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ARTICLE

Demographic Factors Associated with Health-Related Quality of Life Among Urban and Rural Tuberculosis Patients in Kenya

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ABSTRACT

Background: Tuberculosis is one of the deadliest and disabling diseases in the world today. The infection exacts its greatest toll on individuals during their most productive years. TB patients record different perceived health related qualities of life(PHRQoL) which could be attributed to certain environmental, social and physical factors. The objective of the study was to determine the demographic factors associated with the PHRQoL among urban and rural Tuberculosis patients in Kenya. Cross sectional design was adopted. The study applied the multi-stage sampling technique. Random sampling method was used to select the TB clinics that participated in the study. Simple random sampling according to probability proportionate to TB patient's population was preferred to select the study participants. Chi-square test determined association between the various demographic factors and the PHRQoL while ANOVA tests demonstrated the overall association of demographic factors and PHRQoL. Statistical Significance was evaluated at $p<0.05$. Descriptive statistics summarized and described the data. The study established that demographic factors are associated with PHRQoL ($p=0.008$). Specifically, age, levels of education, marital status and house hold size ($P<0.05$). Gender and Household head were not significantly associated with the PHRQoL ($p>0.05$). These findings will persuade the TB management policy towards developing an intervention programs directed at the social-demographic characteristics of the TB patients for improved treatment outcomes.

1. Introduction

Tuberculosis is a global health concern with serious economic and social burden to the patient and the household. Although effective anti-tuberculosis agents have been available for over thirty years, the incident rate of the disease is still increasing [1]. According to WHO, there are 9.4M incidence case worldwide. Because of the long duration of standard treatment (six months) there is a risk of treatment default by patients. Since 1993 the World Health Organization recommended the DOTS strategy through which the National governments can meet their responsibilities to treat patients and to prevent the spread of Tuberculosis [2]. At present much of the attention within tuberculosis (TB) management is spent on microbiological cure and its impact on PHRQoL from the patient's perspective is either undervalued or seldom considered. Studies demonstrate that as compared with the general population, TB patients reported deficits in their physical and mental wellbeing [3].

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The patient's charter for TB care allows the patients to evaluate the programs performance from the patient's perspective. One of the major performance indicators should be the capability of the national TB program (NTP) to address the physical and mental wellbeing of the patient. Therefore, the assessment of PHRQoL of TB patient as an additional indicator of performance will add value to the NTBP. As such, there is increased interest in the quality of life (QoL) experienced by individuals being treated for TB. According to the World Health Organization [1], quality of life (QoL) is defined as the individuals' perception of their position in life in the context of the culture and value system in which they live and in relation to their goals. On the other hand Health related quality of life (HRQoL) is a multi-dimensional concept that includes domains related to physical, mental, emotional and social functioning. It focuses on the impact health status has on quality of life. Clinicians and public health experts have used HRQoL and well-being to measure the effects of chronic illness, treatments and short and long-term disabilities [5]. Due to long duration of treatment and use of several drugs regimes, tuberculosis can lead to poor PHRQoL among patients. To determine the impact of the treatment of a disease, evaluation of the health states of patients have been undertaken [3,4].

In order to obtain information on preferences of different health states and how a health state is valued, (Anxiety, depression, mobility, self care, participation in usual activities, cognitive impairment and social participation), different techniques have been used. In recent times the multi attribute utility instruments (MAU) has been recommended in the UK for use in cost-effectiveness analysis in economic evaluation, health care workers and pharmaceutical industry [6]. The widely used EQ-5D-5L tool has five dimensions (mobility, self care, usual activities, pain/discomfort, and anxiety/depression and three levels on each dimension ("no-, some-and extreme problem"). Respondents indicate levels of health problems on a number of dimensions of health. The questionnaire responses describe the health profile of individual. These profiles capture different dimensions of health and can be translated into an index on a zero-one scale where zero denotes death and one perfect health. Although most studies where health states evaluation has been in diabetes, the instrument remains valid in other health studies applying the same approach [5,6].

A study in Iran by Zhang *et al*. [7] that assessed PHRQoL among patients with tuberculosis by comparing baseline Quality of Life between the Cases and Control according to SF-36 Questionnaire established that Age, Sex, Marriage and Education Significantly differed between the Treatment and Control groups . In a similar study done in Tehran to assess factors associated with HRQoL in tuberculosis patients referred to the National Institute of Tuberculosis and lung disease in Tehran noted that the SF-36 Sub-Scale scores were influenced by characteristics Marital status, education level, Job status and living place. There were Significant Correlations between Education Level and physical functioning, role limitations due to physical problems, bodily pain and Vitality. TB patients with primary and high school education attained better Scores than illiterate TB patients [8].

In yet another study in South Africa whose aim was to assess the overall impact of TB on the health status and on single health domains identified in the WHO definition of health, including physical, mental and social aspects established that PHRQoL improved Significantly during the period of treatment with highest improvement (95%) being observed in mental health. Young patients with higher education and who were employed had a better PHRQoL [9]. In Kenya a study to determine PHRQoL among patient suffering from Diabetes using the EQ-5D-5L observed that 46% of respondents had no problem with mobility, 92.2% self-care, 73.9% usual activities, 40.4% Pain/discomfort and 48.3% anxiety/depression respectively [10].

2. Methodology

2.1 Study Design

The Study adopted the Randomized cross-sectional assessments of TB patients. The study subjects were recruited from hospital registers in the sampled facilities.

2.2 Study Setting

The study was carried out in Kenya. Kenya is in East Africa with 47 Semi-autonomous Countries governed by elected governors. At 580,367 square kilometers, Kenya is the world's 48th largest Country by total area. With a projected population of more than 52.2, the Country is the 27th most populous in the World. Kenya's Capital and largest City is Nairobi.

2.3 Study Population

The study population was the tuberculosis Patients who attended the public health facilities for treatment in Nairobi and Murang'a Counties.

2.4 Sample Size and Sampling Technique

This study had a total sample size of 310. The study adopted the Multi-Stage Sampling technique. Kenya was purposively selected due to its large and rising TB burden in the region. Nairobi County was purposively selected

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due to its TB burden nationally. Murang'a County was selected conveniently due to its rural setting and close proximity to Nairobi County. Random Sampling was used to select the Hospitals, Health Centres and Dispensaries which participated in the study. Random Sampling Proportionate to TB Patient's population was adopted in selecting the study participants.

2.5 Data Collection

The standard questionnaire was the major instruments for data collection. The pre-test-Questionnaire collected information on the TB patient's demographic and socio-economic data such as age, gender, Patients Income, Occupation, residence, education level and employment and Household Income. The functional capacity of the patient was tested by (EQ-5D-5L) with five additional dimensions. The European Quality Visual Analogue Scale (EQ-VAS) tested perceived poor health of the patient.

3. Results

3.1 Introduction

The study sought to determine the demographic factors associated with PHRQoL among the urban and rural tuberculosis patients in Kenya. To achieve this goal public health facilities that treat tuberculosis in Nairobi and Murang'a Counties were identified for the study because of their rural and urban settings. Below is the summery of the results.

3.2 Demographic Characteristic of the Respondents

Demographic factors considered included age, gender, education, primary occupation, marital tutus, household headship and household size. Table 1 below present the demographic characteristics of the respondents.

Table 1. Demographic characteristic of the respondents

Variable	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
Age	296	19	76	35.9696	11.92927
Gender	298	1	2	1.3893	0.4884
Education	283	1	4	2.6572	0.82461
Marital Status	298	1	4	1.7685	0.73173
Primary Occupation	286	1	6	4.014	1.65003
Household Head	288	0	2	1.3403	0.48191
Household size	241	0	8	3.5394	1.70523

The mean age for the respondents was established to be 35.9696. Most of the respondents were female (M=1.3893, Std. Deviation = 0.4884). The study also established that most of the respondents were married (M=1.7685 Std. Deviation. = 0.73173). Most of the respondents indicated that their primary occupation was informal (M=4.014, Std. Deviation = 1.65003). Further, most of the respondents interviewed were household heads (M=1.3403, Std. Deviation. = 0.48191). Of the sampled respondents, mean household size was 4 (M=3.5394).

3.3 Perceived Health Related Quality of Life

The study used a functional capacity of the patient was tested by (EQ-5D-5L) with five additional dimensions. Responses were ranked from the least challenge and to the worst challenge. Table 2 below presents the findings.

Table 2. Descriptive statistics for the quality of life themes

	N	Minimum	Maximum	Mean	Std. Deviation
Mobility	298	1.00	5.00	1.2349	.62914
Self-care	298	1.00	4.00	1.1174	.42199
Usual Activities	298	1.00	5.00	1.3624	.80583
Pain/Discomfort	298	1.00	5.00	1.3960	.68969
Anxiety/ Depression	298	1.00	5.00	1.2483	.50461
Sleep	298	1.00	3.00	1.2047	.43621
Memory/Concentration	298	1.00	3.00	1.1007	.32297
Fatigue/ Energy	298	1.00	3.00	1.2718	.46050
Seeing and hearing	298	1.00	2.00	1.0570	.23232
Contact with others	298	1.00	2.00	1.0302	.17143
Valid N (listwise)	298				

The findings of the study reveal that some of the health challenges for the PHRQoL include pain and discomfort (M=1.3960) and usual activities (M=1.3624). Least health challenge was experienced in contact with others(M=1.0302), seeing and hearing (M=1.0570), memory/concentration (M=1.1007) and self-care (M=1.1174). The responses obtained from the 10-theme PHRQoL were generally left skewed. While this was the case, about half, the total number of respondents did not indicate their overall PHRQoL as above 75%. Table 3 below presents the PHRQoL.

Table 3. Perceived Health Related Quality of Life

	Frequency	Percent	Mean	St.Dev
< 25.00	1	0.3	73.3734	17.78006
25.00 - 49.99	24	8.1		
50.00 - 74.99	121	40.7		
75.00+	151	50.8		

The mean PHRQoL for the respondents was 73.3734 with a standard deviation of 17.78006. About 50.8% of

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the respondents indicated that their PHRQoL was 75% and above. Those with less than 25% PHRQoL were 0.3% while about 8.1% indicated that their PHRQoL was 25-49.99. The PHRQoL scores were also right-skewed, with responses clustered predominantly around 70 and 90 on the 100 mm scale (Figure 1)

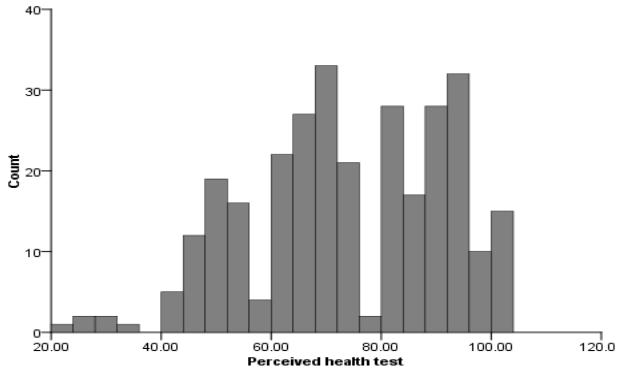

Figure 1. Perceived Health Related Quality of Life

3.4 Demographic Factors Associated with Perceived Health related Quality of Life

Demographic factors investigated for association with PHRQoL included gender, Age, education, Marital status and primary occupation. Table 3 below presents the demographic characteristics associated with PHRQoL.

The study established that demographic associated PHRQoL include age, levels of education, marital status, household size and primary occupation($p<0.05$). However, gender of the participants was not associated with the PHRQoL.

Among the different age cohorts, those aged between 35-44 had the highest mean PHRQoL at 75.0811. Those within the age cohort of 27 and below also had mean PHRQoL of 75.0233. The least mean PHRQoL was recorded among the respondents within the age groups of 28 – 34 years at M=70.3881. Respondents aged 45 years and above had mean PHRQoL of 72.4691. This was significant at p=0.04 and a chi square value of 46.311. The findings indicate that persons with

Table 3. Demographics Factors Associated with Perceived Health Related Quality of Life

Variable		Perceived Health Related Quality of Life					
		<= 25	26 - 50	51 - 75	76+	Mean	SD
Age	<= 27	1(1.2)	11(12.8)	33(38.4)	41(47.7)	75.0233	18.35466
	28 - 34	1(1.5)	16(23.9)	24(35.8)	26(38.5)	70.3881	19.00794
	35 - 44	0(0.0)	5(6.8)	34(45.9)	35(47.3)	75.0811	15.40482
	45+	1(1.5)	7(10.3)	31(45.6)	29(42.6)	72.4691	18.30253
				X^2=46.311	**p=0.04**		
Gender	Male	0(0.0)	24(13.3)	79(43.6)	78(43.1)	73.2536	16.80003
	Female	3(2.6)	15(12.9)	44(37.9)	54(46.6)	73.5603	19.28382
				X^2=46.311	**p=0.885**		
Education	No schooling	0(0.0)	5(23.8)	10(47.6)	6(28.6)	67.1429	19.53532
	Primary	0(0.0)	15(15.3)	47(48.0)	36(36.7)	70.7959	15.99804
	Secondary	3(2.5)	15(12.5)	43(35.8)	59(49.2)	74.26583	18.90905
	Tertiary	0(0.0)	4(9.3)	18(41.9)	21(48.8)	75.9767	17.33355
				X^2=139.824	**P=0.021**		
Marital Status	Single	1(0.9)	15(14.0)	48(44.9)	43(44.2)	72.6449	18.81752
	Married	1(1.6)	19(15.9)	68(41.2)	77(46.7)	74.1145	16.72227
	Divorced	1(9.1)	3(27.3)	4(36.4)	3(27.3)	65.9091	24.98181
	Separated	0(0.0)	2(14.3)	3(21.4)	9(64.3)	76.0714	15.38463
				X^2=139.824	**p=0.0331**		
Primary Occupation	Agriculture	0(0.0)	0(0.0)	5(29.4)	12(70.6)	83.7059	14.05687
	Formal Sector	1(3.8)	2(7.7)	8(30.8)	15(57.7)	77.6923	19.89526
	Informal Sector	2(1.8)	10(9.1)	44(40.0)	54(49.1)	75.3627	17.13383
	Security Agency	0(0.0)	3(25.0)	4(33.3)	5(41.7)	72.6667	22.80085
	Student	0(0.0)	5(20.0)	13(52.0)	7(28.0)	67.84	15.50183
	Unemployed	0(0.0)	16(16.8)	41(43.2)	38(40.0)	71.1684	17.44819
				X^2=180.473	**p=0.002**		
head of the household	Yes	2(1.1)	27(14.4)	75(40.1)	83(44.4)	72.8925	17.87123
	No	1(0.9)	12(10.9)	48(43.6)	49(44.5)	74.1909	17.6752
				X^2=39.61	p=0.543		
Household size	<= 2	0(0.0)	15(22.7)	25(37.9)	26(39.4)	71	19.04004
	3-4	1(0.9)	14(13.1)	49(45.8)	43(40.2)	71.4766	16.90057
	5-6	2(3.4)	5(8.6)	28(48.3)	23(39.7)	70.8776	18.29713
	7+	0(0.0)	1(11.1)	3(33.3)	5(55.6)	79.7778	15.35234
				X^2=357.286	**p=0.003**		

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ages 27 and below as well as those with middle ages (35 – 44) had the PHRQoL. Those with least PHRQoL were aged 28-34 (Youthful ages) and the elderly (45 years and above).

The study also established that female respondents indicated better PHRQoL (M=73.5603) as compared to their male counterparts (M=73.2536)

The findings indicate that respondents with Tertiary levels of education had the highest PHRQoL (M=75.9767) while those with no formal schooling had the least mean PHRQoL (M=67.1429). This was significant at p=0.021 and a chi square value of 139.824. Further, the study established that respondents who indicated that they were separated had the highest PHRQoL (M=76.0714). Those with the least PHRQoL (M=65.9091) indicated that they were divorced. Marital status was established to be associated with PHRQoL (X^2=139.824, p=0.0331). Similarly, respondents whose primary occupation was agriculture had the highest PHRQoL (M=83.7059) with over 70% of them indicating that their PHRQoL of 75% and above. Majority of the respondents within the formal sector (57.7%) also indicated their PHRQoL as 75% and above (M=77.6923). The findings also revealed that students had the least PHRQoL (M=77.6923). The study established that primary occupation was associated with the PHRQoL (X^2=180.473, p=0.002).

From the study findings, it was established that respondents who were not household heads had higher PHRQoL (M=74.1909) as compared to their counterparts who were household heads (M=72.8925). Further, it was established that respondents whose household sizes were above 7 had the highest PHRQoL (M=79.7778). On the other hand, respondents whose household sizes were 2 or less had a PHRQoL (M=71). Those whose household sizes were 5-6 members had a mean PHRQoL of 70.8776. The household size was established to be statistically associated with the PHRQoL (X^2=357.286, p=0.003).

ANOVA test on the overall association between the PHRQoL and the demographic factors were a presented in Table 4 below. A p Value of 0.008 and F=2.825 was obtained indicating a significant association between demographic factors and the PHRQoL.

Table 4. ANOVA test of the Association between Demographic factors and the Perceived Health related Quality of Life

ANOVA[a,b]					
Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	5873.714	7	839.102	2.825	.008
Residual	74852.397	252	297.033		
Total	80726.111	259			
a. Dependent Variable: Perceived health test					
b. Model: (Intercept), Age, Gender, Education, Marital Status, Primary Occupation, Are you the head of the household, Household size					

4. Discussion

4.1 Perceived Health Related Quality of Life

The study established that responses on the functional capacity of the patient was tested by (EQ-5D-5L) were generally left skewed. The overall rating of quality of life was also right skewed indicating more positive rating of PHRQoL. However, half of the respondent did not rate their PHRQoL above 70%. The mean PHRQoL was less than 75% indicating general poor rating of the PHRQoL. The findings lead to an understanding that there was general positive assessment of PHRQoL and an overall percentage rating of the PHRQoL in the study area. The study established that demographic factors associated with the PHRQoL include age, marital status, level of education, household size and primary occupation.

4.2 Age and Perceived Health Related Quality of Life

Age was significantly associated with the PHRQoL. While the lower age brackets indicated higher PHRQoL, there was a decline in such rating at the next age cohort (mid youth) and improves at late youth. However, poor PHRQoL rating was registered at older age brackets. The finding leads to an understanding that at early youthful ages among TB patients presented relatively better quality of life and that at the onset of mid youth age, most TB patients begin to experience less positive PHRQoL. Late age among TB patients however could be understood to be associated with poorer rating of the PHRQoL.

This finding parallels findings of a study conducted by Adeyeye *et al* [11] where lower age groups presented higher PHRQoL as compared to the elderly. Given an assumption that the quality of life as rated by the study participants was related to the TB, it can then be understood that effects of TB on the quality of life is experienced differently among different age groups. It is possible that self-acceptance among TB patients differ across the age groups.

4.3 Level of Education and the Perceived Health Related Quality of Life

The study established that PHRQoL improved positively with the levels of education. The finding may lead an understanding that those with higher levels of education had better PHRQoL. Similar study conducted in Nigeria also established that low levels of education was associated poorer PHRQoL [11]. This finding may be attributed to the higher levels of awareness among individuals with higher levels of education.

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4.4 Marital Status and the Perceived Health Related Quality of Life

Marital status in the study was significantly associated with the PHRQoL. Individuals who were separated had the highest PHRQoL. On the contrast, a study conducted in Nigera [11] found out that respondents without spouses (single, separated or widowed) had higher PHRQoL. This the scholars attribute to the possibility of autonomous lifestyle without their spouses. The findings of this study could be attributable to the fact that only female respondents indicated that they were separated and that in generally, women rated their qualities of life higher than men. The finding that married respondents also had higher rating for the PHRQoL could be explained by the availability of social support within marriage arrangement as opposed to the single respondents who had the lowest rating of the PHRQoL.

4.5 Occupation and Perceived Health Related Quality of Life

The findings of the study indicate that respondents with agriculture as their primary occupation had the highest PHRQoL. Other studies link certain formal occupations with higher PHRQoL [12,13]. The findings of this study however could be attributed to food availability and nutrition which are often associated with better disease management and prognosis. It could also be reasoned that steady source of income as evidenced by higher PHRQoL among those with formal employment as opposed to students with lowest rating influence the PHRQoL.

4.6 Household Size and Perceived Health related Quality of Life

The study established higher PHRQoL among households with 7 and above household members. This finding may lead to an understanding that households with larger membership have higher PHRQoL. This finding could be explained by the possibility that larger household sizes could also be associated with higher income levels and thus higher rating of PHRQoL. However, respondents with 5-6 household members also had least PHRQoL. This finding mirrors the converse for the former explanation.

5. Conclusion

The study concludes that demographic factors are significantly associated with the PHRQoL. Such factors include age, levels of education, marital status, primary occupation and household size. It is therefore evident from the study that TB patients' rating of their PHRQoL depends on their demographic characteristics. From this therefore, it can be understood that indirect effects of TB on the PHRQoL differs based on demographic factors

6. Recommendations

The Study recommend studies to determine the direct association between health effects of TB on the PHRQoL among TB patients. Future studies could also be based on clinical evidence so as to inform intervention deigns.

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