

# Quality of Life Among Type II Diabetes Mellitus Patients at Kamuzu Central Hospital in Lilongwe, Malawi: a Mixed-method Study

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## Research Article

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## Abstract

**Background:** Type II diabetes mellitus (T2DM) significantly impacts the quality of life (QoL) yet data on quality of life among these patients in Malawi are lacking. This study was conducted to assess QoL among patients with T2DM.

**Methods:** A mixed-method cross-section study was carried out at Kamuzu Central Hospital (KCH), Lilongwe, Malawi. A systematic sampling method was used for quantitative data and purposive sampling was used for qualitative data. A modified diabetes quality of life (MDQoL)-17 questionnaire was used for quantitative data while in-depth interviews and diary methods were used for qualitative data. Demographic data were summarized using descriptive statistics and inferential statistics using t-test and ANOVA. Thematic content analysis guided by Braun and Clark (2006) was utilized to analyze qualitative data. Ethical approval was obtained from the College of Medicine Research and Ethics Committee (CoMREC) reference number P.09.20.3122.

**Results:** A sample of 339 participants with a mean age of  $50.3 \pm 15.5$  was recruited. Overall, the mean QoL score was moderate ( $63.91 \pm 19.54$ ). Those with tertiary education and those on health insurance had better QoL (QoL 73.8, C.I. 68.56-79.04, p-value 0.005), (QoL 76.71, C.I. 69.22-84.19, p-value 0.005) respectively compared to those with lower education and those without health insurance. Furthermore, the absence of comorbidities was associated with having better QoL (QoL 71.18, C.I. 66.69-75.67, p-value < 0.0001). Qualitatively, the participants referred to QoL as an absence of disease and leading an independent life. T2DM was associated with patients' health status, increased stress levels, loss of independence as well as lifestyle changes. There were QoL-promoting factors among T2DM patients such as diabetes health talks, having a supportive family, accepting one's condition positively, and following hospital advice such as doing physical exercises and following a prescribed diet. Inhibiting factors include drug shortages, societal perceptions, sedentary lifestyle, stress, and despising hospital advice.

**Conclusion:** Overall the QoL in patients with T2DM receiving treatment at KCH is moderate. The QoL of patients with T2DM is influenced by interrelated factors and this requires multidisciplinary team care to optimize the QoL among these patients. Health workers need to adopt a holistic approach when treating patients with T2DM, such as managing comorbidities and including assessment of QoL, behavioral change measures like physical exercises, and a healthy diet. The government and various stakeholders need to promote education and mandatory national health insurance which improve health status.

## Background

Diabetes mellitus is among the top 10 leading causes of death globally [1]. For the African region in 2021, the prevalence of diabetes was estimated at 4.5% among people aged 20–79 years [2]. In Malawi, an epidemiological transition has occurred with the prevalence of diabetes increasing from less than 1% in the 60s to 5.6% in 2009 [2, 3]. As of 2019, the prevalence was 4.5% among adults aged between 20 and 79 years [4]. Currently, diabetes services in Malawi, are provided in all district hospitals though the services are challenged by a lack of resources and skilled health personnel [5, 6]. There is a small proportion of primary health facilities with adequate resources for screening and treatment of diabetes in Malawi [5, 6].

Diabetes mellitus(DM) is one of the main non-communicable diseases (NCDs) that significantly impact and reduce the quality of life (QoL) among patients [7]. The use of QoL as a measurable outcome in health has increased in recent decades as healthcare has shifted from a disease-focused biomedical model [8] to a more holistic, wellbeing-focused biopsychosocial model [9, 10]. However, QoL is often ignored in the overall assessment of health outcomes [11].

Despite the significance of QoL studies among diabetes patients, there is limited evidence of such in Malawi. Quality of life assessment in diabetes patients is important because it ensures individualization of patients' treatment according to their complaints and different diabetes complications [12]. This study, therefore, assessed quality of life and the associated factors among type II diabetes mellitus patients at KCH in Lilongwe, Malawi.

## Methods

### Study design and setting

A convergent mixed-method employing a cross-section design was conducted at the outpatient diabetes clinic at KCH. The hospital provides referral services from 5 district hospitals and serves a population of 4 million [13]. For qualitative data, a phenomenological approach was used. As of 2019, the clinic had almost 6700 patients that were being followed up and they used to see up to 80 patients per clinic day. Most of these patients are from within the district of Lilongwe.

### Study participants and recruitment

Three hundred thirty-nine (339) patients with T2DM for a duration not less than 1 year, who were of the age of 18 years and above and were receiving care at an outpatient diabetes clinic at KCH were included in the study for the quantitative part. Duration of the presence of diabetes was ascertained by asking the patient verbally to give information about when they were diagnosed with T2DM.

For the qualitative part, eighteen patients with T2DM (6 for in-depth interviews and 12 for the diary method) were purposively selected from the quantitative sample of 339 participants. The diary method (Additional file 1) is essential because it allows events to be recorded in their natural setting and captures data from participants as they live through certain experiences [14]. Six guardians for patients with T2DM who were consistently staying

with the patients for more than 2 weeks were also included for in-depth interviews in the qualitative part. In total, 24 participants were included for the qualitative part.

The sample size for qualitative data was based on the assumption that saturation for the phenomenological approach is reached from 5 to 25 participants [15]. In addition, 6 to 12 interviews are enough to achieve the desired research objective [15].

#### Data collection and analysis

The MDQoL-17 tool (Additional file 2) was used to collect quantitative data. The tool has seven domains which include physical functioning, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions [11]. This tool is appropriate because it covers all domains of quality of life [16]. The interview guide (Additional File 3) and a digital voice recorder were used to collect qualitative data, field notes were also taken to enrich the data [17]. Furthermore, patients were provided with diaries (Additional file 1) to write their daily personal experiences, at least 3 times a week for one month.

MDQoL-17 questionnaire and in-depth interviews were piloted on other diabetes patients to ensure that they were relevant and applicable. To ensure reliability and validity of quantitative data, an existing questionnaire (MDQoL-17) was used which was developed and validated in India by Acharya et al in 2010 [11].

After data collection, STATA software was used for quantitative analysis. Demographic characteristics were summarized using descriptive statistics. QoL scores were calculated using the MDQoL-17 questionnaire where question scores were calculated as percentages with 0 being the lowest score and 100 the highest score according to Prajapati et al 2017 (Table 1) [11]. After scoring the questions, QoL was categorized into 3 parts. QoL score < 50 was poor, a score between 50–70 was moderate and a score more than 70 signified better QoL [11].

Table 1  
Response category and scores of MDQoL-17 questions [11]

Item number	Response category and scores
1,2,7,13	1 = 100, 2 = 75, 3 = 50, 4 = 25, 5 = 0
3	1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100
4,5,6	1 = 0, 2 = 50, 3 = 100
8,9,10,11,12,14,15,16	1 = 0, 2 = 20, 3 = 40, 4 = 60, 5 = 80, 6 = 100
17	1 = 100, 2 = 80, 3 = 60, 4 = 40, 5 = 20, 6 = 0

For comparison of QoL Scores and demographics as well as comorbidities, an unpaired t-test was applied for the means of two groups and ANOVA for three or more groups. The p-value of less than 0.05 was considered significant.

For qualitative data, thematic analysis was used. Firstly, audio data were transcribed into written form [18]. Secondly, the researchers familiarized the data through repeated reading of the transcripts [18]. Generation of codes was the third step, the point at which the researchers identify and highlight the raw data or information that have a common pattern [18]. The codes were developed through both inductive and deductive approaches [19]. The fourth step required the researchers to aggregate all codes with similar meanings into different groups that are called themes [18]. After that, the researchers reviewed and refined the devised themes to understand whether the codes belonged to their earlier allocated themes which followed naming the themes [18]. Finally, the researchers wrote all the themes into a report.

#### Ethical consideration

Ethical approval was obtained from the College of Medicine Research and Ethics Committee (COMREC) reference number P.09.20.3122. The Director of KCH granted institutional support to conduct the study at the facility. Participation was voluntary and informed consent was obtained from the participants. They were assured the right to withdraw from the study at any point without affecting their access to medical services.

## Results

#### Characteristics of persons with type II diabetes mellitus

There were 339 patients with T2DM that were enrolled in this study with the majority being females (64.3%). Of the 339 participants, 55.2% were between 41–65 years old with a mean age of  $50.3 \pm 15.5$  years. Forty percent were overweight (BMI;  $25\text{--}29.9\text{kg/m}^2$ ) with a mean BMI of  $26.6 \pm 5.5\text{ kg/m}^2$  (Table 2).

Table 2  
QoL and Characteristics of persons with type II diabetes mellitus

Patient Characteristics (n = 339)	N	%	Mean QoL (95% CI)	P-value
<b>Total</b>	339	100.0	63.91 (61.83-66.00)	
<b>Sex</b>				0.63
Males	121	35.7	64.59(61.16-68.03)	
Females	218	64.3	63.54(60.90-66.17)	
<b>Agegroups (years)</b>				0.05
< 40	92	27.1	61.64(57.52-65.76)	
41–65	187	55.2	66.23(63.49-68.97)	
> 65	60	17.7	60.18(55.22-65.15)	
<b>BMI (kg/m<sup>2</sup>)</b>				0.02
< 18.5	21	6.2	53.86(45.70-62.01)	
18.5–24.9	104	30.7	63.64(60.02-67.27)	
25-29.9	135	39.8	62.97(59.73-66.21)	
30+	79	23.3	68.56(64.05-73.07)	
<b>Treatment duration (years)</b>				0.56
< 5	137	40.4	64.74(61.47-68.02)	
06–010	114	33.6	62.29(58.68-65.92)	
> 10	88	26.0	64.72(60.61-68.82)	
<b>Education level</b>				0.005
None	39	11.5	58.21(51.81-64.60)	
Primary	134	39.5	62.70(59.43-65.97)	
Secondary	131	38.6	64.21(60.82-67.61)	
Tertiary	35	10.3	73.8(68.56-79.04)	
<b>Marital status</b>				0.87
Divorced	13	3.8	63.77(52.63-74.91)	
Single	30	8.9	61.07(53.75-68.39)	
Widowed	51	15.0	64.08(58.72-69.44)	
<b>Medical aid</b>				0.005
No	322	95.0	63.24(61.10-65.38)	
<b>Alcohol drinking</b>				0.49
No	329	97.1	63.79(61.67-65.90)	
Yes	10	3.0	68.1(54.59-81.61)	
No	339	100.0	63.91(61.83-66.00)	

The mean diabetes duration was  $8.1 \pm 6.5$  years. Forty percent (n = 134) of the participants had a diabetes history of less than 5 years. Forty percent of the participants had primary school education. Out of 339 participants, 73% were married, 5% were on health insurance, 98% reported no alcohol drinking and none of the participants reported a history of smoking.

#### Characteristics of interviewees and diarists

A total of 12 participants took part in the in-depth interviews and their ages ranged from 25 to 72 years of which 7 of them were females. Six of the interviewees were T2DM patients of which 3 were females.

Six of the interviewees were guardians of T2DM patients and 4 of them were females. Out of the 12 diaries that were distributed, 7 diarists were male. In the end, we managed to collect 8 diaries of which 5 were from males.

## **Definition of quality of life**

### **Absence of disease**

The participants referred to the absence of disease as not getting sick often and having a body that is resilient to illness.

"According to me the way I see quality life... is the one who is not falling sick often. Because when you become sick frequently, you cannot work to bring wealth to your family, and you can't manage to work to have enough food for your family. So quality life let's say it is someone who does not get sick frequently, that's the one who has quality life, not just riches... no". (69 years old male, guardian interviewee)

### **Independence**

Quality of life also emerged as an act of independence over oneself. The participants felt that one needs to manage taking care of oneself, work satisfactorily and travel without any problems.

"Quality life means living without getting sick quite often, working satisfactorily, and also walking/travelling without any problem". (35 years old male patient interviewee)

### **Assessment of quality of life among persons with type II diabetes mellitus**

The mean QoL was  $63.91 \pm 19.54$  (95%CI: 61.83-66.00). QoL score < 50 was poor, a score between 50–70 was moderate and a score more than 70 signified better QoL (Table 3). Forty-one percent of patients had QoL between 70–100 while the minority had QoL of less than 50 (Table 3).

Table 3  
Assessment of quality of life among  
persons with type II diabetes mellitus

Quality of life categories	N	%
<b>TOTAL</b>	<b>339</b>	<b>100</b>
< 50	82	24.2
50–70	117	34.5
70–100	140	41.3

## **Factors that inhibit the quality of life among diabetes patients**

Some of the participants from the in-depth interviews explained that there are factors that contribute to the reduction of QoL among T2DM patients in addition to the presence of the disease itself. These factors are categorized under the following level the health system, family or societal factors, and individual.

### **Health system factors (drug shortages)**

The participants complained that sometimes they are faced with a shortage of drugs at the hospital which requires them to buy from private pharmacies. This becomes a challenge as they reported that these drugs are expensive. As such, they become stressed over their ability to access the medicines.

"Sometimes we come to the hospital and we are told diabetes medicines are out of stock, and we are forced to go and buy at pharmacies. Maybe the government should look at that so that we can live in a diabetes-free world". (25 years old woman guardian interviewee)

### **Family/societal factors**

Some patients reported that they are labeled as selfish if they refuse to eat a certain type of food in communal gatherings for example at a funeral or a wedding. Some people may think that diabetics are nagging unnecessarily when they report getting hungry frequently, consequently limiting their travel and participation in social gatherings.

"This disease doesn't allow us to eat good, soft, oily, and sweet food. This results in us being painted as selfish because most of our friends do not understand this disease. We eat m'gaiwa nsima so it is hard for family and friends to accept and assist us accordingly". (Diarist male patient)

### **Individual factors**

Participants highlighted stress as one of the factors that reduce QoL among diabetes clients. Stress may arise from the presence of diabetes itself and its complex nature. In addition, some patients may despise hospital advice like ignoring the prescribed food, medicine, and physical exercises. All of these may put them at risk of getting sick often hence enhancing instability in their lives and that of their relations.

".... anxiety disturbs because just the fact that you are worried, your body is disturbed. This is in a way that the body doesn't function properly. Because getting worried and the nature of diabetes do not go together". (35 years old man patient interviewee)

"... That's why if you just eat those fatty foods, for example at a funeral you have had those fatty foods, you just find that the body is not normal. Not that you are sick or you have general body pains but the body just lacks energy. Then you realize that ooooh I have made a mistake..." (69 years old woman patient interviewee)

#### **Quality of life varied by demographic and behavioral characteristics**

Patients who had tertiary education had a better QoL than those who had lower education levels (QoL score 73.8, 95%CI 68.56–79.04) (p-value 0.005). There was an increasing trend in the QoL by education level. Similarly, patients who had health insurance had a better QoL than those who did not have health insurance (QoL score 76.71, 95%CI 69.22–84.19) (p-value 0.005). Furthermore, patients who were obese ( $BMI > 30\text{kg}/\text{m}^2$ ) had a better QoL compared to those who were underweight, normal weight, and overweight (QoL score 68.56, 95%CI: 64.05–73.07, p-value 0.02) (Table 4).

Table 4  
Quality of life varied by demographic and behavioral characteristics

Patient Characteristics (n = 339)	N	%	Mean QoL (95% CI)	P-value
<b>Total</b>	339	100.0	63.91 (61.83-66.00)	
<b>BMI (kg/m<sup>2</sup>)</b>				0.02
< 18.5	21	6.2	53.86(45.70-62.01)	
18.5–24.9	104	30.7	63.64(60.02–67.27)	
25-29.9	135	39.8	62.97(59.73–66.21)	
30+	79	23.3	68.56(64.05–73.07)	
<b>Education level</b>				0.005
None	39	11.5	58.21(51.81–64.60)	
Primary	134	39.5	62.70(59.43–65.97)	
Secondary	131	38.6	64.21(60.82–67.61)	
Tertiary	35	10.3	73.8(68.56–79.04)	
<b>Medical aid</b>				0.005
No	322	95.0	63.24(61.10-65.38)	
Yes	17	5.0	76.71(69.22–84.19)	

Qualitatively, participants stated factors that are associated with promoting QoL among T2DM patients, and these were categorized under health system, family or societal and individual levels.

#### **Health system factors (diabetes health talks)**

Participants reported that the health education delivered at the facilities helps them lead a healthy life if they follow the protocols taught during the health talks. These health education sessions include aspects like pieces of advice on taking medication properly, the recommended diet, and allowable amount to consume, and avoiding a sedentary lifestyle.

"...But I believe that we can attain a good life if we follow the advice we are taught time and again. A while ago, there was a nurse who used to come before the start of each diabetes clinic to advise us. It was really good but these days she is nowhere to be seen. But if she is no longer here, can't there be another nurse to encourage and help us reduce our stress so that we can have a good and long life if we can manage to take good care of ourselves?" (Diarist male patient)

#### **Family/societal factors (supportive family, good relationships)**

Having a supportive family and good relationships promotes the QoL of diabetes patients. The support that relatives render includes encouragement on following advice received from a hospital for example taking medication properly and following a recommended diet. Participants further reported that good relationships help them with psychological support.

"My relatives are good people and they are the only ones who understand my diabetes problem. They encourage me on the right diet as well as remind me when to take medicine. They always want to see me happy and stress-free". (Diarist female patient)

In agreement with the participants, one guardian reported that supportive families and relationships are good for the patients.

"Because when we remind him to come to the hospital, there are also protocols concerning what kind of food he is supposed to eat and also being active most of the time so that his body should not be weak". (36 years old man, guardian interviewee)

#### **Individual factors**

Some of the participants reported that avoiding stress and accepting their condition are key elements in life. They further indicated that when they accept, it is more likely that they follow hospital advice for example eating the right food as well as leading an active lifestyle.

"Most importantly, it is good not to be worried, no... accept the situation. And also when you accept, be settled so that you should not get sick quite often... because if you are not accepting, you are always worried as a result you may die faster". (47 years old man patient interviewee)

Guardians corroborated with what the participants reiterated on the importance of accepting the condition and adherence to advice as key to leading a better life. Furthermore, one of the guardians indicated that it is possible to live in a diabetes-free world if diabetes management and preventive measures are followed.

"The way I see it, I think diabetes can be prevented. And I have heard other people recovered from it properly. It just requires a person to follow what the doctor says... so if he can follow instructions given at the hospital, we can live in a diabetes free-world". (25 years old woman guardian interviewee)

#### **Quality of life varied by comorbidities**

QoL was further assessed based on the presence and absence of comorbidities as well as types of comorbidities (Table 5). In comparison with patients with comorbidities, those without comorbidities had a better QoL of 71.18 (95%CI: 66.69–75.67, p-value < 0.0001). Specifically, patients without musculoskeletal diseases had a statistically significantly better QoL than those with musculoskeletal diseases and their QoL score was 66.01 (95%CI: 63.48–68.54) (p-value 0.002).

Table 5  
Assessment of quality of life based on comorbidities

Comorbidities	N	%	Mean qol (95%CI)	P-value
<b>Total</b>	339	100	63.91(61.83-66.00)	
<b>Comorbidities</b>				< 0.0001
Absent	92	27.1	71.18(66.69–75.67)	
Present	247	72.9	61.21(58.97–63.45)	
<b>Cardiovascular diseases</b>				0.07
No	283	83.5	64.77(62.49–67.06)	
Yes	56	16.5	59.57(54.54–64.60)	
<b>Musculoskeletal diseases</b>				0.002
No	238	70.2	66.01(63.48–68.54)	
Yes	101	29.8	58.98(55.48–62.48)	
<b>Urologic diseases</b>				0.79
No	335	98.8	63.88(61.78–69.99)	
Yes	4	1.2	66.5(52.67–80.33)	
<b>Reproductive system diseases</b>				0.32
No	329	97.4	64.10(61.97–66.22)	
Yes	10	3.0	57.9(46.85–68.95)	
<b>Endocrine diseases</b>				1
No	330	97.4	63.92(61.80-66.03)	
Yes	9	2.7	63.89(49.56–78.22)	
<b>Neurology diseases</b>				0.13
No	267	78.8	64.75(62.34–67.17)	
Yes	72	21.2	60.81(56.84–64.78)	
<b>Ophthalmic diseases</b>				0.26
No	267	78.8	64.54(62.16–66.91)	
Yes	72	21.2	61.61(57.26–65.96)	

Findings from the qualitative component on existing comorbidities also corroborated with those from the quantitative component. In the qualitative component, some participants reported having body weakness frequently. They also reported that diabetes results in different conditions such as

problems with eye-sight, wounds that are difficult to heal which may end up in loss of limbs through surgery, sudden death, burning sensations, lack of sexual desire, and numbness, especially in the legs and feet. The patients reported that due to all these problems, they become stressed as they feel that their lives are unstable. They also stated that sometimes stress is caused by loss of independence and failure in taking care of their families.

"I hear some people saying that a diabetes patient dies suddenly when their sugar drops extremely. And also when you are diagnosed with diabetes when you are young, you have never been married, and I heard that you lack sexual desire. And also when you have a wound or a sore, it is difficult to get healed and it takes a long time. For example, if you got injured on your leg or toe/finger, in the end, they may remove that part. As a result, I am stressed a lot, furthermore, I heard that diabetes may destroy eyes". (Diarist female patient)

Some family members also observed the impact diabetes has on their patients. They reported that diabetes patients feel weak most of the time, they have various problems like poor/loss of eyesight and also feel stressed because of their disabilities as well as loss of independence.

"When he was diagnosed with diabetes in 2016 his life was not very healthy. He used to be sick always to the extent of being amputated. So you can understand that after amputation there was nothing he could do, he doesn't do anything... but he has a lot of thoughts that he has failed to provide for his family. So that's what I see affects him that as a father is supposed to provide for his family unfortunately he doesn't". (25 years old female guardian interviewee)

#### **Physical challenges faced by patients with type II diabetes mellitus**

Of the 73% that had comorbidities, the most common comorbidities reported by patients were cardiovascular diseases (16.5%), musculoskeletal diseases (29.8%), neurologic conditions (21.2%), and ophthalmic conditions (21.2%). A few patients reported having urologic diseases (2.7%), reproductive (3%), and endocrine system conditions (1.2%) (Table 5).

In addition to the above physical challenges, participants pointed out that diabetes demands multiple changes in someone's life for example loss of independence in that in most cases, they rely on someone to help them with activities of daily living as well as failing to earn a living.

"Everything has to be done for her... for example cooking for her. She can't manage to cook maybe what she wants but maybe we have to cook for her. Maybe washing for her, giving her water to bath. Everything. She has just reached a level whereby it's like we are taking care of a baby now..." (49 years old female guardian)

In addition, the participants stated that they are restricted from eating a variety of foods as a result they feel stressed as they are always searching for their recommended foods. This also restricts them from travelling freely as they are not sure whether they will be able to find the right food as they travel. The participants further reported that food restrictions prevent them from participating in social gatherings.

"...Sometimes, I may be stressed as diabetes demands to eat frequently. Sometimes I might feel hungry when I am in a group of people, I am required to do something according to how I feel... sometimes for example when I am going to a funeral, I don't go thinking that something bad might happen while I am there. Eeeeeee maybe how will I explain to people that I am hungry or maybe for me to leave my friends and tell them that I am going home temporarily to eat? They may say; why is she acting like she is the only one having the disease?" (49 years old female patient interviewee)

## **Discussion**

In this study, QoL was defined as the absence of disease and having an independent life. The factors that promote QoL among T2DM patients are diabetes health talks, having a supportive family, accepting one's condition positively, and following hospital advice such as doing physical exercises and following a prescribed diet. The factors that inhibit QoL among T2DM patients include drug shortages, societal perceptions, sedentary lifestyle, stress, and despising hospital advice. QoL is also determined by demographic and behavioral characteristics and comorbidities. T2DM impacts patients' lives in several ways like food restrictions, loss of independence, change in lifestyle, and increased stress levels.

#### **Definition of quality of life and impact of type II diabetes mellitus**

Our findings that QoL means the absence of disease in an individual as well as an individual's ability to lead an independent life, are similar to the World Health Organization definition that QoL is an individual's perception of their position in life in the context of the culture and value systems in which they live, and concerning their goals, expectations, standards, and concerns [20]. Previous studies found that T2DM can adversely affect virtually all aspects of a patient's life [21]. It often leads to a deterioration in the patient's physical and psychological wellbeing, a change in their lifestyle and its adaptation to the illness, as well as changes in professional, social activity, and values which in turn affects the patients' QoL [21]. These findings were in agreement with this study which also found similar ways in which T2DM impacts patients' lives. In relation to other studies, managing diet and weight is one of the challenges impacting T2DM patients' daily life [22]. In addition, T2DM patients have problems with self-confidence, and the ability to take on life's challenges and they are faced with high levels of stress associated with diabetes management [22]. Literature has further documented that diabetes reduces productivity while working due to increased absenteeism and many working limitations, which results in productivity losses for employers as well as significantly decreasing the probability of subsequent employment [23].

#### **Determinants of Quality of Life among type II diabetes mellitus patients**

Our findings that the majority of the study participants had a better QoL are in contrast to findings from a Brazilian study that found that the majority of the participants had moderate QoL of 50-70 [11].

Our finding that having health insurance was statistically related to better QoL, suggests that people with health insurance manage to afford better health services. Other studies documented similar findings that health insurance improves service utilization and protects members financially by reducing their out-of-pocket expenditure, improving quality of care, social inclusion [24,25], and avoidance of borrowing, selling assets, not getting needed care, and engaging in other coping mechanisms [26].

Although evidence states that having health insurance improves health outcomes [26], the majority of the participants in this study were not on any health insurance which is consistent with insurance coverage in Malawi [27]. Going forward, Malawi could adopt the Namibian Government's approach which has one-third mandatory social health insurance funds and about two-thirds voluntary private plans [26] because this has the potential of optimizing QoL.

Having tertiary education was also significantly related to having better QoL. This is in agreement with a previous study that stated the importance of education on psychological health and well-being [28]. Evidence states that higher education typically leads to occupations that involve less health risk and provide greater financial capacity to purchase better nutrition and health care which are directly linked to health status [28]. This is a call for the government and various stakeholders to promote education that improves health status [29]. Despite obesity being the leading risk factor for T2DM [30], in this study, being obese was significantly related to having better QoL. On the contrary, previous studies have documented that QoL is decreased with increasing BMI/obesity [31,32]. This is seen as a call for a similar study to be done with a larger sample size using more than one study setting.

#### **Factors that promote quality of life among type II diabetes mellitus patients**

Our study showed that health education is key for diabetic clients to lead optimal life because it raises awareness of various aspects of diabetes mellitus which is essential for the prevention, management, and control of the disease [33, 34]. These educational programs help people assess their risks of diabetes, motivate them to seek proper treatment, and inspire them to take charge of their disease [33,34].

Despite that information is important in raising awareness among diabetic patients, a previous study contended that health education for patients is usually inadequate [5] and this has also been observed in this study. Similarly, a previous study conducted in rural settings of Malawi found that there is sub-optimal knowledge about diabetes and care practices among patients [5]. Specifically for Malawi, the management of Diabetes is compounded by the critical shortage of both locally relevant research evidence and NCD scientists who can effectively implement proven-effective health interventions [35].

Increasing facilities offering diabetes services is another strategy that would contribute to the QoL of diabetes patients because it will curb the long distances that patients have to cover to access health services [5,36,37]. This can be learned from other African countries that are actively instigating programs to improve the care of patients with T2DM starting with improved diagnosis [38]. Efforts to adequately equip primary health facilities to manage NCDs including diabetes need to be fast-tracked [36].

A supportive family and good relationships also enable diabetes patients to attain better QoL which is consistent with findings from a previous study that showed that family members are key sources of both instrumental and emotional support [39]. This support includes helping patients complete specific tasks, such as making an appointment with health care providers or helping with insulin injections, and emotional support as providing comfort and encouragement when patients face distress or frustration over the long course of their diabetes care [39]. These characteristics have been linked to superior health outcomes including a healthier diet, increased physical activity, and lower rates of mortality across various medical conditions [40]. However, psychological support in diabetes patients is inadequate, resulting in poor QoL and reduced general well-being [41]. Recognizing the influence family can have, Pamungkas et. al. highlighted the need for diabetes care guidelines to include the provision of diabetes education to family members or incorporate family support as part of the patient's diabetes care plan [39]. Hence mental health specialists need to empower diabetes patients' guardians with skills to support diabetes patients psychologically.

Acceptance of the disease leads to adherence to the prescribed treatment, recommended diet, physical exercises, and living positively [42,43]. All of these enhance the normalization of their blood sugar and reduce sickness frequency hence attaining QoL [42]. Regular physical exercise has proved to be effective in improving glycaemia by lowering insulin resistance and promoting insulin secretion [44]. It also reduces the risk of cardiovascular disease and obesity, the main risk factor for T2DM, in patients with T2DM [44] and they have been classified as a key component of the therapeutic approach for T2D individuals [45].

The study had several limitations. Firstly, cross-section design was used quantitatively which limited analysis of causal relationships. But the use of a mixed-method study, different data collection methods, and tools helped to increase the richness of data and study validity. There is a need to conduct a similar study in more than one study setting to better understand what health systems are doing differently that can optimize the QoL of diabetes patients. Since data collection was done during the COVID-19 pandemic, some patients refused to participate because they thought they would be vaccinated against COVID-19. Some patients reported that they have been participating in several studies but they have never received any results hence their refusing to participate. Some diaries were not collected due to several reasons. For instance, this was a maize harvesting season and some of these diarists were busy in their fields. Some diarists' mobile phones were unreachable when called to arrange for diary collection and some did not pick up their mobile phones during all attempts.

## **Conclusion**

Overall the QoL in T2DM patients is moderate. The QoL of diabetic patients is influenced by factors that are interrelated such that efforts to optimize QoL should be multidisciplinary. The inclusion of guardians in the care of diabetic patients is critical to adherence to recommended treatment and lifestyle which are key in promoting QoL. Health workers need to adopt a holistic approach when treating patients with type II diabetes mellitus and include assessment of QoL, behavioral change measures like physical exercises, and a healthy diet. The government and various stakeholders need to promote education and mandatory national health insurance which improve health status.

## Abbreviations

COMREC: College of Medicine Research and Ethics Committee

CVD: Cardiovascular Disease

DM: Diabetes Mellitus

KCH: Kamuzu Central hospital

MDQoL-17: Modified Diabetes Quality of Life Questionnaire-17

NCDs: Non-communicable diseases

QoL: Quality of Life

T2DM: Type 2 Diabetes Mellitus

WHO: World Health Organization

## Declarations

### Ethical approval and consent to participate

Ethical approval was obtained from the College of Medicine Research and Ethics Committee (CoMREC) (P.09.20.3122). The Director of KCH granted institutional support to conduct the study at the facility. Participation was voluntary and informed consent was obtained from the participants. They were assured that they could withdraw from the study at any point without affecting their access to medical services. All data collected were stored in a password-protected computer and were accessible to the researchers only to safeguard their confidentiality. To conceal their identity, codes and no names were used in identifying the participants.

### Consent for publication

Not applicable

### Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to participant privacy but are available from the corresponding author on reasonable request.

### Competing interests

The authors declare that they have no competing interests

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### Authors' contributions

AC planned and designed the study, developed the study methods, interview guides, diarist instructions, conducted data collection, analyzed the data and drafted the manuscript. ALNM, NT, NPKB, ASM and JK supervised planning of the study, development of methods, data collection, data analysis, reviewed and edited the manuscript. WN supervised data analysis, reviewed and edited the manuscript. All authors read and approved the final manuscript.

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