# Effect of Socio-demographic Characteristics on Health System Responsiveness in Diabetic and Hypertensive Clinics: A Cross-sectional Study in Tier Three Hospitals in Kenya

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## Abstract

This study aimed to investigate the effect of socio-demographic characteristics on health system responsiveness within diabetic and hypertensive clinics in tier three hospitals in Kenya. Responsiveness, which refers to meeting non-health-improving expectations, is crucial for a well-functioning health system, and gaps in responsiveness can compromise the quality of healthcare. While both client and health system factors contribute to responsiveness, the specific influence of socio-demographic characteristics on health systems responsiveness remains unexplored in Kenyan chronic care centers. The cross-sectional descriptive survey involved 308 respondents from Kimilili, Uasin Gishu, and Gatundu hospitals. Data were collected using a structured questionnaire that assessed responsiveness domains such as promptness, respect, communication, involvement, confidentiality, choice, cleanliness, social support access, and overall trust, rated on a five-point Likert scale. Socio-demographic factors investigated included facility location, gender, age, medical condition, religion, marital status, education levels, income level, occupation, and insurance enrollment. The mean responsiveness score was 98.8 (63.7%), with only 38.3% of respondents reporting favorable outcomes. Chi-square analysis revealed significant associations ($p<0.05$) between responsiveness and facility location, religion, marital status, occupation, and medical condition. Age, gender, insurance enrollment, education, and income level showed no significant association ($p>0.05$) with responsiveness. The study concluded that favorable responsiveness was less likely than unfavorable outcomes, highlighting the significance of socio-demographic factors. It recommends that healthcare managers prioritize holistic, patient-centered interactions to improve responsiveness in chronic care clinics, taking into account the influence of socio-demographic characteristics on patients' experiences and expectations.

**Keywords:** *Health system responsiveness, Socio-demographic characteristics, chronic conditions, Diabetes Mellitus, Hypertension*

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## 1.0 Introduction

Responsiveness is a fundamental goal within health systems (Ibeneme et al., 2020) which entails meeting legitimate non-health-improving customer expectations (Achstetter et al., 2022). Responsiveness domains include those of respect for persons; such as dignity, autonomy, clarity of communication and confidentiality; and client orientation domains; such as promptness, quality amenities, choice, and access to social

support networks (Adhikari et al., 2024). Other suggestions for enrolment into the study were effective care and attention (Forouzan et al., 2016); and trust and coordination (Röttger et al., 2014). Responsiveness varies with client features reflecting their expectations and experiences; and provider features, which include organizational processes, resources and culture (Mirzoev & Kane, 2017). Other factors affecting responsiveness include type of hospital (Adesanya et al., 2012), working conditions of health providers (Topp & Chipukuma, 2016) and income level of a country (Geldsetzer et al., 2018).The study targeted outpatient diabetes and hypertension clinics in tier three/primary hospitals in Kenya.

Diabetes mellitus is characterized by sustained high blood sugar levels. Currently, diabetes mellitus affects an estimated 537 million people(10.5% of the adult population aged 20-79 years; and is projected to increase to about 783 million people by the year 2045 (Kumar et al., 2024); This increase will be fueled largely by urbanization and sedentary lifestyle. In Kenya, inconsistency in relevant data has given variable prevalence ,ranging from 2.4% to 3.5% of the population (Otieno et al., 2021). One study estimated diabetes mellitus prevalence at 2.4% more in urban, 3.4% in rich quintile 5.2% while low in rural 1.9%, and poorest wealth quintile,1.6% (Mohamed et al., 2018). Another more recent study places the prevalence of type 2 diabetes at 4.2% of the general population, with 2.2-2.7% in rural and 10.7-12.2 % of the urban population affected (Kiarie et al., 2023).

Hypertension is characterized by high pressure in blood vessels. Prevalence was estimated at 22% of the global adult population; highest in the African region at 27%. Risk factors include fatty diets, sedentary lifestyle, harmful alcohol and tobacco use; and long-term stress Stress may complicate diabetes mellitus, thus making the two conditions closely linked, and thence often require integrated care approaches. In Kenya, the prevalence is quite variable with studies recording prevalence of between 22% (Mogaka et al., 2022) and 29% (Pengpid & Peltzer, 2020).

The Kenyan government initiated mechanisms for implementing patient rights charters, such as strengthened information systems and legitimized complaint procedures, which aim to enhance client involvement (Khan et al., 2021; Njuguna, 2020). Despite these measures, both clients and providers often overlook these crucial accountability measures, leading to occasional disrespectful healthcare that contradict responsiveness principles (Kagwanja, 2023; Lusambili et al., 2020; Njuguna, 2020)

This study focuses on health system responsiveness, which is a crucial goal for effective healthcare delivery, a human rights issue, and a critical ingredient in health outcomes and promotion of trust among clients of a health system (Semyonov-Tal, 2024). Our investigation aimed to explore the effect of socio-demographic characteristics on health system responsiveness among patients with chronic conditions, specifically diabetes mellitus and hypertension, in three tier three/primary hospitals in Kenya; namely,

Kimilili, Uasin Gishu and Gatundu hospitals (Luoma et al., 2010).

*"Responsiveness domains include respect for persons; such as dignity, autonomy, clarity of communication and confidentiality; and client orientation domains; such as promptness, quality amenities, choice, and access to social support networks"*

## 2.0 Materials and Methods

This descriptive cross-sectional study aimed to assess socio-demographic influences on responsiveness among patients with diabetes mellitus and hypertension. Data were collected from September to December 2020 from three primary hospitals; that is, Gatundu in Kiambu County (urban), Uasin Gishu in Uasin Gishu County (peri-urban), and Kimilili in Bungoma County (rural) (Macharia et al., 2021).

***Sample Size***

The sampling frame was 853 patients enrolled in care for diabetes mellitus, hypertension or both. Sample size was determined using the Cochrane formula (Taherdoost, 2017);

$n=z^2pq/d^2$

Where;

n= is sample size

z =is the standard normal deviate at the required confidence level

p= is the proportion in the target population estimated to have characteristics being measured, 50% was chosen for maximum variability.

q=1-p

d=the level of statistical significance set, being 5%, confidence level of 95% as commonly applied in social surveys.

$n=1.96^{2*}0.5*0.5/0.5^2=384.16$

The sample sizes for the finite population

nf=n/ {(1+n)/N} =384/ {1+(384/853)} =266.

This was a baseline survey for a follow up study, hence, to provide for non-retention, 10 % was added, and a further 10% was also added for non-response, as suggested by Fetene et al., (2022) bringing the total sample size to 323.

**Table 1**

*Table showing sample size distributions*

| Hospital | Population | Calculated New sample size | Adjusted sample size | Duly filled |
|---|---|---|---|---|
| Kimilili | 167 | 52 | 81 | 80 |
| Uasin Gishu | 256 | 80 | 108 | 98 |
| Gatundu | 430 | 134 | 134 | 130 |
| **Total** | **853** | **266** | **323** | **308** |

***Sampling and sampling procedures***

Systematic random sampling technique was used to obtain the study sample. Every adult patient enrolled for care for diabetes, hypertension or both in the selected health centres comprised the study population. Systematic random sampling technique was then utilized to obtain a sample size of 323 respondents.

***Data Collection***

Data collected via a structured questionnaire included socio-demographic details, such as facility location, age, gender, medical condition, religion, marital status, insurance enrollment, main income source, income level, and education level. Responsiveness was assessed using a 5-point Likert scale (1 being worst, 5 being best) for the indicators Promptness, Respect, Involvement, Communication, Choice, Confidentiality, Amenities, Social Support, and Trust in facility care outcomes.

***Validity and Reliability***

Validity ensures the accuracy of construct measurement (Coleman, 2022). Data collection tools underwent thorough review, pretesting, and revisions to enhance validity. Randomizing the sample reduced selection bias. Reliability indicates consistency of measurement tool (Amirrudin et al., 2021). Tools were uniform, and they were reviewed by the research team for completeness. Cronbach's coefficient alpha was used to assess reliability.

***Ethical approval***

Approval was obtained from the Research Ethics Committees of Kenya Methodist University (Approval No: KeMU/SERC/HSM/4/2020) and Moi University (Approval No: 0003643). A research license was obtained from NACOSTI (License No: NACOSTI/P/20/5650). Permissions were obtained from hospital managements teams, while written informed consent was obtained from all participants, who were informed of their right to withdraw from the study at any time.

## 3.0 Results and Discussion

A total of 308 questionnaires were duly filled and returned, yielding a response rate of 95.35%, which was satisfactory as guided by Sileyew(2019).

***Descriptive Results for Sociodemographic Variables***

Respondents' ages ranged from 19 to 95 years (mean: 56.6), and they were further categorized into four groups based on developmental stages. Monthly income estimates ranged from Ksh.1000 to Ksh.100000, with a median of Ksh.10000 (70USD). Using median split, earnings were categorized as 'Low' and 'High' as applied in other studies (Herr et al., 2022). Results are summarized in Table 2 below.

Results in Table 2 indicate that most respondents (130 (42.2%) are from Gatundu Hospital; 213(69.2%) are aged between 40-49 years; 159 (51.6%) had only hypertension; and 156(50.7%) are protestants. Most (214 (69.5%) are married; 110 (35.7%) are educated up to primary school level; and 130 (42.2%) engaged in small scale farming. 172(55.8%) are low-income earners without any medical insurance.

**Table 2**

*Socio-demographic Characteristics of Respondents*

| Variable | Subsets | Frequency | Percent |
|---|---|---|---|
| Facility Location | Rural (Kimilili) | 80 | 26.0 |
| | Peri-urban (Uasin Gishu) | 98 | 31.8 |
| | Urban Gatundu | 130 | 42.2 |
| Gender | Female | 213 | 69.2 |
| | Male | 95 | 30.8 |
| Age | <40 Years | 28 | 9.1 |
| | 40-59 Years | 159 | 51.6 |
| | 60-79 Years | 96 | 31.2 |
| | ≥80 Years | 25 | 8.1 |
| Medical Condition | Diabetes Mellitus (DM) | 95 | 30.8 |
| | Hypertension (HTN) | 156 | 50.7 |
| | Diabetes and Hypertension | 57 | 18.5 |
| Religion | Catholic | 114 | 37 |
| | Protestant | 159 | 51.6 |
| | Muslim | 25 | 8.1 |
| | Traditionalists | 10 | 3.2 |
| Marital status | Single | 46 | 14.9 |
| | Married | 214 | 69.5 |
| | Divorced | 10 | 3.2 |
| | Widowed | 22 | 7.1 |
| | Others | 16 | 5.2 |
| Highest educational level | No Formal Education | 29 | 9.4 |
| | Primary School | 110 | 35.7 |
| | Secondary | 108 | 35.1 |
| | Tertiary | 61 | 19.8 |
| Main Source of income | Business | 79 | 25.6 |
| | Farmer (large scale) | 45 | 14.6 |
| | Farmer (Small Scale) | 130 | 42.2 |
| | Formal Employment | 40 | 13.0 |
| | Casual Labour | 9 | 2.9 |
| | Others | 5 | 1.6 |
| Income Level | Low | 217 | 70.5 |
| | High | 91 | 29.5 |
| Insurance enrolment | Yes | 136 | 44.2 |
| | No | 172 | 55.8 |

***Measures of Health System Responsiveness***

A total of 31 questions describing responsiveness indicators with ratings ranging from 31 to 155 were issued to the respondent. Scale reliability was assessed using Cronbach's alpha coefficient (0.936), indicated sufficient internal consistency as guided by Taber, (2018).

***Descriptive Analysis for Responsiveness Levels***

Responsiveness scores ranged from 59 to 149, with a mean of 98.8 (63.7%). Using the demarcation threshold formula by

Fetene et al. (2022), responsiveness was categorized as favorable or unfavorable. Scores equal to or above the threshold (104) were considered favorable. Only 118 (38.3%) respondents had favorable responsiveness. The results were disaggregated by sociodemographic variables as presented in table 3.

**Table 3**

*Disaggregation of Responsiveness Categories by Sociodemographic Variables*

| Sociodemographic Variable | | Favourable | % | Unfavourable | % | Total |
|---|---|---|---|---|---|---|
| Facility | Kimilili | 40 | 50 | 40 | 50 | 80 |
| | Uasin Gishu | 44 | 44.9 | 54 | 55.1 | 98 |
| | Gatundu | 34 | 26.2 | 96 | 73.8 | 130 |
| Gender | Male | 32 | 33.7 | 63 | 66.3 | 95 |
| | Female | 86 | 40.4 | 127 | 59.6 | 213 |
| Age | <40 Years | 12 | 42.9 | 16 | 57.1 | 28 |
| | 40-59 Years | 62 | 39 | 97 | 61 | 159 |
| | 60-79 Years | 34 | 35.4 | 62 | 64.6 | 96 |
| | ≥80 Years | 10 | 40 | 15 | 60 | 25 |
| Medical Condition | DM | 40 | 42.1 | 55 | 57.9 | 95 |
| | HTN | 66 | 42.3 | 90 | 57.7 | 156 |
| | Both DM and HTN | 12 | 21.1 | 45 | 78.9 | 57 |
| Religion | Catholic | 51 | 44.7 | 63 | 55.3 | 114 |
| | Protestant | 59 | 37.1 | 100 | 62.9 | 159 |
| | Muslim | 8 | 32 | 17 | 68 | 25 |
| | Traditionalist | 0 | 0 | 10 | 100 | 10 |
| Marital Status | Single | 12 | 26.1 | 34 | 73.9 | 46 |
| | Married | 88 | 41.1 | 126 | 58.9 | 214 |
| | Divorced | 1 | 10 | 9 | 90 | 10 |
| | Widowed | 5 | 22.7 | 17 | 77.3 | 22 |
| | Others | 12 | 75 | 4 | 25 | 16 |
| Education level | No Formal | 13 | 44.8 | 16 | 55.2 | 29 |
| | Primary | 45 | 40.9 | 65 | 59.1 | 110 |
| | Secondary | 33 | 30.6 | 75 | 69.4 | 108 |
| | Tertiary | 27 | 44.3 | 34 | 55.7 | 61 |
| Income source | Business | 32 | 40.5 | 47 | 59.5 | 79 |
| | Farmer (LS) | 1 | 2.2 | 44 | 97.8 | 45 |
| | Farmer (SS) | 61 | 46.9 | 69 | 53.1 | 130 |
| | Formal Job | 16 | 40 | 24 | 60 | 40 |
| | Casual Labour | 6 | 66.7 | 3 | 33.3 | 9 |
| | Others | 2 | 40 | 3 | 60 | 5 |
| Income Level | High | 42 | 46.2 | 49 | 53.8 | 91 |
| | Low | 76 | 35 | 141 | 65 | 217 |
| Insurance | Yes | 56 | 41.2 | 80 | 58.8 | 136 |
| | No | 62 | 36 | 110 | 64 | 172 |

LS: Large scale, SS: Small scale

Most favorable responsiveness experiences 44 (44.9%) were noted in Uasin Gishu Hospital; out of which 86 (40.4%) were female; and 12 (42.9%) are relatively young persons aged below 40 years; 51 (44.7%) subscribed to catholic faith;, 88 (41.1%) are married; 13 (44.8%) have no formal education; 61(46.9%) are small

scale farmers; 42 (46.2%) earned comparatively high income; and 56 (41.2%) had medical insurance cover.

***Association between Socio-demographic Variables and Responsiveness***

The chi-square ($\chi 2$) test was used to determine the statistical significance of association between socio-demographic variables and responsiveness. The results are presented in table 4.

**Table 4**

*Association between Socio-demographic Variables and Responsiveness Experiences*

| Categories | | d.f | $\chi 2$ | P value |
|---|---|---|---|---|
| Facility | 3 | 2 | 14.554 | 0.001 |
| Gender | 2 | 1 | 1.245 | 0.265 |
| Age Categories | 4 | 3 | 0.647 | 0.886 |
| Medical Condition | 3 | 2 | 8.817 | 0.012 |
| Religion | 4 | 3 | 8.721 | 0.033 |
| Marital Status | 5 | 4 | 18.389 | 0.001 |
| Education Level | 4 | 3 | 4.498 | 0.212 |
| Income source | 6 | 5 | 32.155 | 0.001 |
| Income level | 2 | 1 | 3.361 | 0.067 |
| Insurance | 2 | 1 | 0.846 | 0.358 |

Five variables; namely, facility location, medical condition, religion, marital status and income source had statistically significant effect on responsiveness. For the binary variables of gender, income level and enrolment in insurance, a further analysis by odds ratio was done to compare the relative odds of experiencing favorable responsiveness. The results are presented in table 5.

**Table 5**

*Odds ratios for responsiveness by gender, income category and enrolment in insurance*

| | OR | 95%CI |
|---|---|---|
| Gender(Male/Female | 1.333 | 0.804-2.211 |
| Income level (Low/High) | 1.590 | 0.967-2.616 |
| Insurance (No/Yes) | 1.242 | 0.507-1.278 |

OR: Odds ratio CI: Confidence interval

Table 5 indicates that females, the high-income category and those insured had better odds of experiencing responsive care.

***Discussion***

Facility location, medical condition, religion, marital status, and income source impact responsiveness. This finding corroborates findings by Ali et al., (2015),

and Paddison et al., (2015), who underscored the effect of demographic factors on health system responsiveness. However, these associations fluctuate across contexts and time, as noted by Kapologwe et al., (2020), thereby necessitating context-based policies to address healthcare disparities.

Favorable experiences diminish progressively from Kimilili hospital in rural Bungoma County, to Uasin Gishu hospital, which is considered peri-urban; and finally Gatundu hospital in urban Kiambu County. This aligns with Raynald Pineault & Jean-Frédéric Levesque, (2010) observation that there is better responsiveness in rural compared to urban facilities, as well as Tremblay et al., (2015) finding that facility location significantly predicts health system responsiveness. The rural-urban gradient in healthcare experiences underscores disparities in access and quality, warranting policy intervention.

Females exhibited 1.333 times higher odds of responsive care, contrary to gender disparities in other studies (Alcalde-Rubio et al., 2020; Kruk et al., 2018). Age showed no significant effect on responsiveness, aligning with Meesala & Paul (2018) findings. However, a declining trend was observed in young to old, with a slight reversal among the very old; differing from Tille et al. (2019) and Amani et al. (2020) findings.

Insured individuals had 1.242 times higher odds of experiencing favorable responsiveness compared to the uninsured. This finding is consistent with a South African study where responsiveness improved with insurance (Peltzer & Phaswana-Mafuya, 2012). However, it differs with findings by Kapologwe et al. (2020) and Negash et al. (2022) who found no socio-demographic effect on responsiveness.

Marital status had no significant effect on responsiveness, supporting findings by Mohammed et al. (2013). However, this finding differs from Kapologwe et al.'s (2020) research where marital status was found to have significant effect. Education level did not significantly associate with responsiveness, aligning with findings of a study by Zalmanovitch & Vashdi (2015). Nonetheless, this result contrasts with Liabsuetrakul et al. (2012) and Tremblay et al. (2015) findings that found association between educational level and responsiveness.

Regarding medical conditions, favorable responsiveness was lower among those with poorer health and having both conditions, compared to individuals with either diabetes or hypertension alone. This aligns with a study in Germany which indicated that customers with poor health received more unresponsive care (Tille et al., 2019). However, this contrasts with another study where medical condition did not affect responsiveness scores (Stewart et al., 2020).

Religion's association with responsiveness was statistically significant, hence corroborating other research findings indicating the impact of religion on health system responsiveness (Liabsuetrakul et al., 2012). Religion, a sociocultural practice, affects health service acceptability and plays a central role in social support (Kruizinga et al., 2018). It influences health-seeking behaviors, medical treatment decisions, and ethical

considerations in healthcare, thereby potentially affecting responsiveness.

Income source/occupation significantly affected responsiveness. However, no significant association was found between income levels and responsiveness. Low-income categories had 0.63 lower odds of favorable outcomes compared to high-income, aligning with other findings of wealth inequalities in responsiveness (Stewart et al., 2020). Poverty restricts access to healthcare, limits consultations, and reduces involvement in treatment decisions, leading to unresponsive care (Shaqura et al., 2022). These results are consistent with Liabsuetrakul et al. (2012), who noted that income and occupation influence health system responsiveness.

## 4.0 Conclusion

In conclusion, this study reveals that socio-demographic factors significantly influence health system responsiveness, with variables such as facility location, medical condition, religion, marital status, and income source showing a notable impact. Despite higher odds of experiencing unfavorable responsiveness, it is crucial for healthcare managers to adopt a holistic, patient-centered approach to improve the quality of care. Further, targeted interventions, educational programs, and workshops are recommended to address specific contextual variations.

## 5.0 Recommendations

In light of these findings, the study recommends healthcare managers to prioritize a holistic approach to patient care, emphasizing individualized interactions. Targeted educational programs, workshops, and peer review sessions should be implemented to enhance healthcare responsiveness and address the unique needs of patients with chronic conditions.

### *Study Contribution*

This study contributes to the discourse on health systems responsiveness by uniquely highlighting the influence of socio-demographic factors among clients with chronic illnesses in primary hospitals in Kenya. By demonstrating that these factors vary in different contexts, the study emphasizes the importance of tailoring healthcare responses to individual characteristics.

### *Conflict of interest*

The authors state that they have no conflict of interest.

### *Author contribution*

Al authors contributed to the conceptualization and design of the study. Kibiriti Hillary performed data collection, analysis, interpretation, manuscript drafting, and revision. Study supervision and manuscript review were carried out by Wanja Tenambergen and Mapesa Job. All authors have reviewed and approved the final manuscript.

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