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RESEARCH ARTICLE

Physical Disability Among Adults with Type 2 Diabetes at Bombo Hospital, Tanga Region: Prevalence, Knowledge and Prevention Practices

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Abstract:

***Background*:** Physical disability in adults with Type 2 Diabetes Mellitus (T2DM) often arises from various medical complications, notably Diabetic Peripheral Neuropathy (DPN). However, inadequate statistical data impedes a comprehensive understanding of the pattern of physical disability associated with diabetes in this area. Therefore, this study investigated the current prevalence of physical disability and its association with the level of knowledge and prevention practices among adult patients with T2DM attending the diabetic clinic at Bombo Hospital in the Tanga region.

***Methods*:** A hospital-based quantitative cross-sectional study was carried out among 337 adult patients with T2DM aged 40 years and above attending a diabetic clinic at Bombo Hospital. Data were collected using a structured questionnaire and the Katz Index of Independence in Activities of Daily Living (ADLs). Data were analyzed using descriptive statistics, chi-square, and logistic regression tests.

***Results*:** The study revealed that 59.9% of participants experienced physical disability associated with diabetes. Approximately 46.9% of participants had moderate levels of knowledge regarding physical disability, while 58.5% demonstrated appropriate prevention practices. Notably, being female (AOR 1.94, 95%CI: 1.14-3.32) and having a T2DM diagnosis for 5 to 10 years (AOR 2.73, 95%CI: 1.40-5.34) were significantly linked to a higher prevalence of physical disability.

***Conclusion*:** The observed prevalence of physical disability linked to diabetes is alarmingly high. Therefore, there is a crucial need for healthcare providers to persist in educating diabetic patients on methods to prevent physical disability associated with diabetes.

Keywords: Physical disability, adult type 2 diabetic patients, knowledge, prevention practices, Bombo hospital, Tanga region.

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1. INTRODUCTION

Diabetes is a non-communicable metabolic condition characterized by high glucose levels in the blood [1]. It can be caused by defects in insulin secretion (Type 1 Diabetes Mellitus) or insulin action (Type 2 Diabetes Mellitus) and is most common in middle-aged or older adults. T2DM is the most common form of diabetes, often referred to as adult-onset diabetes [1].

In T2DM, the blood sugar levels are consistently high, which leads to endothelial dysfunction, hence causing atherosclerosis. Due to damage to blood vessels, the plaque buildup leads to narrowing and hardens, increasing the risk of complications like retinopathy, nephropathy, peripheral neuropathy, and diabetic foot ulcers. The most common complication is diabetic peripheral neuropathy (DPN) [2].

The global diabetes prevalence among adults aged 20-79 is expected to rise from 10.5% in 2021 to 12.2% in 2045, with the highest increase expected in middle-income countries [3]. T2DM accounts for 90-95% of all diagnosed cases, with a higher prevalence among older adults [3–5]. Tanzania, like other sub-Saharan African countries, is experiencing a global increase in T2DM burden, particularly in the adult population [6]. This increase is linked to a rise in micro- and macrovascular complications, such as DPN, which results in physical disability [7].

The prevalence of physical disability among adult patients with T2DM in sub–Saharan Africa was 27%-59% in 2016. The most common factors known to be associated with physical disability among adult T2DM patients include: increasing age, inadequate knowledge of T2DM complications, and poor prevention practices [8]. Physical disability is an important measure of health for diabetics, and an estimate of its magnitude and associated factors is crucial given the global diabetes epidemic [9].

According to a situational analysis of disability in Tanzania in 2016, levels of disability were higher on the Tanzania mainland (9.3%) compared to Zanzibar (7.3%). The most common disabilities reported in Tanzania's mainland were difficulty seeing (1.9%), followed by difficulty walking (1.2%). The percentage of People with Disabilities (PWDs) was higher among the adult population compared to the young population group [10]. Tanga City has no specific statistics on disability among the adult population, especially on disability resulting from the effects of diabetes in this era of the global increase of diabetes and its complications. In 2021, about 2,170 diabetics were registered at the Diabetic clinic at Bombo Hospital. About 90% of these patients were from Tanga City, and the majority of them diagnosed with diabetes were T2DM [11].

Despite the efforts made by the Ministry of Health in Tanzania, such as collaborating with the Tanzania Diabetes Association (TDA) to reduce physical disabilities related to diabetes, including lowering the rate of limb amputations due to diabetic foot, the problem persists and remains a public health challenge in Tanga City and Tanzania in general [12]. Little is known about the current burden of physical disability related to diabetes in Tanzania among adult patients with T2DM. The findings from this study will provide some insights into this problem and evidence to support effective intervention relevant to the problem and prevent physical disability related to diabetes among adult T2DM patients.

2. MATERIALS AND METHODS

2.1. Study Setting

This study was conducted at Bombo Regional Referral Hospital in the Tanga region. Bombo Hospital is a government referral and teaching hospital in Tanga City, North-Eastern Tanzania, with a catchment population of approximately 2,045,205 inhabitants [13] from all districts around the Tanga region. It is the sole public facility in the region providing specialized diabetic care due to the limited capacity of primary health centers to manage chronic diseases like diabetes.

2.2. Study Design

A hospital-based cross-sectional study was conducted at Bombo Referral Regional Hospital in Tanga Region, Tanzania, from July to August 2022.

2.3. Study Population and Eligibility Criteria

The study population consisted of individuals aged 40 years and above attending the diabetic clinic at Bombo Hospital during the study period. The participants aged 40 years and above were selected based on the fact that T2DM affects most people who are middle-aged or older adults. The adult patients with T2DM aged 40 years and above who were severely ill and admitted to the hospital for treatment during the study, and those who had other chronic diseases like leprosy and arthritis were excluded.

2.4. Sample Size Estimation and Sampling Techniques

The sample size was determined by using a Cochran formula: $n = z^2p(1-p)/\mathcal{E}^2$ (n = sample size, z = standard normal deviation (1.96) on using 95% CI, p = previous prevalence of physical disability (27%) [8], and $\mathcal{E}$ = margin of error (5%). Considering a non-response rate of 10%, the estimated sample was 337 adult T2DM patients.

A consecutive sampling technique was used to select study participants based on the attendance schedule of the patients during the study period from July to August, avoiding the cycling of the participants.

2.5. Data Collection Tools and Methods

A prepared questionnaire and Katz Index instrument on ADLs were pre-tested before at the Youth with Disabilities Community Programme (YDCP) in Tanga City, involving 34 (10%) T2DM patients who received services there. The participants were selected randomly from 200 adult T2DM patients. The tools were prepared in English, then translated and administered in Kiswahili, and the data collection process involved three research assistants, one registered nurse, one medical officer, and one physiotherapist from Bombo Hospital. The interviewer-administered questionnaire collected data on socio-demographics, health profiles, prevalence, knowledge, and practices towards physical disability. The Katz Index of Independence Instrument assessed major Activities of Daily Living (ADLs) to determine the prevalence of physical disability related to diabetes among T2DM patients.

2.6. Data Management and Analysis

The study used SPSS version 28 to analyze data on physical disability prevalence, knowledge, and prevention practices related to diabetes. Descriptive statistics were used to summarize variables, and chi-square tests were used to compare categorical variables. Bivariate and multivariate logistic regressions were applied to determine factors influencing physical disability. Adjusted Odds Ratios (AOR) were used to measure the strength of association. Composite scoring was used for knowledge, with participants receiving one point for correct responses. Overall knowledge levels were classified using Bloom's cut-off points, with scores between 80 and 100% deemed high, 60 to 79% moderate, and below 60% low. Practices were classified as appropriate if they scored higher than the average (≥60) and inappropriate if they scored lower (≤59).

2.7. Ethical Considerations

Ethical approval for this study was sought from the Institutional Review Board (IRB) of Muhimbili University of Health and Allied Sciences (MUHAS-REC-07-2022-1270). Further permissions to conduct this study were sought from the administrative units of Bombo Referral Regional Hospital management. Both oral and written consent were obtained from each study participant after a thorough explanation of the objectives of the study. The consent forms were provided to the study participants to read and sign. The study emphasized the importance of voluntary participation. Data collected were kept confidential, and no name or identifier was taken from the study participants.

3. RESULTS

3.1. Socio-demographic Characteristics of Study Participants

A total of 337 T2DM patients were enrolled in this study, with about half of the participants being males (50.4%) and belonging to the age group of 40-59 years (53.7%). Almost half of the participants

(49.1%) were diagnosed with T2DM five to ten years ago, with about 40% diagnosed with other chronic diseases, such as high blood pressure (Table **1**).

Table 1: Socio-demographic and health characteristics of the study participants (n=337).

Characteristics	n (%)
Sex	
Male	170 (50.4)
Female	167 (49.6)
Age (Median= 59 years (IQR= 15)	
40-59	181 (53.7)
60-79	140 (41.5)
80+	16 (4.7)
Marital status	
Married	238 (70.6)
Not married	26 (7.7)
Divorced	11 (3.3)
Cohabiting	12 (3.6)
Widow	50 (14.8)
Level of Education	
No formal education	76 (22.6)
Primary education	158 (46.9)
Secondary education	66 (19.6)
College and above	37 (11.0)
Occupation	
Employed	42 (12.5)
Self-employment	150 (44.5)
Unemployed	145 (43.0)
Daily income	
None	48 (14.2)
< 5000	119 (35.3)
≥5000	170 (50.5)
Duration of T2DM (Years)	
<5	86 (25.5)
5-10	165 (49.1)
10+	86 (25.5)
Presence of other chronic diseases	
Yes	135 (40.1)
No	202 (59.9)

3.2. Prevalence of Physical Disability Related to Diabetes Among Study Participants

The overall prevalence of physical disability related to diabetes among adults with T2DM attending diabetic clinics at Bombo Hospital was 59.9%. According to the distribution of physical disabilities related to diabetes, a higher prevalence of physical disability was observed among participants with limited /stiff hand deformities (23.1%), physical disabilities on ADLs (21.0%), and foot cellulitis (19.6%) (**Figure 1**).

3.3. Prevalence of Physical Disability Related to Diabetes According to Socio-demographic and Health Profile Characteristics of Study Participants

According to socio-demographic and health profile characteristics, there was a statistically significant higher prevalence of physical disability among males compared to females (67.1% vs. 52.7%, p=0.008), among the age group of 80 years and above (75.0%, p<0.001), and among those who had diabetes for 5–10 years (67.3%) and above ten years (67.4%) (p<0.001) (Table **2**).

3.4. Knowledge of Physical Disability Related to Diabetes

The vast majority (95.5%) were aware that diabetes can cause physical disability, and most demonstrated a clear understanding that poor blood glucose management is a major risk factor for diabetes-related physical disabilities (Table **3**).

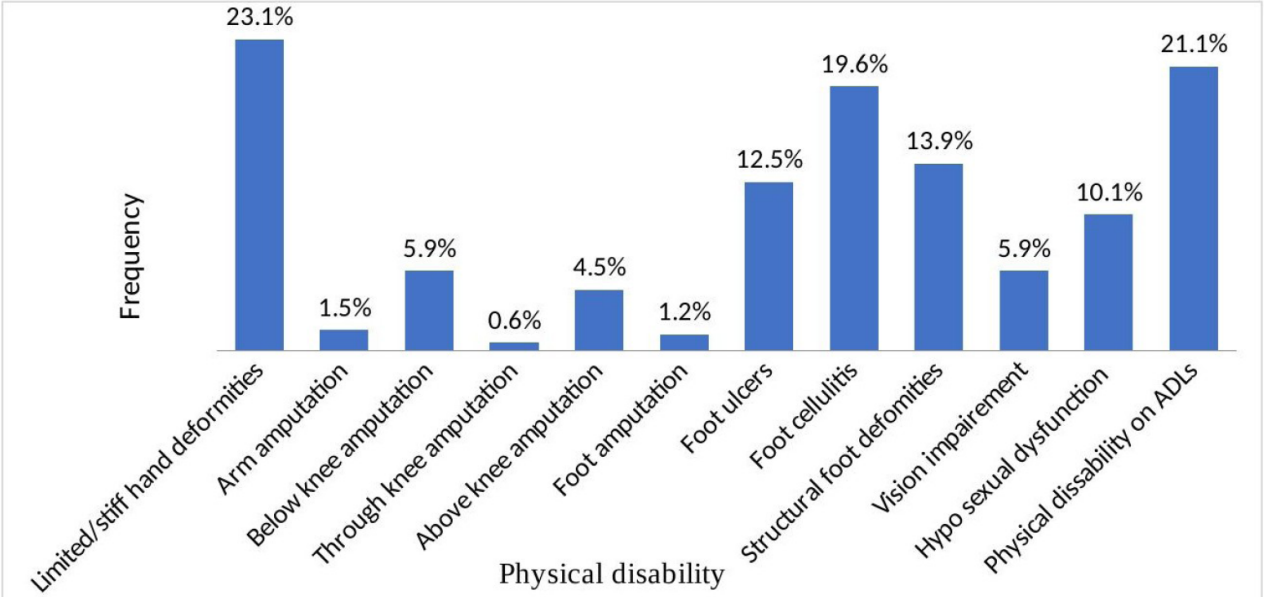

Figure 1: Distribution of physical disabilities related to diabetes among study participants.

Table 2: Prevalence of physical disability related to diabetes according to socio-demographic and health profile characteristics

Characteristics	Total (n)	Physical disability Yes, n (%)	p-value
Sex			
Male	170	114 (67.1)	0.008*
Female	167	88 (52.7)	
Age			
40-59	181	89 (49.2)	0.000*
60-79	140	101 (72.1)	
80+	16	12 (75.0)	
Marital status			
Married	238	145 (60.9)	0.844
Not married	26	13 (50.0)	
Divorced	11	6 (54.5)	
Cohabiting	12	7 (58.3)	
Widow	50	31 (62.0)	
Level of education			
No formal education	76	50 (65.8)	0.359
Primary	158	89 (56.3)	
Secondary	66	43 (65.2)	
College +	37	20 (54.1)	
Occupation			
Employed	42	20 (47.6)	0.092
Self-employment	150	87 (58.0)	
Unemployed	145	95 (65.5)	
Daily income			
None	48	33 (68.8)	0.401
<5000	119	69 (58.0)	
≥5000	170	100 (58.8)	
Duration of T2DM			
<5	86	33 (38.4)	0.000*
5-10	165	111 (67.3)	
10+	86	58 (67.4)	
Presence of other chronic disease			
Yes	135	86 (63.7)	0.249
No	202	116 (37)	

*Significant ($p<0.05$)

Table 3: Participants' responses on knowledge of physical disability related to diabetes.

Variables	Responses Percent	
	Frequency (n)	(%)
General knowledge of physical disability		
Limited function of the body parts due to deformities	291	86.4
A condition that limits body function, capacity, or stamina	248	73.6
Reduced mental capacity due to mental illness	41	12.2
Loss of one or more body parts	169	50.1
Knowledge on diabetes as a cause of physical disability		
Yes	322	95.5
No	3	0.9
Don't know	12	4.2
Risk factors for physical disability related to diabetes		
Drinking too much water	26	7.7
Cigarette smoking	136	40.5
Overweight and obesity	272	81.0
Excessive alcohol drinking	200	59.5
Eating too much fat and sugar	231	68.8
Poor blood glucose management	267	79.5
Increasing age	100	29.8
Don't know	23	6.8
Signs and symptoms of physical disability related to diabetes		
Loss of sensation in limbs	272	80.7
Too much sleeping	74	22.0
Tingling in hands and feet	154	45.7
Numbness in the feet	278	82.5
Sharp pain in feet and hands	106	31.5
Loss of appetite	31	9.2
None of the above	4	1.2
Knowledge of prevention measures for risk factors of disability related to diabetes		
Foot care	282	83.7
Stop cigarette smoking	141	41.8
Stop excessive alcohol drinking	175	51.9
Reading a magazine daily	34	10.1
Not listening to what others say about your condition	106	31.5
Don't know	18	5.3
Knowledge of preventive measures for developed complications, i.e. diabetic foot		
Examination of feet and toes daily	308	91.4
Get an annual foot examination	219	65.0
Visit a doctor when you notice a foot infection, cracks, or corn	314	93.2
Wear comfortable cushion-soled shoes	107	31.8
Change socks daily	108	32.0
Several town trips	6	1.8
Don't know	13	3.9
The best measure to prevent complications due to diabetic neuropathy		
Avoid regular health examinations	33	9.9
Taking too much water	236	70.4
Strict control of blood glucose levels	317	94.1
Sleeping on time	109	32.5
Don't know	7	2.1
Further complications developed due to poor management of the diabetic foot		
Foot ulcers	265	78.6
Gangrene	236	70.0
Lower limb amputation	240	71.2
Difficulty in mobility	102	30.3
Don't know	15	4.5

3.5. Classification of Knowledge Levels Regarding Physical Disabilities

About 22% of the study participants had a high level of knowledge, 46.9% had a moderate knowledge level, and 31.2% had a low level of knowledge regarding physical disability related to diabetes.

3.6. Knowledge Level According to Socio-demographic Characteristics

Level of education (p=0.009), occupation (p=0.036), and daily income (p<0.001) were statistically significantly associated with a low knowledge level of physical disability. This indicates that participants who had no formal education, those who were unemployed, and those who had no daily income for years were associated with a higher likelihood of low knowledge level regarding physical disability related to diabetes (Table **4**).

Table 4: Knowledge level regarding physical disability according to socio-demographic and economic characteristics (n=337)

Variable	Total (N)	Knowledge level (n %)			p-value
		High	Moderate	Low	
Sex					
Male	170	39 (22.9)	84 (49.4)	47 (27.6)	0.373
Female	167	35 (21.0)	74 (44.3)	58 (34.7)	
Age					
40-59	181	37 (20.4)	85 (47.0)	59 (32.6)	0.152
60-79	140	35 (25.0)	68 (48.6)	37 (26.4)	
80+	16	2 (12.5)	5 (31.5)	9 (56.2)	
Marital status					
Married	238	61 (25.6)	110 (46.2)	67 (28.2)	0.060
Not married	26	2 (7.7)	11 (42.3)	13 (50.0)	
Divorced	11	1 (9.1)	7 (63.6)	3 (27.3)	
Cohabiting	12	0 (0.0)	5 (41.7)	7 (58.3)	
Widow	50	10 (20.0)	25 (50.0)	15 (30.0)	
Level of education					
No formal education	76	5 (6.6)	37 (48.7)	34 (44.7)	0.009*
Primary	158	40 (25.3)	73 (46.2)	45 (28.5)	
Secondary	66	19 (28.8)	31 (47.0)	16 (24.2)	
College +	37	10 (27.0)	17 (45.9)	10 (27.0)	
Occupation					
Employed	42	10 (23.8)	19 (45.2)	13 (31.0)	0.036*
Self-employment	150	43 (28.7)	69 (46.0)	38 (25.3)	
Unemployed	145	21 (14.5)	70 (48.3)	54 (37.2)	
Daily income					
None	48	3 (6.2)	16 (33.3)	29 (60.4)	0.000*
<5000	119	23 (19.3)	61 (51.3)	35 (37.1)	
≥5000	170	48 (28.2)	81 (47.6)	41 (53.0)	

*Significant (p<0.05)

3.7. Prevention Practices Towards Physical Disability Related to Diabetes Among Study Participants

The majority of the participants (90.8%) showed a significant regularity in a blood checkup as part of preventive measures for physical disability related to diabetes, while only one-fifth (19.6%) of the participants had an appropriate regularity in undergoing a foot care examination (Table **5**).

3.8. Prevention Practice on Physical Disability Related to Diabetes According to the Socio-demographic Characteristics of the Study Participants

Generally, more than half of the participants (197, 58.5%) had appropriate practices toward the prevention of physical disability related to diabetes, while the rest (140, 41.5%) had inappropriate practices. There were statistically significant differences in prevention practices regarding physical disability related to diabetes based on marital status (p=0.008) and daily income (p=0.018). This suggests that individuals

who are divorced or have no daily income may be more likely to engage in inappropriate prevention practices (Table **6**).

3.9. Factors Associated with the Prevalence of Physical Disability Related to Diabetes Among Participants

The statistically significant factors linked to the occurrence of physical disability included being female (AOR 1.94, 95%CI: 1.14-3.32) and being diagnosed with T2DM for 5-10 years (AOR 2.73, 95%CI: 1.40-5.34) (Table **7**).

4. DISCUSSION

The study revealed that more than half of the participants attending the diabetic clinic developed physical disabilities related to diabetes. The observed results were similar to a study conducted in South India on microvascular complications among adult T2DM patients, which reported a prevalence rate of 52.1% [14]. However, the observed findings were inconsistent with previous studies conducted in Cameroon and Tanzania, which reported lower prevalence rates of 27% [8] and 28.8% [15], respectively. The observed discrepancies might be attributed to differences in the study population, particularly the age limit and sampling technique used.

Table 5: Prevention practices towards physical disability related to diabetes among study participants

Variable	Frequency (N)	Percent
When was your last visit with your physician?		
Once within a month	203	60.2
Once in three months	75	22.3
Once in six months	4	1.2
Only when needed	8	2.4
Others	47	13.9
When was your last foot care examination?		
Within one month	66	19.6
Two months ago,	51	15.1
Six months ago,	16	4.7
One year ago,	11	3.3
More than a year ago	33	9.8
Never	160	47.5
When was your last blood sugar checkup?		
Within one month	306	90.8
Two months ago,	25	7.4
Six months ago,	4	1.2
Don't know	2	0.6
Follow a dietary modification.		
Yes, many times	151	44.8
No, never	13	3.9
Yes, occasionally	173	51.3
Regularity in physical activity		
20-30 minutes every day	145	43.2
30 minutes once per week	104	31.0
2 to 3 times per month	36	10.7
Once within six months	15	4.5
Never	17	5.1
Others	20	6.0
Lifestyle modifications used for the prevention of physical disability related to diabetes		
Exercises / physical activity	329	97.9
Dietary modification	300	89.3
Maintain a healthy weight	291	86.6
Stop cigarette smoking	137	40.8
Stop excessive alcohol drinking	157	46.7
Don't know	3	0.9
Other best options used for the prevention of physical disability related to diabetes		
Regular health check-ups	268	79.5

Variable	Frequency (N)	Percent
Strict control of blood sugar levels	316	93.8
Regular foot care and examinations	271	80.4
Avoid talking too much	36	10.7
Don't know	4	1.2
Status on the practice of regular blood sugar monitoring as a prevention practice		
Yes, I agree	311	92.3
No, I disagree	4	1.2
Not relevant	3	0.9
Don't know	19	5.6

Table 6: Practice level toward prevention of physical disability related to diabetes according to socio-demographic characteristics (n=337)

Variable	Total (N)	Prevention practice level (n %)		p-value
		Appropriate	Inappropriate	
Sex				
Male	170	101 (59.4)	69 (40.6)	0.660
Female	167	95 (56.9)	72 (43.1)	
Age				
40-59	181	102 (56.4)	79 (43.5)	0.115
60-79	140	88 (62.9)	52 (37.1)	
80+	16	6 (37.5)	10 (62.5)	
Marital status				
Married	238	150 (63.0)	88 (37.0)	0.008*
Not married	26	10 (38.5)	16 (61.5)	
Divorced	11	3 (27.3)	8 (72.7)	
Cohabiting	12	4 (33.3)	8 (66.7)	
Widow	50	29 (58.0)	21 (42.0)	
Level of education				
No formal education	76	42 (55.3)	34 (44.7)	0.064
Primary	158	83 (52.5)	75 (47.5)	
Secondary	66	46 (69.7)	20 (30.3)	
College and above	37	25 (67.6)	12 (32.4)	
Occupation				
Employed	42	28 (66.7)	14 (33.3)	0.407
Self-employment	150	88 (58.7)	62 (41.3)	
Unemployed	145	80 (55.2)	65 (44.8)	
Daily income				
None	48	19 (39.6)	29 (60.4)	0.018*
<5000	119	72 (60.5)	47 (39.5)	
≥5000	170	105(61.8)	65 (38.2)	

*Significant ($p<0.05$)

Table 7: Factors associated with the prevalence of physical disability related to diabetes among study participants.

Variable	Total	Physical disability YES (%)	COR (95%CI)	p-value	AOR (95%CI)	p-value
Sex						
Male	170	114 (67.1)	1		Ref	
Female	167	88 (52.7)	1.83 (1.18-2.84)	0.007 *	1.94 (1.14-3.32)	0.015*
Age						
40-59	181	89 (49.2)	1		Ref	
60-79	140	101 (72.1)	0.37 (0.23- 0.60)	0.000*	2.02 (0.55-7.39)	0.286
80+	16	12 (75.0)	0.32 (0.10-1.04)	0.058	1.14 (0.32-4.05)	0.837
Marital status						
Married	238	145 (60.9)	1			
Not married	26	13 (50.0)	1.56 (0.69-3.51)	0.284		
Divorced	11	6 (54.5)	1.30 (0.39-4.38)	0.673		
Cohabiting	12	7 (58.3)	1.11 (0.34-3.61)	0.858		

Variable	Total	Physical disability YES (%)	COR (95%CI)	p-value	AOR (95%CI)	p-value
Widow	50	31 (62.0)	0.96 (0.51-1.79)	0.887		
Level of education						
No formal education	76	50 (65.8)	1		Ref	
Primary education	158	89 (56.3)	1.49 (0.84-2.63)	0.169	0.66 (0.22-2.00)	0.465
Secondary education	66	43 (65.2)	1.023(0.51-2.06)	0.936	0.80 (0.30-2.12)	0.656
College and above	37	20 (54.1)	1.64 (0.73-3.64)	0.230	0.63 (0.24-1.64)	0.339
Occupation						
Employed	42	20 (47.6)	1		Ref	
Self-employment	150	87 (58.0)	0.66 (0.33-1.31)	0.233	1.82 (0.67-4.93)	0.238
Unemployed	145	95 (65.5)	0.48 (0.24-0.96)	0.038*	1.34 (0.73-2.47)	0.351
Daily income (TSH)						
None	48	33 (68.8)	1		Ref	
<5000	119	69 (58.0)	1.59 (0.78-3.25)	0.198	0.88 (0.35-2.18)	0.775
≥5000	170	100 (58.8)	1.54 (0.78-3.05)	0.215	1.03 (0.55-1.93)	0.931
Duration of T2DM (years)						
<5	86	33 (38.4)	1		Ref	
5-10	165	111 (67.3)	0.30 (0.18-0.52)	0.000*	2.73 (1.40-5.34)	0.003*
10+	86	58 (67.4)	0.30 (0.16-0.56)	0.000*	0.82 (0.45-1.51)	0.526
Presence of other chronic disease						
Yes	135	86 (63.7)	1		Ref	
No	202	116 (57.4)	1.30 (0.83-2.04)	0.250	0.79 (0.48-1.32)	0.370
Level of knowledge						
High	74	42 (55.4)	1			
Moderate	158	93 (58.2)	0.92 (0.53-1.60)	0.762		
Low	105	67 (63.8)	0.74 (0.41-1.37)	0.342		
Prevention practices						
Appropriate	196	115 (58.7)	1			
Inappropriate	141	87 (61.7)	0.881 (0.57-1.37)	0.576		

COR stands for Crude Odds Ratio, AOR stands for Adjusted Odds Ratio, *Significant ($p<0.05$)

Regarding gender disparities, the research noted a higher vulnerability among females to develop physical disability linked to diabetes compared to males. This finding aligns with similar research conducted in Nigeria concerning the prevalence of physical disability among older adults with T2DM. The results imply a pronounced risk of physical disability among adult patients with T2DM, particularly among females [16]. The observed prevalence of diabetes-related physical disability underscores the necessity for diverse interventions and programs. Factors such as individual health behaviours, socio-economic circumstances, and access to healthcare services may contribute to the onset of physical disability. These factors could be associated with heightened patient workload, shortages in staff, and incomplete implementation of national strategies aimed at preventing non-communicable diseases. Therefore, it is imperative to intensify efforts to disseminate knowledge on diabetes complications and their management through various initiatives, including mass screening for diabetic foot complications, regular general health check-ups, and social and behaviour change communication (SBCC) programs targeting adults aged 40 years and older with T2DM.

The present study reported that a considerable number of the participants possessed a moderate level of understanding concerning physical disabilities associated with diabetes, possibly due to their regular visits to diabetes clinics. This observation contrasted with the findings of a prior study conducted in Ghana, which noted a higher percentage of participants with limited knowledge about diabetes complications [17]. The disparity in results might be attributed to collaborative efforts by healthcare professionals and other stakeholders in the healthcare sector, such as non-governmental organizations (NGOs), in delivering educational programs on diabetes and its complications, consequently enhancing awareness among the study participants.

The current study unveiled that over half of the participants displayed suitable preventive measures concerning physical disability associated with diabetes, which could be attributed to their consistent attendance at diabetic clinics and participation in awareness sessions. This observation was supported by prior studies conducted in Ghana and other developing nations, which noted adequate preventive behav-

iours among diabetic patients [18]. Another notable finding was the limited regularity in certain practices, like foot examinations, which mirrored findings from a study conducted in Dar es Salaam [12]. Conversely, a notable and appropriate frequency of engaging in physical activity was observed. This finding differed from the results of a study conducted in Nigeria, which indicated that a majority of participants had low levels of physical activity [19]. Given that appropriate preventive measures play a crucial role in averting physical disabilities among adult patients with type 2 diabetes mellitus, efforts should be made to enhance these practices.

The higher odds of physical disability among females and individuals diagnosed with T2DM for 5–10 years can be attributed to various factors. These factors may include physiological differences between genders, such as hormonal influences, which may increase the susceptibility of females to complications [20]. Additionally, the longer duration of T2DM may cause progressive damage to organs and tissues, thus raising the risk of physical disabilities over time. Lifestyle habits, access to healthcare, and adherence to treatment regimens may also have a significant impact on determining the risk of physical disability in these groups [21].

5. STUDY LIMITATIONS

This study utilized a cross-sectional design, which is limited in establishing a causal relationship between variables because measures and exposures are assessed at a single point in time. Moreover, there is a potential for recall bias, particularly regarding questions such as the duration of T2DM since diagnosis; however, this was addressed by utilizing information extracted from participants' clinic cards. Additionally, consecutive sampling was employed to minimize the impact of participant selection bias, as participants were recruited based on their scheduled clinic attendance, thus avoiding repeated inclusion or exclusion. Despite these limitations, this study provides insights into the prevalence of physical disability and its correlation with the level of knowledge and preventive behaviours among adult patients with T2DM attending the diabetic clinic at Bombo Hospital in Tanga.

CONCLUSIONS AND RECOMMENDATIONS

The study observed a high prevalence (59.9%) of physical disability associated with diabetes among adult patients with T2DM. Nearly half of the participants exhibited a moderate level of knowledge regarding diabetes-related physical disability, with a higher prevalence of low knowledge levels noted among females. Additionally, most participants demonstrated appropriate preventive practices for diabetes-related physical disability. Factors associated with the prevalence of physical disability related to diabetes included being female and having a T2DM diagnosis for 5-10 years.

There is a pressing need for healthcare providers to continue educating diabetic patients on strategies to prevent physical disability related to diabetes. Furthermore, healthcare facilities at all levels should integrate and implement cost-effective specialized diabetic and rehabilitation services to alleviate the burden and enhance prevention efforts for diabetes and its complications.

AUTHOR'S CONTRIBUTIONS

Conceptualization: Olida Joseph, Vivian P. Mushi, and Lwidiko E. Mhamilawa.

Methodology: Olida Joseph, Vivian P. Mushi, and Lwidiko E. Mhamilawa.

Analysis: Olida Joseph.

Supervision: Vivian P. Mushi, and Lwidiko E. Mhamilawa.

Writing – original draft: Olida Joseph and Vivian P. Mushi.

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CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

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DATA AVAILABILITY

The corresponding author will provide the datasets used in/or analyzed during the current work upon reasonable request.

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