

## **Introduction**

Improvement of the human well-being has occupied social policy overtime. Past studies have demonstrated that a person's own appraisal of his/her general health is a powerful predictor of future morbidity and mortality, even after controlling for a variety of physical, socio-demographic and psycho-social health status indices (Kaplan and Camacho, 1983; Idler and Angel, 1990). Well-being, whether measured objectively or subjectively, is generally viewed as a description of the state of people's life situation (McGillivray, 2007; p. 3). In recent times, more scholars from different branches of science are joining the conversations and debates. This interest has been stimulated by the changing demographic trends and epidemiological transition, especially those age 60 and over.

While research on subjective well-being among the elderly rose exponentially in the last two decades, most of the such studies have been concentrated in the USA, Canada, Germany, England and Australia (McGillivray, 2007; Diener et al., 2018). In the last decade, researches on the well-being of older have broadened in scope, have been multidisciplinary in nature and conducted on all the continents. Many of the studies focused on exploring the relationships between life satisfaction and aging, volunteering, religion, health, physical activity, emotions, gender differences, amongst others. In the above studies, attempts have been made to explain why subjective well-being (SWB) generally increases with age in most high-income countries. However, there are few studies that attempt to explain circumstances associated with subjective well-being among older persons in sub-Saharan Africa. This paper draws its objectives from a larger longitudinal study on the factors influencing well-being of adults age 60 and over in Nairobi, Kenya. The main objective is to explore factors associated with low self-report of well-being among older persons living in urban areas.

## **Past literature**

Subjective well-being involves a multidimensional evaluation of life, that includes cognitive judgments of life satisfaction and affective evaluations of emotions and moods (McGillivray and Clarke, 2006, p. 4). Studies from high-income countries indicate that a range of factors influence subjective evaluations of well-being in old age (Diener and Oishi, 2002). Social groups, relationships and support systems are thought to be strongly associated with subjective well-being in later life (Ryff et al., 2004).

The few studies exploring subjective well-being among the elderly in sub-Saharan Africa (reveal that persons age 60 and over with low socio-economic status, few social supports, a woman, are more likely to report low/poor subjective well-being compared to their economically advantaged, socially connected, male counterparts (Adebowale et al., 2012; Gureje, 2008). However, in a comprehensive review on subjective well-being, Diener and Ryan (2009) observed that women and men do not differ so much in terms of subject well-being. Some studies in Africa show that there is no consensus on subjective well-being scores between men and women (Ohemeng et al., 2018). Gómez Olivé et al. (2010), using the WHO SAGE data on South Africa, after controlling for other variables, report that there is no difference in reported quality of life indicators between males and females. But studies from Tanzania, Kenya and Vietnam report that women seem to have a poorer subjective well-being score compared to men (Kyobutungi et al., 2010; Mwanyangala et al., 2010).

The role of gender on subjective well-being in old age is unique and is found to vary across the life course. Women in their adolescence and early adulthood, on average, report higher levels of subjective well-being compared to men (Graham, 2013); but in old age, women often report lower levels of subjective well-being than older men due to disadvantages in income, social relations and socio-economic status that accrue in later life (Jivraj

et al., 2014). On the other hand, some studies have suggested that older men report lower levels of subjective well-being since they have fewer tasks from which to gain happiness.

The importance of socio-economic status, such as income and education, for outcomes for subjective well-being in old age have been mixed (Jivral et al., 2014). Some studies suggest that older persons in high-income brackets have better outcomes of subjective well-being compared to their financially constrained counterparts, due to their ability to directly access financial resources and indirectly draw down on a range of cultural and social resources (Cheung et al., 2012; Netuveli et al., 2006). While other studies report that education significantly influences subjective well-being during youth and early adulthood, others consistently demonstrate that education has a small to negligible influence on subjective well-being in old age (Pinquart et al., 2000).

A scoping review by Courtin and Knapp (2017) indicated that social isolation and loneliness are common among older people and can be both negatively associated with mental and physical health. Literature suggests that having diverse, supportive social networks can promote physical and mental health (Berkman, 1995; Thoits, 2006; Fratiglioni et al., 2004; Hertzog et al., 2008; Windsor et al., 2014). Social network members can have a positive influence on health behaviours and can provide support during times of need, and allow opportunities for social interactions that create positive emotional experiences (Berkman, 1995; Thoits, 2006). In the last decade, there has been an increase in studies that investigated the possibility that social engagement may be protective against cognitive decline (Fratiglioni et al., 2004; Hertzog et al., 2008; Windsor et al., 2014).

## Data and methods

### Data

The data comes from the first wave of a longitudinal study carried out by Health Age International and Population Studies and Research Institute of the University of Nairobi, that was conducted in selected Nairobi communities that host populations in lower and middle class areas in March 2021 (see map of study sites in annex). The survey was captured using computer-assisted personal interviews (CAPI) designed in android smart phones/tablets installed with survey CTO, a tool that enables automatic upload of survey data to a secure, password protected server. Data collection took a total of 12 days during which 2,458 households were covered across 3 sub-counties of Nairobi city. In these households, a total of 7,819 household members were listed with 2,609 being eligible older persons age 60 years and above who had lived in the sub-counties for at least 6 months. The breakdown of the households, household members and older persons covered by sub-county is shown in Table 1.

Table 1: Number of households, household members and older persons by study site

Sub-county	Number of households	Members in the households	Number of older persons
Dagoretti North	489	1,643	522
Dagoretti South	721	2,293	805
Kibra	1,248	3,883	1,282
<b>Total</b>	<b>2,458</b>	<b>7,819</b>	<b>2,609</b>

Data was collected using two instruments: household and individual older person questionnaires. The household questionnaire had six modules (household members, household characteristics, water and sanitation, food insecurity, food consumption and expenditure, household expenditure); while the individual questionnaire incorporated 11 modules (background characteristics, marriage and family, work and social protection, decision

making, social and community, self-reported health status, chronic conditions, lifestyle/health behaviour, health utilization, intergenerational care, subjective wellbeing).

## **Study variables**

### *Outcome variable: Subjective well-being*

In this paper, the main study outcome was the subjective well-being defined as “a person’s cognitive and affective evaluations of his or her life” (Diener et al., 2006). It is, thus a composite reflection of how people appraise the many facets of their lives. Previous studies have indicated that such indicators are useful in assessment of personal and societal quality of life. An index of life satisfaction generated from self-evaluation report was therefore used as proxy indicators for subjective well-being. The self-evaluation utilized the set of questions as in the WHO Study on Global Ageing and Adult Health (SAGE) section 2000 on subjective wellbeing and quality of life.. The focus was on four major question items:

1. How satisfied are you with your health?
2. How satisfied are you with your ability to perform your daily living activities?
3. How satisfied are you with your personal relationships?
4. How satisfied are you with the conditions of your living places?

Responses to the questions were also in a five-point Likert scale: very satisfied; satisfied; neither satisfied nor dissatisfied; dissatisfied; and very dissatisfied. Since the responses are likely to be correlated, and from the fact that the overall life entails several facets, factor analysis procedures (principal components) were used to derive a single indicator denoted in this paper as ‘life satisfaction index’. First, principal component analysis was done which generated three main components. The first component was used as the indicator for life satisfaction index. By first ranking and then ranked scores divided in three, denoted as high (1), medium (2) and low (3) reported level of satisfaction. This index was then used as a proxy measure of subjective well-being.

### *Explanatory variables*

Table 2 provides a list of explanatory variables used in the paper broadly grouped as; demographic, socio-economic, social inclusion/exclusion. These explanatory variables were selected based on literature (see for example Diener, et al., 2018).

#### a) Demographic variables – age, sex and marital status

Some studies in sub-Saharan Africa show that women tend to report poor subjective well-being, while others report that there are no differences in self-reports on life satisfaction among the elderly. Therefore, sex was taken as a major explanatory variable for investigation although Tesch-Romer et al. (2008) noted that, the direction of sex differences depended on the nation. The experience of physical functional declines with increasing age, hence a reduction in social activities in general. In high-income countries, the relationship between age and well-being is consistently U-shaped (Steptoe et al., 2015).

Studies have also indicated that social support systems (such as family, friends, clubs, groups) can enhance social relationships, promote happiness and generate better appreciation of SWB in old age (Lau & Machizawa, 2012; Taniguchi et al., 2016). Marital status is an important status for SWB in old age (Diener, 2000; Mroczek, 2005) because being married is strongly and significantly related to higher SWB since marriage provides social support and the accumulation of resources that can directly and indirectly affect SWB in later life (Diener et al., 2018).

## b) Socio-economic status

The role of socio-economic status, such as income and education, for outcomes for SWB in old age has been mixed (Jivraj, 2014). Most studies suggest that older persons in high-income brackets have better outcomes of SWB compared to their financially constrained counterparts, due to their ability to directly access financial resources and indirectly draw down on a range of cultural and social resources (Cheung et al., 2014; Netuveli et al., 2006). On the other hand, studies consistently demonstrate that education has a small to negligible influence on SWB in old age (Pinquart et al., 2000). Three variables were used as indicators of socio-economic status. These were level of educational attainment, whether person receives pension and economic activity. Further, receipt of pension and work status may be proxy indicators for income.

## c) Social engagement

Two variables were constructed to measure social engagement: social participation and loneliness index. Social participation refers to a person's involvement in activities providing interactions with others in the community. Research has found it to be a key determinant of health and well-being, and thus an important intervention to reduce these risks in old age. Social isolation and loneliness have been associated with negative health outcomes and quality of life. Literature identifies four domains of social engagement: namely; social networks, social support, social integration and relationship quality.

### i) Loneliness (social isolation)

Loneliness pertains 'to the feeling of missing intimate relationships or missing a wider network', and is, therefore, 'an individual's subjective evaluation of his or her social participation or isolation' (de Jong et al., 2004). Loneliness Index was generated from three items from the University of California-Los Angeles (UCLA) scale. The UCLA items are:

- i. *How often do you feel that you lack companionship?*
- ii. *How often do you feel left out? and*
- iii. *How often do you feel isolated from others?*

The responses to each of the three items above are categorized as: 1) Hardly ever or never; 2) Some of the time; and 3) Often. To generate the index, the score was summed up for each individual. The lowest possible combined score on the loneliness scale was 3 (indicating less frequent loneliness) and the highest was 9 (indicating more frequent loneliness). There is no standard accepted score for which a person would definitely be considered lonely. Instead, it is suggested that it may be more helpful to use the average score across the sample. The average scores were divided into two categories namely; not lonely (score 0) and lonely (score of 1).

### ii) Social participation

The following five questions were asked to solicit information on social participation among older persons.

- i. *How often in the last ONE month have you attended any public meeting in which there was discussion of local affairs?*
- ii. *How often in the last ONE month have you attended any group, club, society, association, union or organizational meeting?*
- iii. *How often in the last ONE months have you attended religious services (not including weddings and funerals)?*
- iv. *Do you have any leadership role in any clubs or organizations in your community?*
- v. *How often in the last ONE month have you gotten out of the house/your dwelling to attend social meetings, activities, programs or events or to visit friends or relatives?*

The expected responses were: [1] for never; [2] for once or twice per year; [3] for once or twice in a month; and [4] for at least once a week. To obtain the social inclusion indicator, the scores were summed and divided into two - those inactive, and those who were socially active.

Table 2: Summary of explanatory variables used in the paper and their measurement

Broad group	Variable	Measurement
Demographic	Sex	1=Male, 2=Female
	Age group	1=60-69 2= 70 and over
	Current marital status	1= Not in union 2= In union
	Socio-economic	Education
Economic activity		1=Does not work 2=Working
Receives Pension		1=No 2= Yes
Social inclusion	Loneliness index	1= Not lonely 2= Lonely
	Social participation	1= Not socially active 2=Socially active

### Statistical method

The dependent variable is polytomous since the outcome falls into three hierarchical categories, namely: high, medium or low category of self-rating. A more appropriate model for analysis is to use ordinal regression often referred to as ordered response model. The model uses the cumulative response probabilities  $Y_{ij} = \Pr(Y < j)$  rather than category probabilities for simplicity (McCullagh and Nelder, 1989) and in its most general form written as:-

$$\text{Link } Y_{ij} = \{\theta_j - [\beta_1 X_{i1} + \dots + \beta_p X_{ip}]\} / \{\exp[\tau_1 Z_1 + \dots + \tau_m Z_m]\}$$

$Y_{ij}$  is the cumulative probability of the  $j^{\text{th}}$  category for the  $i^{\text{th}}$  case.

$\theta_j$  is the threshold parameter sometimes referred to as the cut off parameter for the  $j^{\text{th}}$  category.

$X_{i1} \dots X_{ip}$  are predictor variables that influence the response variable

$\beta_1 \dots \beta_p$  are the regression coefficients that account for the linear differences in the response variable (location components)

$Z_1 \dots Z_m$  predictor variables that influence the dispersion of the response variable (scale component)

$\tau_1 \dots \tau_m$  are the scale coefficients that account for the differences in variability.

The model, rather than predicting the cumulative probability, predicts a function of those values often called the link function. The link function chosen depends on the nature of the distribution of the response probabilities (McCullagh and Nelder, 1989). If the response probabilities are uniformly distributed, then the suitable link function is the logit link written as  $\log \gamma_{ij} / (1 - \gamma_{ij})$ . For responses that may be skewed, other forms of link functions may be chosen (McCullar and Nelder, 1989). The model is based on the assumption that there is a latent continuous outcome variable and that the observed ordinal outcome arises from discretizing the underlying continuum into  $j$ -ordered groups. The location parameter coefficients ( $\beta_i$ ) influence the likelihood of being in a higher/lower category given a change in the location independent variable  $X_i$  constrained by the scale parameter. The coefficients in the scale component account for the differences due to variability. The cut off parameters are not interpreted but are used to compute the cumulative probabilities.

## Results

### Characteristics of the study population

The distribution of the characteristics of the study population is presented in Table 3. Overall, as expected, more women were surveyed (55% females versus 45% males) and the ratio of males to females rapidly declines with age. The mean age was 68.8 years (males 67.9, Females 69.3) with a range from 60 to 110 years. Slightly over half of the respondents were currently married or in some union. Majority of older persons belong to the Roman Catholic followed by other Christian denominations. Slightly over one in five of the population did not have formal schooling, while three percent had higher level of education.

Table 3: Distribution of respondents by socio-demographic, social inclusion characteristics and age

Characteristic	Category	Age group					All age Groups
		60-64	65-69	70-74	75-79	80+	
Sub-county	Dagoretti North	20.0	20.1	20.8	18.5	19.8	20.0
	Dagoretti South	20.1	29.1	34.0	45.4	56.7	30.9
	Kibra	59.9	50.8	45.2	36.1	23.6	49.1
Sex	Male	47.1	47.1	47.4	45.4	31.2	45.4
	Female	52.9	52.9	52.6	54.6	68.8	54.6
Marital status	In union	59.8	54.1	50.0	40.3	20.9	50.9
	Not in union	40.2	45.9	50.0	59.7	79.1	49.1
Religion	Roman Catholic	23.3	27.6	28.8	30.3	33.5	27.0
	ACK	7.6	6.9	6.5	10.9	6.8	7.4
	PCEA	5.2	6.1	8.9	9.2	15.2	7.5
	SDA	4.3	1.9	1.9	1.3	1.1	2.7
	Evangelical	20.3	20.1	16.0	16.0	14.4	18.5
	Other Christian	24.4	23.4	21.6	18.9	17.1	22.4
	Muslim	9.6	10.0	11.0	9.7	9.1	9.9
Education	Other religion	5.3	3.9	5.2	3.8	2.7	4.5
	None	13.4	18.4	22.1	29.4	50.6	21.4
	Primary	54.9	57.9	58.2	53.4	44.5	55.0
	Secondary	28.8	20.8	16.0	14.3	3.8	20.7
Worked in last 7 days	Higher	3.0	2.8	3.7	2.9	1.1	2.9
	Yes	53.2	45.4	30.7	17.2	8.4	39.4
Receives Pension	No	46.8	54.6	69.3	82.8	91.6	60.6
	Yes	3.2	4.0	4.5	4.2	3.0	3.7
Often feels isolated from others	No	96.8	96.0	95.5	95.8	97.0	96.3
	Never	69.1	66.1	71.9	71.0	66.4	68.7
	Some of the time	25.9	29.4	22.7	23.5	29.0	26.3
Participation in social activities outside household	Often	5.0	4.5	5.4	5.5	4.6	4.9
	Very active	24.0	22.0	19.0	12.0	10.0	20.0
	Fairly active	49.0	51.0	47.0	45.0	30.0	47.0
	Not very active	21.0	21.0	23.0	29.0	29.0	23.0
Number of cases	Not active at all	6.0	6.0	10.0	13.0	31.0	10.0
		<b>979</b>	<b>667</b>	<b>462</b>	<b>238</b>	<b>263</b>	<b>2609</b>

About four percent of the respondents were receiving some form of pension, while nearly 4 in 10 continue to engage in some form of economic activity. Only one in 5 older persons reported to be participate in some form of social activities outside the home.

### Bivariate analysis

Table 4 presents the distribution of the respondents by life satisfaction index and selected explanatory variables (shown in Table 2). About 25 percent of the respondents classified themselves has having low level of life satisfaction. For all the variables except age, there was clear statistically significant differences in self-report on life satisfaction. The differences clearly reflect what literature reports on correlates of life satisfaction (Diener et al., 2018). A higher proportion of women responded to have lower life satisfaction index compared to men. The age differences were small. The largest differences were; between those who were judged as being lonely compared those who were not lonely, social participation and health condition.

Table 4: Cross classification of life satisfaction index with selected variables

Variable	Category	Life satisfaction index (% of cases)			P- value	Number of cases
		High	Medium	Low		
	<b>All cases</b>	<b>45.8</b>	<b>29.4</b>	<b>24.8</b>		<b>2607</b>
Sex	Male	49.7	28.1	22.2	<0.001	1183
	Female	42.6	30.5	26.9		1424
Age group	60-69	47.1	29.0	24.0	0.084	1645
	70 and above	43.7	30.1	26.2		962
Marital status	Not in union	41.1	29.9	29.0	<0.001	1279
	In union	50.3	29.0	20.7		1328
Level of education	None	40.9	29.6	29.6	<0.001	558
	Primary	45.5	29.7	24.8		1435
Work status in last 7 days	Does not work	41.2	29.1	29.8	<0.001	1421
	Work	51.3	29.8	18.8		1186
Receives pension	Yes	64.6	24.0	11.5	<0.001	96
	No	45.1	29.6	25.3		2511
Social participation	Not active	43.0	28.7	28.2	<0.001	1689
	Active	51.1	31.0	17.8		880
Loneliness index	Not lonely	54.8	29.9	15.3	<0.001	1670
	Lonely	29.8	28.5	41.7		937

### Multivariate analysis

Tables 5a and 5b presents the results of ordinal regression on the propensity to report having lower level of life satisfaction. Four models are presented in order to explore how various factors may relate to the likelihood of reporting having a low level of life satisfaction. The first two models are based on the demographic correlates. The third model is the socio-economic model, while the fourth model is the full model. Even after controlling for age, there are differences between men and women in the propensity to report low levels of life satisfaction. However, when marital status was introduced in the regression equation (Model II), the difference between males and

females became insignificant. Thus, marital status maybe confounding the sex differences in the chance of reporting low subjective wellbeing.

Table 5a: Ordinal regression results on factors associated with life satisfaction index

		Model I			Model II		
		B (odds ratio)	Std Err	95% Confidence interval	B (odds ratio)	Std Error	95% Confidence interval
Sex (Male)	Female	1.311**	0.097	1.13, 1.51	1.061	0.099	0.88, 1.27
Age (60-69))	70+	1.125	0.085	.978 , 1.30	1.069	0.082	0.92, 1.24
Current marital status(not married)	married				0.704**	0.066	0.59,0.85
	Cut1	0.022	0.062	-.10, .14	-0.293	0.104	-0.59, -.09
	Cut 2	1.307	0.068	1.17 1.44	0.998	0.106	0.79, 1.21
	N	2607			2607		
	Pseudo R2	0.003			0.0055		

\*p-value <0.05, \*\*p-value < 0.01

reference categories in parenthesis in column 1

In model III, only current marital status, receipt of pension and work remain predictors of the chance of reporting lower level of subjective wellbeing. Those not lonely are less likely to report having a low life satisfaction index. In the final full model, the demographic factors including education are not statistically significant.

Table 5b: Ordinal regression results on factors associated with life satisfaction index

		Model III			Model IV		
		B (odds ratio)	Std Error	95% Confidence interval	B (odds ratio)	Std Error	95% Confidence interval
Sex (male)	Female	0.952	0.09	0.78,1.19	1.082	0.10	0.89, 1.31
Age (60-69)	70+	0.925	0.08	0.79,1.08	0.971	0.08	0.82, 1.15
Current marital status (not married)	Married	0.726**	0.07	0.60,0.87	0.973	0.10	0.80, 1.18
Has pension (Yes)	No	2.194**	0.47	1.44, 3.35	1.917**	0.47	1.23, 2.98
Education (None)	Primary	0.939	0.09	0.78, 1.14	0.974	0.10	0.8, 1.19
	sec+	0.845	0.1	0.64,1.07	0.856	0.11	0.67, 1.09
Work (does not) social engagement (not active) lonely index (not lonely)	Work	0.641**	0.05	0.55, 0.75	0.633**	0.05	0.53, 0.74
	Active				0.696**	0.06	0.54, 0.82
	Lonely				3.247**	0.27	2.77, 3.81
	Cut1	0.086	0.25	-.41, 0.45	0.472	0.26	-0.04, 0.98
	Cut 2	1.396	0.25	0.9, 1.9	1.891	0.26	1.37, 2.41
	N	2607			2,569		



Pseudo  
R2 0.0144

0.0572

---

\*p-value <0.05, \*\*p-value < 0.01  
reference categories in parenthesis in column 1

## Discussion

The main objective was to explore factors associated with low self-report of well-being among older persons living in urban areas. The measure of well-being was derived from the responses to life satisfaction questions and categorized as high, medium and low level of satisfaction. The study begun by exploring the relationship between subjective well-being and sex. While men are less likely to report having low level of life satisfaction irrespective of age, the differences diminish once current marital status is controlled for. Which implies that the male-female difference arises from the differences of whether one is in union or not.

The results presented in this study are consistent with what has been in literature. For example, Jebb et al. (2020) concluded from a study of 166 countries that four important predictors of subjective well-being are marriage, employment, prosociality, and life meaning. In this study, the effect of marriage diminishes once other social engagement factors are included in the models. However, it is important to note that some studies have reported that the role that marriage plays may be complicated by the fact that the effects of marriage may vary across cultures or over time (Diener et al., 2000; Lucas & Dyrenforth, 2006). Although literature has indicated that income plays an important role in SWB outcomes, the effect of income was not investigated directly because information on individual income was not sought. The receipt of pension and work status were used as proxy indicators for income but this may not be taken as full representation of income. For example, some older persons may choose to work in order to get income but the earnings may not exceed those who do not work.

## Conclusion

In view of the fact that there are no widespread studies on wellbeing of older persons in sub Saharan Africa, this study contributes to debate and therefore calls for increased of studies in different settings. Secondly, Diener et al. (2018) point out that there is no single, overarching theory of subjective well-being because SWB is a broad construct that is likely multiply determined. But results of this study are consistent with literature that social relationships and income may play an important role in people's evaluations of their lives. However, it is noted that a limitation that these correlations, are often based on self-reports of relationship quality (Lucas & Dyrenforth, 2006), which can inflate correlations with self-reported measures of subjective wellbeing.

## References

- Adebowale, S. A.; Atte, O.; Ayeni, O. 2012. Elderly Well-being in a Rural Community in North Central Nigeria, sub-Saharan Africa. *Public Health Res.*, 2, 92–101.
- Calys-Tagoe, B. N. L.; Hewlett, S. A.; Dako-Gyeke, P.; Yawson, A. E.; Baddoo, N. A.; Seneadza, N. A. H.; Kowal, P. 2014. Predictors of subjective well-being among older Ghanaians. *Ghana Med. J.*, 48, 178–184.
- Cheung, C. K.; Ngan, R. M. H. 2012. Filtered Life Satisfaction and Its Socioeconomic Determinants in Hong Kong. *Soc. Indic. Res.*, 109, 223–242.
- Diener, E.; Gohm, C.; Suh, E.; Oishi, S. 2000. Similarity of the relations between marital status and subjective well-being across cultures. *Journal of Cross Cultural Psychology*, 31, 419–436. DOI: <https://doi.org/10.1177/0022022100031004001>
- Diener, E.; Lucas, R. E.; Oishi, S. 2002. Subjective well-being: The science of happiness and life satisfaction. In *Handbook of Positive Psychology*, 2nd ed.; Amazon: North Seattle, WA, USA, 2002; pp. 63–73.
- Diener, E. & Ryan, K. 2009. Subjective well-being: A general overview. *South Africa Journal of Psychology*, 39(4), 391–406.
- Gureje, O.; Kola, L.; Afolabi, E.; Olley, B. O. 2008. Determinants of quality of elderly Nigerians. Results from the Ibadan of Aging. *Afri. J. Med. Sci.* 2008, 37, 239.
- Gómez-Olivé, X. F.; Thorogood, M.; Clark, B. D.; Kahn, K.; Tollman, S. M. (2010). Assessing health and well-being among older people in rural South Africa. *Global Health Action*, 3(1), 2126.
- Graham, C.; Chattopadhyay, S. 2013. Gender and well-being around the world. *Int. J. Happiness Dev.* 1,212–232
- Idler, E. L & Angel, R.J. 1990. Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *Am J Public Health*, 80, 446–52.
- Jebb, A. T.; Morrison, M.; Tay, L.; Diener, E. 2020. Subjective well-being around the world: Trends and predictors across the life span. *Psychological Science*, 31(3), 293–305. <https://doi.org/10.1177/0956797619898826>
- Jivraj, S.; Nazroo, J. 2014. Determinants of socioeconomic inequalities in subjective well-being in later life: A cross-country comparison in England and the USA. *Qual. Life Res*, 23, 2545–2558.
- Kaplan, G. A & Camacho, T. 1983. Perceived health and mortality: a nine-year follow-up of the human population laboratory cohort. *Am J Epidemiol*, 117, 292–304.
- Kyobutungi, C.; Egondi, T.; Ezeh, A. 2010. The health and well-being of older people in Nairobi's slums. *Global Health Action*, 3(1), 2138.
- Lau, D. T.; Machizawa, S. M. 2012. Informal and Formal Support among Community-Dwelling Japanese American Elders Living Alone in Chicagoland: An In-Depth Qualitative Study. *J. Cross Cult. Gerontol.* 27, 149–161
- Lucas, R. E & Dyrenforth, P. S. 2006. Does the existence of social relationships matter for subjective well-being? In: Vohs, K. D., & Finkel, E. J. (Eds.), *Self and relationships: Connecting intrapersonal and interpersonal processes*, 254–273. New York: Guilford.
- McCullagh, P. and J. A. Nelder. 1989. *Generalized Linear Models*. London, Chapman and Hall. 2nd Edition.
- Miroslav Verbič. 2019. Subjective well-being among the elderly: A bibliometric analysis. *Quality & Quantity* 53:1187–1207 <https://doi.org/10.1007/s11135-018-0811-9>
- Mwanyangala, M.; Mayombana, C.; Urassa, H.; Charles, J.; Mahutanga, C.; Abdullah, S.; Nathan, R. 2010. Health status and quality of life among older adults in rural Tanzania. *Global Health Action*, 3(1), 2142
- Netuveli, G.; Wiggins, R. D.; Hildon, Z.; Montgomery, S. M.; Blane, D. 2006. Quality of life at older ages: Evidence from the English longitudinal study of aging (wave 1). *J. Epidemiol. Community Health*, 60, 357–363.

- Ohemeng Fidelia; Brent Small & Victor Molinari 2018. Social Activities and Subjective Well-Being of Older Adults in Ghana. *Journal of Population Ageing* (2020) 13:443–463. <https://doi.org/10.1007/s12062-019-09251-9>
- Pedro Conceição and Romina Bandura. 2008. *Measuring Subjective Wellbeing: A Summary Review of the Literature*. Office of Development Studies, United Nations Development Programme, New York, 18 April 2008
- Pinquart, M.; Sörensen, S. 2000. Influences of socioeconomic status, social network, and competence on subjective well-being in later life: A meta-analysis. *Psychol. Aging* 2000, 15, 187–224.
- Ralston, M. 2018. The Role of Older Persons' Environment in Aging Well: Quality of Life, Illness, and Community Context in South Africa. *Gerontologist* 2018, 58, 111–120.
- Stephoe, A.; Deaton, A.; Stone, A. A. 2015. Subjective wellbeing, health, and aging. *The Lancet*, 385, 640–648. DOI: [https://doi.org/10.1016/S0140-6736\(13\)61489-0](https://doi.org/10.1016/S0140-6736(13)61489-0)
- Taniguchi, H.; Potter, D. A. 2016. Who are your Neighbors? Neighbor Relationships and Subjective Well-Being in Japan. *Appl. Res. Qual. Life* 11, 1425–1443.
- Tesch-Römer, C.; Motel-Klingebiel, A.; Tomasik, M. J. 2008. Gender differences in subjective wellbeing: Comparing societies with respect to gender equality. *Social Indicators Research*, 85, 329–349. DOI: <https://doi.org/10.1007/s11205-007-9133-3>

Study sites of Dagoretti and Kibra (in green shade) within Nairobi County

