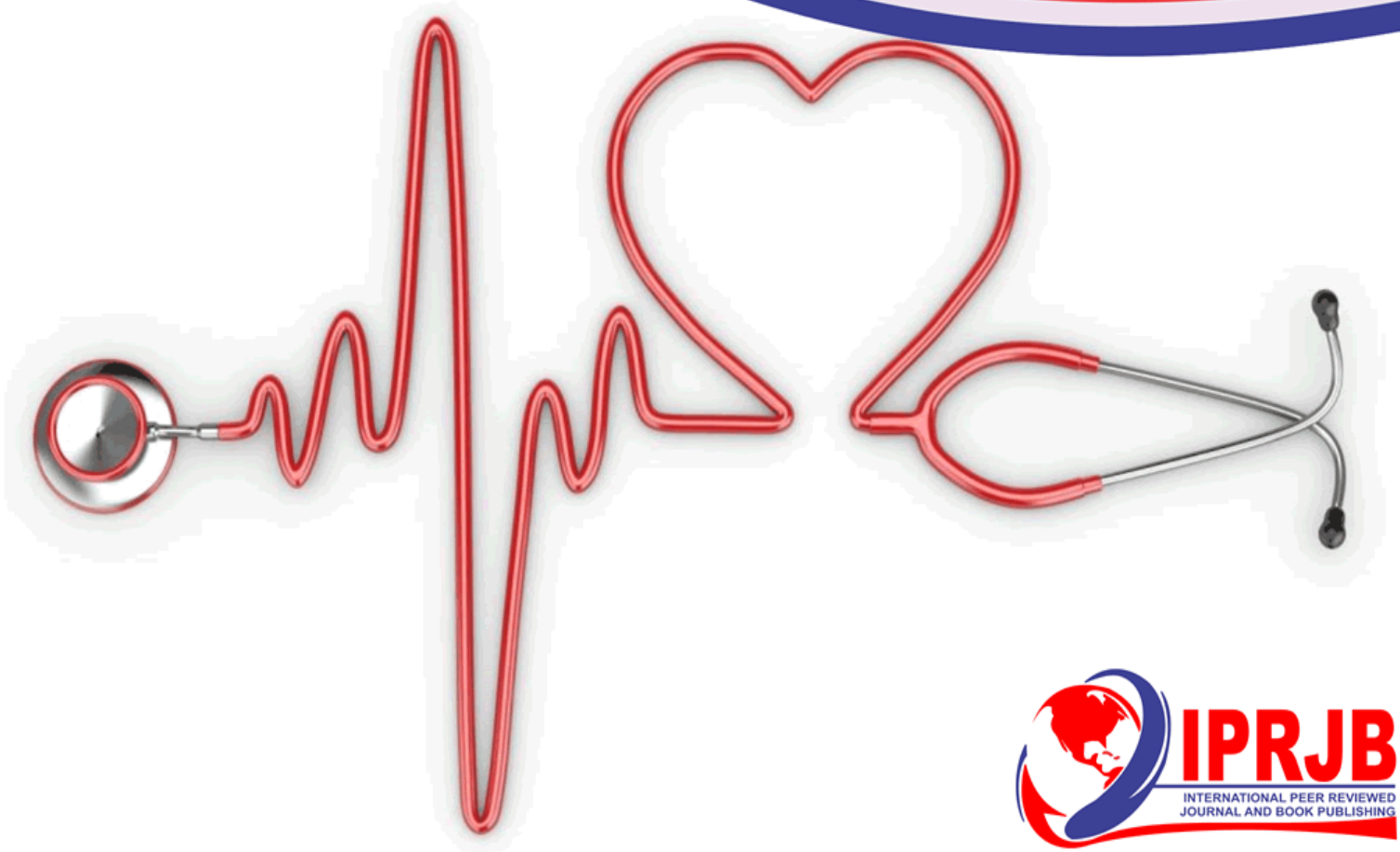


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SOCIO-DEMOGRAPHIC CHARACTERISTICS ASSOCIATED WITH HEALTH-RELATED QUALITY OF LIFE AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT TENWEK HOSPITAL

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SOCIO-DEMOGRAPHIC CHARACTERISTICS ASSOCIATED WITH HEALTH-RELATED QUALITY OF LIFE AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT TENWEK HOSPITAL

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Abstract

Purpose: To determine socio-demographic characteristics associated with health-related quality of life among patients with type 2 diabetes mellitus at Tenwek hospital.

Methodology: This was an analytic cross-sectional study that was done among patients with diabetes mellitus type 2 attending outpatient clinics at Tenwek Hospital. Quantitative approach was used in data collection. Systematic sampling was used to determine 227 participants who participated in the study. Quantitative data was analyzed using descriptive statistics (mean) and Inferential statistics were done using One-Way ANOVA and Factorial ANOVA. Using One-Way ANOVA, p value was used to show whether the difference between the mean is statistically significant. Factorial ANOVA was used to give a summary of the results by bring all the variables and testing their association with the overall health related quality of life (HRQoL)

Findings: Age group, education level and religion were associated with overall health related quality of life with ($F = 19.9, p < 0.0001$; $F = 3.94, p = 0.05$; $F = 9.46, p = 0.002$, respectively). Gender, marital status and occupation were not associated with overall health related quality of life.

Unique contribution to theory, practice and policy: This study has identified socio-demographic characteristics associated with health-related quality of life among patients with type 2 diabetes mellitus. The findings will provide insight to the hospital administration to come up with interventions for creating awareness in the community and identifying cases of type 2 diabetes early so as to save victims at an early stage of disease progression and to prevent development of complications and comorbidities. Also, multi-disciplinary team assessment of HRQoL among patients with type 2 diabetes mellitus early in disease course or as soon as they are diagnosed will help to identify modifiable factors that may help the patient lead an active and healthy life. The study will also establish baseline information for future studies on health-related quality of life and associated factors among patients with diabetes mellitus type 2 at the study site. This study recommends reassessment and expansion of Wilson–Cleary model of health-related quality of life.

Keywords: *Socio demographic characteristics, health related quality of life, diabetes mellitus type 2*

1.0 INTRODUCTION

1.1 Background

The global prevalence of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population (Wagana *et al.*, 2016). In 2019, it was estimated that 463 million people had diabetes (Saeedi *et al.*, 2019). Prevalence of diabetes in the Africa Region among adults was estimated to be 3.8%, with uncertainty interval of 2.6–7.9% (Ogurtsova *et al.*, 2017). In Kenya, the estimate of diabetes prevalence was at 3.3 % with a projection of rising to 4.5 %, in 2025, translating to 1.8 million Kenyans living with Diabetes (Kenya the National Diabetes strategy 2010–2015).

HRQoL is one of the most widely measured treatment outcomes to self-assess the effects of the management of chronic disease on health. It monitors the physical, psychological and social aspects of personal health and is influenced by individual expectations, beliefs, perceptions and experiences (Megari, 2013)

Type 2 diabetes (T2D) has a negative impact to patient's HRQoL affecting working life, health status, family and sexual life, future perspectives and dietary habits (Papazafiropoulou *et al.*, 2015). Diabetes is known to worsen the health- related quality of life (Kumar, Krishan & Jhaji, 2016). Absence of diabetes-related complications is associated with better HRQoL of patients (Aschalew, Yitayal & Minyihun , 2020). Effective control of blood glucose levels through routine monitoring can reduce the onset of serious complications (Wolters, Braspenning and Wensing, 2017).

Studies have reported sociodemographic factors to be associated with health related quality of life among patients with diabetes mellitus type. In a study conducted in India, it was reported that as the age increased the QoL decreased, patients less than 40 years had a better QoL while those more than 65 years had comparatively a poor QoL (Prajapati, Blake, Acharya & Seshadri, 2017). A cross-sectional study that was conducted within a 6-month period found that male respondents perceived a better quality of life compared to women (Spasić *et al.*, 2014). A hospital-based cross-sectional study was conducted in Ghana by Osei-Yeboah *et al.*, 2016, showed that Patients' attained level of formal education significantly distinguished patients' quality of life. A study done in Saudi Arabia reported that there was a strong positive relationship between religious connectedness and HRQL among muslim diabetic patients (Alzahrani & Sehlo, 2013). A study done at Kenyatta National Hospital showed that age of study participants, duration of diabetes, presence of complications and income related factors were determinants of HRQoL. In Bomet County, health- related quality of life and associated factors among type 2 diabetes mellitus patients is unknown.

While data on treatments and follow- up care is available at Tenwek Hospital, there is no research which has been done on health -related quality of life. Considering the worldwide growing prevalence of diabetes mellitus type 2 and increasing importance of HRQoL in chronic diseases, improving knowledge about HRQoL and its associated factors is important. Therefore there is need to investigate health- related quality of life and associated factors among patients with diabetes mellitus type 2.

1.2 Statement of the Problem

Diabetes is one of the fastest growing global health emergencies of the 21st century (Saeedi *et al.*, 2019) and is known to worsen the health- related quality of life (Kumar, Krishan & Jhaji, 2016) through macro vascular complications, associated non-vascular co-morbidity and total burden of disease (Mehta *et al.*, 2015). Most of health professionals in the world focus on

treatment and have limited knowledge and information on their patients' subjective health related quality of life profile (International diabetic Federation (IDF), 2015).

In Kenya, national guideline on diabetes mellitus is in place to guide management of the disease. These guidelines lack the specific areas of HRQoL dimension which is affected by the disease. There's little/no emphasis on health -related quality of life among patients and associated factors. Few studies have been done on health -related quality of life among patients with type 2 diabetes mellitus.

The researcher observed that at up to date, no study has conducted been at Tenwek Hospital to investigate health- related quality of life among patients with type 2 diabetes mellitus attending outpatient clinic in the main referral hospital in Bomet County. Therefore, this study investigated health- related quality of life and associated factors among adult patients with type 2 diabetes mellitus at Tenwek hospital in Bomet County, Kenya.

1.3 Objective

To determine socio-demographic characteristics associated with health-related quality of life among patients with type 2 diabetes mellitus at Tenwek hospital.

1.4 Research hypothesis

HO: There is no association between patient sociodemographic characteristics and health-related quality of life of adults with type 2 diabetes mellitus at Tenwek hospital.

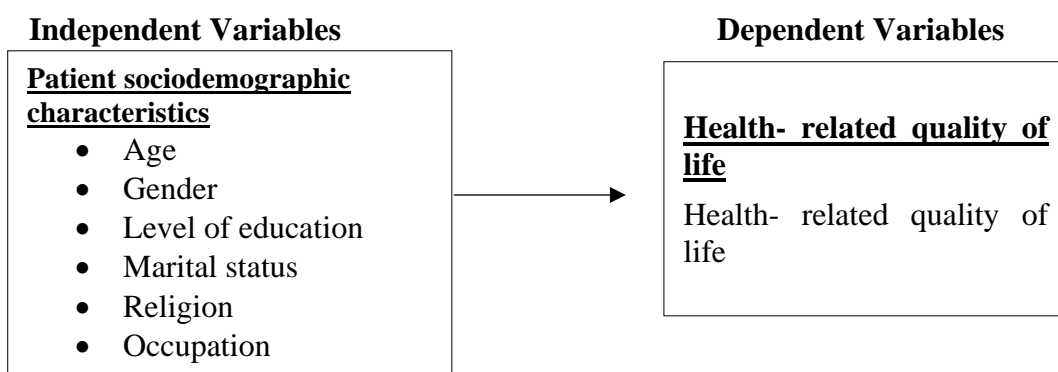
2.0 LITERATURE AND THEORITICAL REVIEW

2.1 Theoretical Framework

This study was based on Wilson–Cleary model of health-related quality of life (HRQOL) by using the structural equation modeling (SEM) approach to understand the interrelationships among sociodemographic characteristics and health related quality of life among patients with diabetes mellitus type 2. This study focused on age, gender, level of education, marital status, religion and occupation.

2.2 Conceptual framework

Figure 1: Conceptual framework



Source: (Researcher, 2020)

Figure 1 shows the independent variables which are the demographic characteristics (age, gender, level of education, marital status, religion and occupation) and dependent variable which is the overall health- related quality of life.

2.3 Empirical Review

2.3.1 Socio-demographic characteristics associated with health-related quality of life

Age affects health – related quality of life among patients with diabetes mellitus type 2. In a study conducted in India, as the age increased the QoL decreased, patients less than 40 years had a better QoL while those more than 65 years had comparatively a poor QoL (Prajapati, Blake, Acharya & Seshadri, 2017). A study by Kumar et al. 2016 reported that 70% of the patients in the age less than 50 years showed good quality of life while 23.3% of patients in age group of 51-65 years and 28.6% of the patients in age group of more than 65 years exhibited poor quality of life. Thus, with advancement of age quality of life deteriorated. A study done in Ethiopia reported that age was associated with all domains of HRQOL (Gebremedhin, Workicho & Angaw, 2019). In a study done in Kenya, age had a significant association with all domains of HRQOL except the environmental domain (Genga, Otieno, Ogola & Maritim, 2014)

A cross-sectional study that was conducted within a 6-month period found that male respondents perceived a better quality of life compared to women (Spasić et al., 2014). The QoL in comparison to the demographic characteristics of the patient showed that there was no significant difference in the QoL scores between male and female (Prajapati, Blake, Acharya & Seshadri, 2017).

A hospital-based cross-sectional study was conducted in Ghana by Osei-Yeboah *et al.*, 2016, showed that Patients' attained level of formal education significantly distinguished patients' quality of life. The highest percentage of the group experiencing poor quality of life was found among patients with basic education (20.69%) whereas those with no formal education presented with the least proportion of respondents with excellent quality of life (18.75%). A cross sectional survey done in Nis showed that there was no significant difference in the quality of life of patients with diabetes compared to the level of education (Spasić *et al.*, 2014).

A study done in Ethiopia reported that unemployment had a significant association with lower HRQOL (Aschalew, Yitayal & Minyihun , 2020). In a study done by Kien, Hoa, Duc & Wens, 2021 reported that educational attainment was positively associated with HRQoL. A study done in Saudi Arabia reported that there was a strong positive relationship between religious connectedness and HRQL among muslim diabetic patients (Alzahrani & Sehlo, 2013)

3.0 METHODOLOGY

Study Design. This was an analytic cross-sectional study, that employed a quantitative approach of data collection. The study took place between 22nd August and 23rd September 2019.

Study Area. This study was conducted at Tenwek Hospital which is a faith based committed to excellence in compassionate healthcare, spiritual ministry, and training for service to the glory of God. The hospital has a capacity of 300 beds and offers a wide-range of quality and primary and specialized healthcare services. It is located 240 Kilometers (150 miles) from Nairobi in the Bomet County. The hospital itself is located approximately 7 km NE from the town of Bomet. Tenwek is situated in the Western highlands at 6,800 feet, the climate is very moderate and pleasant. September-May is the driest and hottest season; June-August is more moderate and cool in the evenings. Temperatures average between 51 F and 70 F in the cool

season and between 52 F and 79 F degrees in the warm season. There are two rainy seasons: November-December and March-June. The average rainfall at Tenwek is 55 inches.

The hospital serves as a training institution for health care professionals to include nurses clinical medicine and doctors.

Bomet County is an agricultural area and mainly inhabited by Kipsigis community. The residents are normally in constant contact with the soil as they cultivate their farms. Most roads are tarmac and housing is heterogeneous, ranging from scarce well-constructed homes to wood and grass thatched houses. Only a small number of homes have piped water.

Study Population. The study population were patients with type 2 diabetes mellitus attending outpatient clinic at Tenwek Hospital in the last one year. According to the hospital records, the hospital receives an average of 450 patients with with diabetes mellitus type 2 monthly.

Inclusion criteria and exclusion criteria. Inclusion criteria included Patients who had diagnosis type 2 diabetes mellitus as per ICD-10 and had been on follow-up outpatient clinic at Tenwek Hospital for at least one year.

Exclusion criteria: a patient who had type 2 diabetes mellitus, but below 18 years and a patient who had been on follow-up outpatient clinic at Tenwek Hospital for less than one year.

Sampling Procedure. Systematic sampling was used to determine the participants in the study. This sampling method provides a good approximation guaranteeing a more representative sample from the target population. Participants were picked according to a constant (k) which was 1. The participants were selected from outpatient clinic, as it was easily accessible to the researcher and this is where diabetes are followed up patients were selected on computer as they registered when coming in. 1st participant was selected randomly and then after every one patient, a participant was picked.

Sample Size calculation. The desired sample size was arrived at using Fisher's formula. The final sample size being 227 after adding a 10% loading population to cater for possible non-response

Development of Research Instrument. The study used structured questionnaires to collect quantitative data from respondents and corroborated with patient's medical records. Health related quality of life data was collected using a questionnaire adapted from Short-Form 36 item health survey (SF-36).

Data collection procedure. Researcher administered questionnaires to participants. Pretest of the questionnaire was done at Longisa county referral hospital because the study population has the same characteristics

Data Analysis. Data was entered into Microsoft excel spread sheet as the data collection process continued. Quantitative data was analyzed using descriptive (mean), Health related quality of life was assessed under the following constructs: social relationship, Physical, Psychological, level of independence and Environment. Inferential statistics were done using One-Way ANOVA and Factorial ANOVA. using One-Way ANOVA, p value was used to show whether the difference between the mean is statistically significant. Higher means showed better HRQoL for the particular domain. Factorial ANOVA was used to give a summary of the results by bring all the variables and testing their association with the overall HRQoL. Significant results meant that that particular variable has significant association with overall HRQoL controlling for other variables in the model. F value of ≤ 0.05 meant

that the model was fitting and could be used to assess the relationship. The analysis was done using SPSS version 27.0.

Ethical considerations. Ethical clearance was obtained from Institutional Ethical Review Committee. A research permit was obtained from the National commission for science, Technology and innovations (NACOSTI). Permission was also sought from Tenwek hospital and Longisa County referral hospital.

4.0 FINDINGS

4.1 Socio-demographic characteristics associated with health-related quality of life among patients with type 2 diabetes mellitus at Tenwek hospital.

4.1.1 Socio-demographic characteristics

Table 1 shows that patient's sociodemographic characteristics. Majority of the participants were females, 53.7%. Majority age group was between 55-74 years (43.1%), with mean age of 56.8 ± 17.4 in years. Majority of the participants had been educated up to the primary level, 51.8%. 69% of the participants were married. 93.1% were Christians and majority were farmers, 36.6%.

Table 1 : Socio-demographic characteristics

Variable	Categories	N	%
Gender	Male	100	46.3
	Female	116	53.7
Age group in years	15 – 34	24	11.1
	35 – 54	70	32.4
	55 – 74	93	43.1
	≥ 75	29	13.4
Mean age ± SD (Range) in years		56.8 ± 17.4 (18.0 – 101.0)	
Level of education	None	34	15.7
	Primary	112	51.8
	Secondary	38	17.6
	Tertiary	32	14.8
Marital status	Single	33	15.3
	Married	149	69.0
	Divorced	9	4.2
	Widow	25	11.6
Religion	Christian	201	93.1
	Muslim	15	6.9
Occupation	Housewife	48	22.2
	Farmer	79	36.6
	Teacher	20	9.3
	Self-employed	40	18.5
	Civil Servant	15	6.9
	Student	12	5.6
	Pastor	2	0.9

4.1.2 Relationship between patient socio-demographic characteristics and health-related quality of life domains

Table 2 shows the relationship between patient sociodemographic characteristics and health related quality of life domains. There was a significant relationship between age and health-related quality of life domains with p value of 0.01 in general health status, 0.002 in Social relationship, 0.0002 in Physical, 0.008 in Psychological and 0.02 in Environment. There was no significant relationship between gender and health-related quality of life domains. Level of education had significant relationship with health-related quality of life domains: 0.003 in general health status, 0.01 in Social relationship, 0.003 in Psychological and 0.002 in

Environment. There was no significant relationship between marital status and health-related quality of life domains. There was a significant relationship between religion and health-related quality of life domains with p value of 0.02 in general health status, 0.05 in Physical, 0.0005 in Psychological and 0.007 in Environment. There was a significant relationship between occupation and health-related quality of life domains with p value of 0.009 in Social relationship, 0.003 in Physical and 0.04 in Psychological.

Age group < 50 years had better health related quality of life compared to those in age group > 50 years in all HRQL domains. These findings corroborate with those reported by Prajapati, Blake, Acharya & Seshadri, 2017, who reported that patients who had less than 40 years had a better QoL while those more than 65 years had comparatively a poor QoL.

Those participants who had secondary/ tertiary education had better HRQL compared to those with none or primary level education. These findings corroborate with those reported by Osei-Yeboah *et al.*, 2016, which showed highest percentage of the group experiencing poor quality of life was found among patients with basic education whereas those with no formal education presented with the least proportion of respondents with excellent quality of life.

The employed had better HRQL in all domains compared to the unemployed. This study findings corroborate with those by Aschalew, Yitayal & Minyihun, 2020 which reported that unemployment had a significant association with lower HRQOL. Furthermore, a study done by Kien, Hoa, Duc & Wens, 2021 reported that educational attainment was positively associated with HRQoL.

Table 2: Relationship between patient sociodemographic characteristics and health related quality of life domains

Variable	Categories	Health-related quality of life domains											
		General health status		Social relationship		Physical		Psychological		Level of independence		Environment	
		Mean± SD	P value	Mean± SD	P value	Mean± SD	P value	Mean± SD	P value	Mean± SD	P value	Mean± SD	P value
Age group in years	< 50	13.2 ± 1.5	0.01	19.4 ± 3.4	0.002	20.1 ± 3.3	0.002	32.7 ± 4.6	0.008	11.4 ± 4.1	< 0.001	16.7 ± 2.9	0.02
	> 50	12.3 ± 2.1		17.9 ± 3.0		18.3 ± 3.3		31.0 ± 4.6		7.0 ± 4.5		15.7 ± 2.7	
Gender	Male	12.6 ± 2.3	0.88	18.5 ± 3.4	0.82	18.9 ± 3.3	1.00	32.2 ± 4.9	0.08	8.4 ± 4.7	0.69	16.3 ± 2.9	0.21
	Female	12.7 ± 2.3		18.4 ± 3.1		18.9 ± 3.5		31.1 ± 4.4		8.6 ± 5.0		15.9 ± 2.7	
Level of education	None / primary	12.3 ± 2.2	0.03	18.0 ± 3.1	0.01	18.6 ± 3.5	0.09	30.9 ± 4.7	0.003	7.8 ± 4.9	0.001	15.7 ± 2.6	0.002
	Secondary / tertiary	13.3 ± 2.3		19.2 ± 3.4		19.5 ± 3.1		32.9 ± 4.3		10.0 ± 4.4		16.9 ± 2.9	
Marital status	Married	12.6 ± 2.3	0.42	18.5 ± 3.3	0.47	19.0 ± 3.6	0.59	31.7 ± 4.7	0.60	8.7 ± 4.9	0.40	16.1 ± 2.9	0.79
	Single, divorced, etc	12.8 ± 2.4		18.2 ± 3.0		18.7 ± 2.9		31.4 ± 4.7		8.1 ± 4.7		16.0 ± 2.7	
Religion	Christian	12.7 ± 2.3	0.02	18.5 ± 3.2	0.09	19.0 ± 3.4	0.05	31.9 ± 4.6	0.005	8.6 ± 4.9	0.56	16.2 ± 2.8	0.007
	Muslim	11.3 ± 2.1		17.1 ± 2.8		17.3 ± 2.8		27.6 ± 3.6		7.8 ± 4.3		14.2 ± 2.5	
Occupation	Employed	12.8 ± 2.3	0.37	19.2 ± 3.3	0.009	19.8 ± 3.1	0.003	32.5 ± 4.3	0.04	10.3 ± 4.3	< 0.001	16.6 ± 2.9	0.06
	Not employed*	12.5 ± 2.3		18.0 ± 3.1		18.4 ± 3.4		31.1 ± 4.8		7.6 ± 4.8	0.01	15.8 ± 2.7	

4.1.3 Factorial ANOVA: Relationship between socio-demographic characteristics and overall quality of life

The results in table 3 show that age group, education level and religion were associated with overall health related quality of life with ($F = 19.9, p < 0.0001$; $F = 3.94, p = 0.05$; $F = 9.46, p = 0.002$, respectively). Gender, marital status and occupation were not associated with overall health related quality of life.

Table 3: Relationship between socio-demographic characteristics and overall quality of life

Variable	Categories	N	Mean	F	P value
Age group in years	≥ 50	75	100.2	19.89	<.0001
	> 50	141	89.9		
Gender	Male	100	94.3	1.18	0.28
	Female	116	92.8		
Level of education	None / primary	146	91.1	3.94	0.05
	Secondary / tertiary	70	98.6		
Marital status	Married	149	94.0	0.03	0.87
	Single, divorced, etc	67	92.3		
Religion	Christian	201	94.2	9.46	0.002
	Muslim	15	83.9		
Occupation	Employed	75	98.4	2.43	0.12
	Not employed*	141	90.9		

5.0 DISCUSSION

5.1 Socio-demographic characteristics associated with health-related quality of life among patients with type 2 diabetes mellitus at Tenwek hospital.

The study findings show that age group, education level and religion were related to overall health related quality of life. Age group < 50 years had better health related quality of life compared to those in age group > 50 years in all HRQL domains. This study findings concur with a study conducted in India which showed that as the age increased the HQoL decreased, patients less than 40 years had a better QoL while those more than 65 years had comparatively a poor QoL (Prajapati, Blake, Acharya & Seshadri, 2017). This study showed that Those participants who had secondary/ tertiary education had better HRQL compared to those with none or primary level education. In a hospital-based cross-sectional study conducted in Ghana by Osei-Yeboah *et al.*, 2016, it showed that Patients' attained level of formal education significantly distinguished patients' quality of life. The highest percentage of the group experiencing poor quality of life was found among patients with basic education (20.69%) whereas those with no formal education presented with the least proportion of respondents with excellent quality of life (18.75%).

The study findings differ from a cross sectional survey done in Nis which showed that there was no significant difference in the health -related quality of life of patients with diabetes compared to the level of education (Spasić *et al.*, 2014). This study findings also differ from study done in Birjand which showed that the quality of life for the type 2 diabetes patients was affected by numerous factors including sex and occupation. While there was no relation of sex and occupation with health -related quality of life in this study.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The study concludes that age group, education level and religion were associated with overall health related quality of life. Age group < 50 years had better health related quality of life

compared to those in age group > 50 years in all HRQL domains. Those participants who had secondary/ tertiary education had better HRQL compared to those with none or primary level education. The employed had better HRQL in all domains compared to the unemployed.

6.2 Recommendations

The study recommends hospital administration to come up with interventions for creating awareness in the community and identifying cases of type 2 diabetes early so as to save victims at an early stage of disease progression and to prevent development of complications and comorbidities. Also, multi-disciplinary team assessment of HRQoL among patients with type 2 diabetes mellitus early in disease course or as soon as they are diagnosed will help to identify modifiable factors that may help the patient lead an active and healthy life. This study recommends reassessment and expansion of Wilson–Cleary model of health-related quality of life.

REFERENCES

- Alzahrani H.& Sehlo M. (2013). The Impact of Religious Connectedness on Health-Related Quality of Life in Patients with Diabetic Foot Ulcers. *J Relig Health* (2013) 52:840–850 DOI 10.1007/s10943-011-9529-x
- Aschalew, A.Y., Yitayal, M. & Minyihun, A. Health-related quality of life and associated factors among patients with diabetes mellitus at the University of Gondar referral hospital. *Health Qual Life Outcomes* 18, 62 (2020). <https://doi.org/10.1186/s12955-020-01311-5>
- Gebremedhin T, Workicho A, Angaw DA.(2019). Health-related quality of life and its associated factors among adult patients with type II diabetes attending Mizan Tepi University Teaching Hospital, Southwest Ethiopia. *BMJ Open Diab Res Care* ;7:e000577. doi:10.1136/bmjdr-2018-000577
- Genga E, Otieno C, Ogola E, Maritim M. (2014). Assessment of the Perceived Quality of Life of Non insulin Dependent Diabetic patients attending the Diabetes Clinic in Kenyatta National Hospital. *Diabetes Research and Clinical Practice*; Elsevier IRELAND ltd ELSEVIER house, BROOKVALE plaza, east park SHANNON, co, CLARE, 00000, IRELAND.
- International Diabetes Federation (IDF). *Diabetes atlas*. Seventh Edition, 2015
- Kien N., Hoa N., Duc M & Wens J. (2021). Health-related quality of life and associated factors among patients with type II diabetes mellitus: A study in the family medicine center (FMC) of Agricultural General Hospital in Hanoi, Vietnam. *Health Psychology Open* January-June 2021: 1–9 © The Author(s) 2021 Article reuse guidelines: sagepub.com/journals-permissions DOI: 10.1177/2055102921996172 journals.sagepub.com/home/hpo
- Kumar R., Krishan P. & Jhaji R. (2016). *International Journal of Research in Medical Sciences* | May 2016 | Vol 4 | Issue 5 Page 1513
- Megari, K. (2013). Quality of Life in Chronic Disease Patients. *Health Psychol Res*. 2013 Sep 24; 1(3): e27. Published online 2013 Sep 23. doi: 10.4081/hpr.2013.e27
- Mehta, S., Mocarsk, M., Wisniewski, T., Gillespie, K., Narayan, V. & Lang, K. (2017). Primary care physicians' utilization of type 2 diabetes screening guidelines and referrals to behavioral interventions: a survey-linked retrospective study. *BMJ open diabetes research and care*. Volume 5, issue 1

- National diabetes control programme ,Kenya National diabetes strategy (2010– 2015).
First edition. 2010.
- Ogurtsova K, daRochaFernandesa J , Huang Y, Linnenkampa U, Guariguataa L,Choa N, Cavana D, Shawc J, Makaroffa L (2017) .IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes research and clinical practice* 128(2017)40–50
- Osei-Yeboah J., William, K., Owiredu, Norgbe G., Lokpo, S., Allotey, E., Doe, E, & Florence, A. (2016). Health related quality of life of People Living with Type 2 Diabetes in Ho, Ghana: A Cross-Sectional Study. *American Journal of Biomedical Sciences*, 8(4), 297-310; doi: 10.5099/aj160400297
- Papazafiropoulou, K., Bakomitrou,F., Trikillinou, A., Ganotopoulou, A., Verras, C., Christofilidis, G., Bousboulas, S. & Melidonis, A (2015). Diabetes-dependent quality of life (ADDQOL) and affecting factors in patients with diabetes mellitus type 2 in Greece. *BMC Res Notes*. 2015; 8: 786. Published online 2015 Dec 15. doi: 10.1186/s13104-015-1782-8
- Prajapati, V., Blake, R., Acharya, L., & Seshadri, S. (2017). Assessment of quality of life in type II diabetic patients using the modified diabetes health related quality of life (MDQoL)-17 questionnaire. *Brazilian Journal of Pharmaceutical Sciences*.
- Saaed, P., Petersohn, I., Salpea, P., Bright, D. & Williams, R. (2019). Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: results from the international Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes research and clinical practice* Volume 157, 107843, November 10, 2019
- Spasić A., Radovanović R., Đorđević A. , Stefanović N. & Cvetković T. (2014). Health related quality of life in Type 2 Diabetic Patients. *Scientific Journal of the Faculty of Medicine in Niš* ; 31(3):193-200. DOI: 10.2478/afmnai - 0024
- Wagana, L., Muyodi, C., Sultani, H., Otepo, Sule, Njoroge, Muli, Kimonjino. (2010). Kenya national diabetes strategy, Ministry of public health and resuscitation, Republic of Kenya.
- Wolters, R., J. Braspenning and M. Wensing (2017), “Impact of primary care on hospital admission rates for diabetes patients: A systematic review”, *Diabetes Research and Clinical Practice*, Vol. 129, pp. 182-196, <http://dx.doi.org/10.1016/j.diabres.2017.05.001>