices and its associated factors among patients with type 2 diabetes in Addis Ababa, Ethiopia</td>
<td>Quantitative: cross sectional</td>
<td>Ethiopia</td>
<td>Patient Preference and Adherence</td>
</tr>
</tbody>
</table>

**Stress of Diabetes Management**

- Feeling burned out by constant effort to manage diabetes

**Socio-demographic**

1. Higher prevalence of diabetes among female relative to male
2. Diabetes prevalence among people aged 40-59
3. Mean age 51.1±10.6
4. Most diabetes patients are married
5. Most diabetes patients had attained secondary level of education

**Adherence diabetes management practices**

1. Physically exercising for 30-45 minutes per session
2. High adherence to diabetes medications (taking insulin and oral hypoglycemic agents)
3. Majority of diabetes patients do not adhere to recommended dietary management practices
4. The majority of diabetes patients do not adhere to SMBG

**Factors affecting adherence to diabetes self-care practices**

1. Unemployed diabetes patients mostly adhere to SMBG
2. Diabetes patients with tertiary educational level mostly adhere to SMBG
3. Diabetes patients within the age group 40-49 yrs mostly...
<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Study Title</th>
<th>Study Design</th>
<th>Country</th>
<th>Journal</th>
<th>Findings</th>
</tr>
</thead>
</table>
Higher prevalence of diabetes among people aged 60 yrs  
**Risk factors associated with diabetes**  
a. Hypertension  
b. Obesity  
c. Smoking  
d. Sedentary lifestyle |
| Werfalli et al.    | 2020 | Does social support effect knowledge and diabetes self-management practices in older persons with Type 2 diabetes attending primary care clinics in Cape Town, South Africa? | Cross-sectional study: Quantitative | South Africa    | PLoS ONE                          | Family support was positively associated with diabetes self-management such as diabetes meal plan, taking care of feet, physical activity and testing blood sugar |
| O’Brien et al.     | 2020 | Self-management of persons living with diabetes mellitus type 2: Experiences of diabetes nurse educators | Qualitative: Focus group discussion | South Africa    | Health SA Gesondheid              | **Findings**  
Professional nurses continually educate type 2 DM patients regarding self-management |