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# Resilience in the face of post-election violence in Kenya: The mediating role of social networks on wellbeing among older people in the Korogocho informal settlement, Nairobi

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ABSTRACT

Older people in slum settings are a vulnerable sub-group during crises, yet have received minimal attention in the development discourse. This paper examines the protective role of different types of social networks for older slum dwellers' wellbeing during adversity by investigating the relationship between social networks, the Kenyan 2007/08 post-election violence, and dimensions of wellbeing namely self-rated health, life satisfaction and happiness amongst older people in the Korogocho slum, Nairobi. The analyses are based on conditional change logistic regression models using data from a unique longitudinal survey of the health and wellbeing of older people. The results show that maintaining or increasing formal local networks reduced the detrimental effects of the post-election violence for older people's wellbeing, whilst household environment and informal local and non-local networks did not influence the relationship. Consequently, the paper provides evidence that supporting inclusive community organisations which are accessible to older people can be valuable in promoting the resilience of this population group.



## 1. Introduction

The slums of sub-Saharan Africa's cities are particularly daunting places to grow old in the context of minimal government assistance, growing pressures on traditional intergenerational support, and increasingly hostile urban economies for older people. Understanding which factors contribute to resilience amongst older people is of paramount importance for the design of policy to support this vulnerable population group. Literature on older people's wellbeing has consistently highlighted that social networks are an important source of support as people grow older, particularly in resource constrained settings. This paper employs unique panel data to examine the role of social networks as a protective factor in mitigating the impact of a shock on three dimensions of older people's wellbeing: self-rated health, life satisfaction and happiness, in Nairobi's Korogocho informal settlement. The Kenyan post-election violence had a devastating impact on Nairobi's slums and is used as a case study of an adverse event which posed a risk to wellbeing. The paper presents evidence on the relationship between social networks, being affected by the post-election violence, and wellbeing amongst older slum dwellers and discusses the policy implications of these findings for promoting the resilience of older people in low resource settings.

## 2. Resilience & social networks in later life

The concept of resilience emerged as a result of research by child psychologists attempting to understand how some children are able to overcome trauma and emerge with positive outcomes, and is now increasingly being applied to other life stages, including old age (Wild et al., 2013). It represents a shift in focus from examining hardship itself to looking at how people can positively adapt to hardship (Seccombe, 2002). Resilience researchers focus on the interplay between i) risks: the probability that a person will experience negative outcomes following adversity; ii) vulnerabilities: factors which may predispose individuals to experiencing negative outcomes following risk; and iii) protective factors: circumstances which can enable an individual to adapt to adversity (Masten, 2001). While early work focused on personality traits which influence coping capacity (Wagnild and Young, 1993; Jacelon, 1997), later work has conceptualised resilience as a

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multi-faceted dynamic process characterised by both individual characteristics and individuals' interactions with family, household and community factors which promote coping (Wagnild, 2003; Sapountzaki, 2007). By conceptualising resilience as a dynamic process, it is possible to design policies to increase resilience (Hardy et al., 2004). Prior studies examining resilience amongst older people have focused almost exclusively on high income settings. Nonetheless, the concept is increasingly applied to other human development topics in low income settings (Béné et al., 2014) as a pragmatic approach to vulnerability reduction in the context of constrained resources.

The conceptualisation guiding the current study is shown in Fig. 1. The focus is on protective factors which contribute to preventing a decrease in an individual's wellbeing after a shock, compared to the individual's wellbeing before a shock. This protective role is assessed by comparing wellbeing trajectories amongst individuals who experienced the shock with those who did not experience the shock, the 'control group', while considering their different levels of protective factors. The focus of this paper is to investigate how social networks act as a protective factor which may contribute to older people's coping capacity. Social networks relate to the dynamic group of people that individuals maintain relationships with throughout their lives, and span *informal* connections including family, friends and neighbours, and relationships built through *formal* connections such as membership of community-based and religious organisations (Litwin and Stoeckel, 2013). Social networks influence individuals' feelings, such as sense of self-worth, access and use of services and information, and can offer practical and emotional support (Cattell, 2001). Networks are particularly important in old age, when individuals may experience declining health and increasingly disengage from paid work. Whilst relationships with others are not always supportive and beneficial, research with older people has generally highlighted a greater proportion of positive than negative attributes of social networks (Pinquart and Sörensen, 2000). Prior resilience research has highlighted the positive role of social networks for older people. For example, a study investigating the resilience of British widowers identified social networks, both formal and informal, to be vital to achieving resilience following spousal death (Bennett, 2010), whilst a study of older Americans who had experienced multiple negative life events found those with extensive networks were less likely to exhibit depressive symptoms (Fuller-Iglesias et al., 2008). The majority of countries in sub-Saharan Africa have no formal social support system for older people; therefore individuals' own social networks are likely to be even more crucial for coping. Based on qualitative research with older people in the Nairobi slums, Mudege and Ezeh (2009: 254) assert that where communities live in economic insecurity with weak formal support structures, social networks become a "prerequisite to good health and to accessing help when needed".

## 3. Measurement challenges

Wenger (1989) identified three building blocks of social networks based on the types of relationships older people maintain, including two forms of informal networks, the availability of local kin and the frequency of contacts with family, friends and neighbours. In sub-Saharan Africa, older people's networks traditionally rely on family ties, and living with family is seen as a key indicator of social support (Bongaarts and Zimmer, 2002). In addition, a distinct feature of the social networks of urban dwellers in sub-Saharan Africa is the ties to family and community members who continue to reside in rural origin communities. These linkages have been shown to be an important bi-directional support strategy (Owuor, 2007). Whilst there is a dearth of literature on the role of friends and neighbours for the wellbeing of older people in Africa, studies from Asia have shown that non-relatives can be instrumental in providing social interaction and economic support to older people without family support (Kato, 1998; Erb, 2011). A qualitative study examining social networks amongst adults of all ages in the Nairobi slums highlighted that friends and neighbours are vital for rallying moral and economic support from the wider community during crises (Amuyunzu-Nyamongo and Ezeh, 2005).

The third element of Wenger's (1989) typology of networks relates to formal networks: level of connection to community groups. The role of community, religious and self-help organisations in the social networks of older people in sub-Saharan Africa have been described as playing an important role in reducing social isolation and loneliness, contributing to hope and optimism and providing material support in times of need (Kodzi et al., 2011; Agbényiga and Huang, 2012). In their work on self-help groups in the Nairobi slums, Fafchamps and La Ferrara (2012) were able to

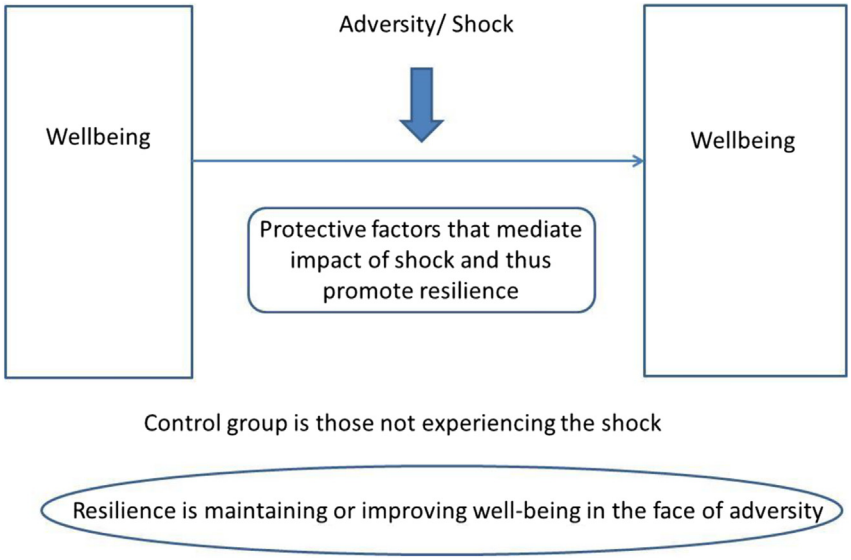



**Fig. 1.** Conceptual framework.

show that membership of such groups lead to mutual assistance, which they link both to knowledge sharing between members and deliberate income sharing during times of risk.

Conceptualisations of social networks commonly include a structural component (e.g. number of contacts) and a functional component (e.g. how often they are in contact). Single measures of social networks can provide a holistic understanding of total network strength, whilst network typologies based on individual components are useful for identifying which types of networks are most important (Glass et al., 1997). Resilience research considers the ways people adapt to hardship; therefore dynamic measures are particularly relevant. Very few studies have been able capture the stability of older people's social networks over time. Exceptions include Walter-Ginsburg et al.'s (2005) study that revealed maintaining or increasing emotional ties reduced mortality risk for older Israeli men and Netuveli et al.'s (2008) research that demonstrated older people in the UK with high levels of social networks before and during adversity were most likely to display resilience.

A key difference in examining resilience in high and low income settings is variation in what constitutes a major shock. For example, while food shortages would be an unprecedented shock in many high income settings, they would be considered too commonplace for friends, family and the wider community to assist with in the Nairobi slums (Amuyunzu-Nyamongo and Ezeh, 2005). A second issue relating to the selection of a shock in resilience research is endogenity between the probability of experiencing the shock and prior levels of resilience. Older people's resilience to shocks which affect the whole population has received less attention despite the fact that older people may have pre-existing health conditions and a partial dependence on others making them vulnerable in crises (Wells, 2005). Furthermore, external events can be analysed as natural experiments as the probability of experiencing the event is not linked to prior levels of resilience, hence disentangling the independent role of protective factors is more achievable. The current study focuses on the 2007/08 Kenyan post-election violence: a shock which was both unprecedented to the study population and an external event.

## 4. The 2007/08 Kenyan post-election violence

Kenya experienced a state of crisis following the results of the elections held at the end of December 2007. The incumbent president from the Kikuyu ethnic group was declared winner despite allegations of manipulation made by his opponent who led a party based on an alliance of the Kalenjin, Luhya and Luo groups. The announcement triggered an unprecedented level of violence, largely following the ethnic divide of the two main parties, which lasted until a compromise agreement was reached in February 2008 (Roberts, 2009). In addition to the election result, the violent outbreak has been linked to deep-rooted issues including land allocation grievances, corruption and widespread poverty (Human Rights Watch, 2008). Over 1100 people were killed, 350,000 people were displaced and there were over 110,000 instances of property destruction (Government of Kenya, (2008)).

## 5. Data & methods

### 5.1. Data source & study setting

The study uses data from a longitudinal survey of older people residing in Korogocho: a multi-ethnic slum with a population density of over 250 dwelling units per hectare (Emina et al., 2011). The survey was nested in the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) which contains data on the population of Korogocho and was conducted via face-to-face interviews. The first wave of survey data collection was conducted between 2006 and 2007 and the eligibility list included all individuals aged 50 years or older who were recorded as living in the NUHDSS study area shortly before the start of data collection ($N = 2076$). In total, 1762 (85%) individuals participated. Wave 2 took place in 2009 and the eligibility list included all wave 1 participants; 1193 individuals responded (68% of wave 1 participants). Between the two waves 6% of participants died, 15% out-migrated and 11% did not respond for other reasons. Complete data on the variables used in this study was available for 1185 individuals. Data collection for the survey and the NUHDSS were conducted by the African Population and Health Research Center. Ethical approval was granted by the Kenya Medical Research Institute (KEMRI/RES/7/3/1).

### 5.2. Measures

#### 5.2.1. Social networks

Four measures were derived to account for different domains of social networks. Individual measures rather than a composite measure were used to identify which types of relationships were most important for resilience. The first measure captures household environment, and is the closest available measure to 'availability of close kin' in Wenger's (1989) work. The measure is scored 0 if the individual lives alone, 1 if the individual lives in a multi-person household which does not include a spouse or adult child(ren) and 2 if the individual lives in a multi-person household which includes a spouse and/or adult child(ren). The second measure captures local informal networks. The score is based on the total of binary scores from the following indicators: 'has two or more friends,' 'first confidant whom they can trust lives in Nairobi', 'first confidant for financial issues lives in Nairobi' and 'worked with others at least once in previous 4 months to solve community problems'. In recognition of the fact that slum dwellers frequently have connections to family and friends not living locally, the third measure of social networks captures non-local informal networks and was derived from the total of binary scores from the following indicators: 'spouse lives outside Nairobi', 'first confidant for financial issues lives outside Nairobi' and 'first confidant whom they can trust lives outside Nairobi'. The fourth measure captures formal local networks and is based on the total of binary scores from the following indicators: 'member of self-help group', 'met with community leader at least once in previous 4 months', 'attended a social group meeting at least once in previous 4 months' and 'attended a religious ceremony at least once in previous 1 month'. Information on quality of networks was not available; therefore the measures were scored based on quantity of networks only. In addition to calculating variables for the baseline social networks, measures of continuity in social networks were derived to assess the extent to which older people maintain their networks over time. In order to calculate the continuity variables, the social networks variables for the first and second wave data were calculated separately, and then a measure of change was calculated by subtracting the wave 2 score from the wave 1 score for each domain. Scores of one or more were categorised as 'increased', scores of zero were categorised as 'constant' and scores of less than 0 were categorised as 'decreased'.

#### 5.2.2. Wellbeing

Subjective wellbeing measures are based on individuals' own experiences and interpretations of their lives and can therefore provide a more holistic understanding of wellbeing than economic measures (Kahn and Juster, 2002; O'Donnell et al., 2014). This study uses three measures: self-rated health, life satisfaction and happiness, which are all widely used in studies assessing the impact of older people's social networks (see Zunzunegui et al., 2004, and

studies reviewed in Pinquart and Sörensen (2000)). Participants were asked to position their overall score for each indicator on a five point Likert scale. It was uncommon for participants to select the top or bottom category in any of the measures, therefore the bottom two and top two categories were collapsed. Self-perceived health at older ages has been shown to be influenced by emotional wellbeing and physical health and is strongly correlated with objective health measures (Iecovich and Cwikel, 2010). Research suggests perceived life satisfaction reflects continuing long-term life circumstances, whilst perceived happiness has a closer link to emotions and reflects short-term current status (Helliwell and Barrington-Leight, 2010). By using data on wellbeing measures before and after the post-election violence, the study is able to evaluate change in wellbeing in the face of adversity, which has been highlighted as a strong research design for examining resilience (Kahn and Juster, 2002).

#### 5.2.3. Post-election violence

The wave 2 survey included a question asking about ways the participants had been affected by the violence. Participants were able to give multiple responses. In total, 76% of older people reported being affected by the violence in at least one way. The most common experience was emotional distress, with 69% of older people being affected. In addition, 12% lost property and 7% lost their job or livelihood. Furthermore, 7% reported that a family member had been killed or injured. This is lower than results from a national survey which indicated 11% of households experienced at least one death (Johnson et al., 2014). Population density in Korogocho is extremely high and households are often clustered by ethnicity. During the violence residents in single ethnicity slum areas benefited from protection from their neighbours (Kago, 2009; Okombo and Sana, 2010). Therefore while economic insecurity and risk of crime in the slums contributed to heightened vulnerability amongst residents, individuals living in very close proximity to others from their ethnic group may have experienced a lower threat than individuals elsewhere. It is also important to note that although the national estimate reported by Johnson et al. (2014) was based on a survey including households from each county, it was not nationally representative.

### 5.3. Study design and statistical methods

The protective factor investigated in this study is social networks during the period 2006/07 to 2009. The analysis is based on conditional change models to examine factors associated with wellbeing in 2009 (after the post-election violence), after controlling for wellbeing in 2006/07 (before the post-election violence). To capture change in wellbeing, the main variable of interest included in the models has the following categories: 'affected by the violence & experienced an increase in networks', 'affected by the violence & maintained constant networks', 'affected by the violence & experienced a decrease in networks' and 'not affected by the violence'. This made it possible to (i) compare the odds of experiencing a reduction in wellbeing of older people affected by the violence with the same level of networks, or who experienced an increase or a decrease in networks, to older people who were *not* affected by the violence and (ii) to compare the odds of experiencing a reduction in wellbeing amongst violence-affected older people by whether they maintained the same networks or experienced an increase or decrease in their networks. This study design, based on the conceptual framework shown in Fig. 1, is illustrated in Fig. 2.

For each domain of social networks, the baseline and continuity variables were included together. While this study is interested in the reliability of networks, the level of networks at baseline is included to account for the fact that stability at a low level is not representative of resilience (Walter-Ginzburg et al., 2005). Ordinal logistic models were used for the models of self-perceived life satisfaction and happiness. An ordinal model was tested for self-rated health but this model did not meet the proportional odds assumption (assessed using a Brant test). A multinomial logistic model was also tested with poor or very poor health as the base outcome. However, none of the covariates varied significantly for moderate health compared to the base outcome. Therefore a binary logistic model for good or very good health compared to very poor, poor or moderate health was used. The results of the models are presented as odds ratios. For the ordinal logistic models these represent the odds of reporting a higher level of the outcome for individuals in a particular category relative to individuals in the reference category for that variable, after controlling for other factors in the model. For the binary logistic model these represent the odds of reporting one outcome compared to the other (in this case, good or very good health compared to very poor, poor or moderate health) for individuals in a particular category relative to individuals in the reference category for that variable, after controlling for other factors in the model.

In addition to age and sex, ethnicity was controlled for as the violence was related to ethnic group. Furthermore, a control variable for disability status based on the World Health Organisation Disability Assessment Schedule (see World Health Organisation (2001)) was included as participation in some social networks may be confounded by disability status. Probability weights based

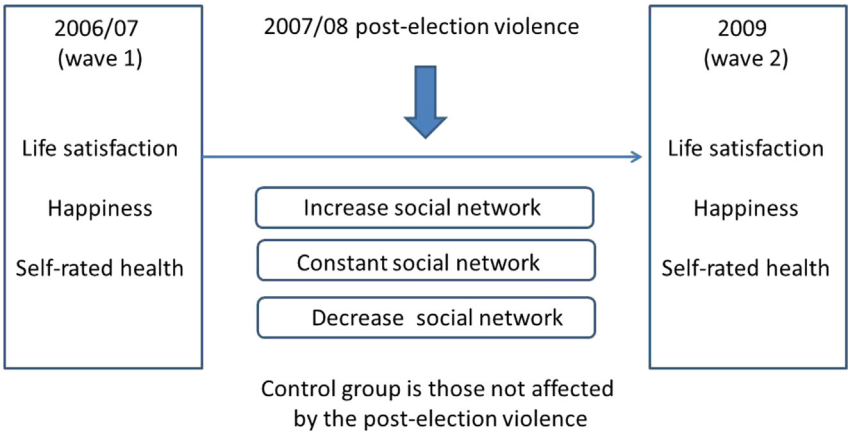



**Fig. 2.** Study design.

on age and sex were calculated to account for non-response at wave 1 and non-response at wave 2 (conditional on response at wave 1) and applied throughout the analyses.

**Table 1**
Socio-demographic characteristics, economic status and social networks amongst older people (50 + years) in Korogocho, 2006/07.

| | % | Unweighted N |
|---|---|---|
| *Age (years)* | | |
| 50–54 | 41% | 491 |
| 55–59 | 23% | 271 |
| 60–64 | 14% | 177 |
| 65–69 | 8% | 105 |
| 70+ | 14% | 141 |
| *Sex* | | |
| Male | 64% | 694 |
| Female | 36% | 491 |
| *Ethnicity* | | |
| Kamba | 8% | 97 |
| Kikuyu | 47% | 569 |
| Luhya | 13% | 144 |
| Luo | 13% | 158 |
| Other | 19% | 217 |
| *Disability status* | | |
| None | 22% | 261 |
| Mild | 38% | 452 |
| Moderate | 33% | 388 |
| Severe/extreme | 7% | 84 |
| *Employment status* | | |
| Not currently working | 13% | 166 |
| Currently working | 87% | 1019 |
| *Highest level of education* | | |
| None or primary school | 83% | 985 |
| Secondary school or higher education | 12% | 141 |
| No information | 5% | 59 |
| *Household environment (2006/7)* | | |
| 0 | 27% | 321 |
| 1 | 11% | 129 |
| 2 | 62% | 735 |
| *Continuity in household environment (2006/7–2009)* | | |
| Declines | 23% | 180 |
| Constant | 70% | 940 |
| Increases | 7% | 65 |
| *Informal local networks (2006/2007)* | | |
| 0–1 | 3% | 37 |
| 2 | 20% | 239 |
| 3 | 54% | 645 |
| 4 | 22% | 264 |
| *Continuity in informal local networks (2006/7–2009)* | | |
| Declines | 43% | 510 |
| Constant | 34% | 405 |
| Increases | 23% | 270 |
| *Informal non-local networks (2006/2007)* | | |
| 0 | 66% | 803 |
| 1 | 24% | 278 |
| 2 | 8% | 85 |
| 3 | 2% | 19 |
| *Continuity in informal non-local networks (2006/7–2009)* | | |
| Declines | 11% | 125 |
| Constant | 74% | 891 |
| Increases | 15% | 169 |
| *Formal local networks (2006/2007)* | | |
| 0 | 8% | 80 |
| 1 | 35% | 403 |
| 2 | 17% | 203 |
| 3 | 21% | 250 |
| 4 | 19% | 239 |
| *Continuity in formal local networks (2006/7–2009)* | | |
| Declines | 27% | 434 |
| Constant | 30% | 358 |
| Increases | 33% | 393 |
| **Total** | **100%** | **1185** |

## 6. Results

### 6.1. Socio-demographic and economic characteristics, social networks and wellbeing

Table 1 shows the majority of older people in Korogocho were less than 60 years old, a greater proportion were men than women and most belong to one of the ethnic groups directly involved in the violence (the Kikuyu, Luyha and Luo). Although reliable estimates of the impact of the post-election violence in the different slums are not available, the fact that Korogocho's population includes concentrations of the groups directly involved in the violence has been highlighted as a contributory factor to the large scale destruction in this settlement (Kago, 2009). The education level of older slum dwellers was largely low and homogenous (83% do not have secondary education) and would not be a barrier to involvement in the social networks considered in this paper. However, it is possible that the minority with secondary education may be more likely to assume leadership positions in formal local networks. The majority (87%) of older slum dwellers are involved in some form of income-generating activity, and therefore interact with others through work, although work is often temporary and unstable.

In 2006/07, 27% of older people lived in single person households (household environment score 0). Among older people in multi-person households, the majority lived with a spouse and/or their child(ren) (household environment score of 2). Relationships with other residents were very common: less than 1% of older people do not have any informal local networks, therefore the categories '0' and '1' were collapsed. Furthermore, approximately one third of older people had one or more informal non-local connections. Most older people (93%) had at least one connection to a formal local network and over half have two or more connections. The majority of older people maintained the same score for the household environment and informal non-local network domains between 2006/07 and 2009. There was a higher level of change in levels of informal local networks and formal local networks: only approximately one third of older people maintained the same level of each of these types of networks between surveys.

Table 2 shows the bivariate associations between social networks and subjective wellbeing in 2006/07. Household environment was not significantly associated with the wellbeing measures. Number of informal local networks was significantly positively associated with happiness, the measure of wellbeing correlated with emotions and short-term circumstances, while number of informal non-local networks was positively associated with self-rated health and life satisfaction. Number of formal local networks was significantly positively associated with all three wellbeing measures.

### 6.2. Modelling the relationships between wellbeing, the post-election violence and social networks

The social network measures designed to capture the baseline level of, and continuity in, household environment, informal local networks and informal non-local networks were not significant in the conditional change models for any of the wellbeing measures. This indicates that these types of networks do not have an independent association with self-rated health, life satisfaction or happiness at wave 2 after controlling for the relevant wellbeing measure at wave 1. However, the variables designed to measure baseline formal local networks and continuity in formal local networks was significant in the conditional change models. Older people with more formal local networks at baseline and those who maintained or increased their number of connections were significantly more likely to experience better wellbeing in 2009 than

**Table 2**
Social networks by wellbeing amongst older people (50 + years) in Korogocho, 2006/07.

| | Life satisfaction | | | | Happiness | | | | Health | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Very unsatisfied or unsatisfied | Neither satisfied or unsatisfied | Very satisfied or satisfied | p-value[a] | Very unhappy or unhappy | Neither happy or unhappy | Very happy or unhappy | p-value[a] | Very bad, bad or moderate | Very good or good | p-value[a] | |
| *Household environment* | | | | | | | | | | | | |
| 0 | 30% | 26% | 27% | 0.2687 | 23% | 31% | 25% | 0.0521 | 27% | 27% | 0.1622 | **27%** |
| 1 | 14% | 12% | 9% | | 15% | 11% | 1% | | 13% | 9% | | **11%** |
| 2 | 57% | 63% | 64% | | 62% | 58% | 66% | | 60% | 64% | | **62%** |
| *Informal local networks* | | | | | | | | | | | | |
| 0–1 | 3% | 2% | 4% | 0.1878 | 2% | 3% | 4% | 0.0085 | 4% | 3% | 0.6318 | **3%** |
| 2 | 27% | 19% | 19% | | 21% | 24% | 17% | | 20% | 20% | | **20%** |
| 3 | 50% | 55% | 56% | | 60% | 55% | 53% | | 56% | 53% | | **54%** |
| 4 | 21% | 24% | 22% | | 17% | 19% | 26% | | 21% | 24% | | **22%** |
| *Informal non-local networks* | | | | | | | | | | | | |
| 0 | 75% | 68% | 65% | 0.030 | 77% | 66% | 68% | 0.2356 | 71% | 65% | 0.0203 | **66%** |
| 1 | 20% | 25% | 24% | | 19% | 25% | 23% | | 23% | 24% | | **24%** |
| 2 | 4% | 5% | 10% | | 4% | 8% | 8% | | 5% | 9% | | **8%** |
| 3 | 1% | 2% | 2% | | 1% | 2% | 2% | | 2% | 1% | | **2%** |
| *Formal local networks* | | | | | | | | | | | | |
| 0 | 6% | 8% | 8% | 0.0028 | 7% | 8% | 8% | <0.0001 | 8% | 7% | 0.0074 | **8%** |
| 1 | 45% | 35% | 28% | | 42% | 41% | 27% | | 39% | 30% | | **35%** |
| 2 | 13% | 17% | 19% | | 18% | 18% | 16% | | 17% | 18% | | **17%** |
| 3 | 16% | 20% | 24% | | 19% | 17% | 25% | | 18% | 24% | | **21%** |
| 4 | 20% | 20% | 21% | | 14% | 16% | 25% | | 18% | 22% | | **19%** |
| **Total** | **100%** | **100%** | **100%** | | **100%** | **100%** | **100%** | | **100%** | **100%** | | **100%** |
| **Row%** | **18%** | **37%** | **46%** | | **10%** | **43%** | **48%** | | **45%** | **55%** | | **100%** |

[a] As the data is weighted, the Rao and Scott (1987) second order correction to the Pearson chi-squared statistic was used to test for difference.

other older people, indicative of a positive influence for this network type.

Table 3 presents the ordinal logistic conditional change models for perceived life satisfaction and happiness including the variable combining being affected by the post-election violence and continuity in formal local networks. Older people affected by the violence had significantly reduced odds of higher levels of happiness and life satisfaction in 2009 compared to older people who were not affected by the violence regardless of continuity in formal local networks. However, older people who increased their formal local networks experienced the smallest reduction in odds, whilst older people who reduced their number of formal local networks experienced the greatest reduction.

Table 4 presents the binary logistic conditional change model for perceived health status in 2009 including the variable which combined being affected by the violence and continuity in formal local networks. The odds of reporting good or very good health in 2009 amongst older people who were affected by the violence and experienced a decrease in formal local networks are 46% lower than for older people who were not affected by the violence. However, those older people who managed to maintain or increase their number of formal local networks despite being affected by the violence do not have significantly different odds of reporting good or very good health in 2009 compared to older people who were not affected.

For all three wellbeing measures, older people most commonly reported the highest level of wellbeing at baseline (Table 2). Fig. 3 presents the predicted probabilities of older people affected by the violence who reported the highest category of wellbeing in 2006/07 still reporting the highest category of wellbeing in 2009, by continuity in their formal local networks. The probabilities were calculated for an older person in the reference categories for all the control variables and with a score of '2' for baseline formal local networks (mean 2.1; median 2). The predicted probability of continuing to report high wellbeing is greater for self-rated health than life satisfaction and happiness. Older people who increased their networks had the greatest predicted probability of retaining the highest level of wellbeing between 2006/07 and 2009 across all three wellbeing measures. The size of the decrease in probability of retaining the highest level of wellbeing between those who increased their formal local networks and those who decreased their formal local networks is largest for happiness and life satisfaction.

Older people who were particularly badly affected by the post-election violence may have experienced disruption to their formal local networks as a result of the violence. In this case individuals who experienced a decrease in formal local networks would be expected to have poorer outcomes. However, older people affected by the violence were less likely to experience a decline in formal local networks than older people not affected by the violence (35% vs. 41%). Another potential limitation is that older people in the top category cannot experience an increase in formal local networks and likewise older people in the bottom category for the baseline variable cannot experience a decrease in formal local networks. However, if this was influencing the results, it would be expected that a decrease in formal local networks would not be associated with a decline in wellbeing as this category includes older people from the top category of the baseline variable and none of the older people from the bottom category.

## 7. Discussion & conclusions

The findings of this paper demonstrate that older slum dwellers affected by the post-election who maintained or increased their formal local networks were no more likely to experience a decline in self-rated health than older people who were not affected by the violence, i.e. who did not experience the 'shock'. The post-election violence had a more severe influence on perceived life satisfaction and happiness compared to self-rated health, a difference which is likely to relate in part to the fact that the most common experience of the violence was emotional distress. However, older people affected by the violence who increased their formal networks experienced a smaller decrease in their odds of higher life satisfaction and happiness than older people affected by the violence

**Table 3**
Ordinal logistic conditional change models for perceived life satisfaction and happiness amongst older people (50 + years) in Korogocho, 2006/07–2009.

| | Life satisfaction | | | Happiness | | |
|---|---|---|---|---|---|---|
| | OR | S.E. | p-value | OR | S.E. | p-value |
| *Affected by the violence & continuity in formal networks* | | | | | | |
| (Not affected by the violence) | | | | | | |
| Affected by violence & decrease in formal networks | 0.33 | 0.06 | <0.001 | 0.25 | 0.04 | <0.001 |
| Affected by violence & constant formal networks | 0.49 | 0.08 | <0.001 | 0.41 | 0.07 | <0.001 |
| Affected by violence & increase in formal networks | 0.75 | 0.12 | 0.061 | 0.68 | 0.11 | 0.019 |
| *Formal local networks 2006/07* | | | | | | |
| (0) | | | | | | |
| 1 | 1.47 | 0.34 | 0.098 | 1.34 | 0.30 | 0.197 |
| 2 | 2.63 | 0.66 | <0.001 | 2.03 | 0.51 | 0.005 |
| 3 | 1.93 | 0.48 | 0.008 | 1.88 | 0.45 | 0.009 |
| 4 | 2.77 | 0.73 | <0.001 | 2.60 | 0.67 | <0.001 |
| *Ethnicity* | | | | | | |
| (Kamba) | | | | | | |
| Kikuyu | 0.99 | 0.21 | 0.962 | 0.86 | 0.18 | 0.466 |
| Luhya | 1.05 | 0.26 | 0.844 | 0.81 | 0.20 | 0.393 |
| Luo | 1.11 | 0.26 | 0.668 | 0.66 | 0.16 | 0.086 |
| Other | 1.92 | 0.47 | 0.008 | 1.39 | 0.34 | 0.176 |
| *Gender* | | | | | | |
| (Male) | | | | | | |
| Female | 0.73 | 0.09 | 0.010 | 0.68 | 0.08 | 0.001 |
| *Age (years)* | | | | | | |
| (50–54) | | | | | | |
| 55–59 | 1.02 | 0.16 | 0.901 | 0.80 | 0.12 | 0.130 |
| 60–64 | 0.94 | 0.16 | 0.725 | 0.74 | 0.13 | 0.091 |
| 65–69 | 1.14 | 0.23 | 0.522 | 1.10 | 0.26 | 0.693 |
| 70+ | 0.70 | 0.14 | 0.075 | 0.67 | 0.13 | 0.044 |
| *Disability status* | | | | | | |
| (None) | | | | | | |
| Mild | 0.83 | 0.13 | 0.240 | 0.92 | 0.15 | 0.600 |
| Moderate | 0.92 | 0.15 | 0.621 | 0.91 | 0.16 | 0.593 |
| Severe/extreme | 1.17 | 0.30 | 0.537 | 0.72 | 0.20 | 0.242 |
| *Baseline wellbeing outcome* | | | | | | |
| (Low) | | | | | | |
| Medium | 1.23 | 0.20 | 0.200 | 1.06 | 0.18 | 0.710 |
| High | 1.21 | 0.20 | 0.262 | 1.14 | 0.20 | 0.475 |
| Cut point 1 | −0.74 | 0.34 | 0.030 | −2.16 | 0.35 | <0.001 |
| Cut point 2 | 0.50 | 0.34 | 0.147 | −0.25 | 0.35 | 0.470 |

'O.R' Odds Ratio, 'S.E.' Standard Error. Reference categories shown in brackets.

who experienced a drop in their formal local networks. Qualitative research with Nairobi slum dwellers has highlighted that individuals need to already belong to community organisations in order to use them for support during crises, yet it is often the most marginalised who struggle to participate (Amuyunzu-Nyamongo and Ezeh, 2005). This relates to qualitative research conducted with older people in Tanzania which found that self-organised groups were effective sources of emotional and practical support in times of crisis, but the benefits could only be enjoyed by established members (Help Age International, 2000). Findings of this study reveal that individuals affected by the adverse event in this study who failed to maintain their formal local networks experienced a drop in their number of connections and succumbed to the worst outcomes, suggesting an important way to support the resilience of older people is to promote the inclusivity of community-based organisations. On the other hand, the finding that those affected by the violence but who were able to increase their formal local networks emerged with the best outcomes may also be indicative of the individual traits associated with resilience.

In the absence of formal government support for older people, coupled with traditional cultural norms of older people residing with family in many low income contexts, including sub-Saharan Africa, the academic and policy communities often highlight the importance of living arrangements for social support (Bongaarts and Zimmer, 2002; UNDP, 2005). However, in this study, household environment did not mediate the negative relationship between being affected by the post-election violence and wellbeing. This finding highlights the importance of a contextualised understanding of the benefits of different living arrangements in old age. Given the severe overcrowding in the slums, living alone may be a positive (or at least non-negative) choice made by older people whose economic position and health status enables them to live in their own structure. A limitation of this analysis is that it only considers the immediate household environment due to the limited available information regarding the impact on family living in close proximity, which may be a more valuable component of older people's social networks.

Similarly to the result for household environment, neither informal local or non-local networks significantly mediated the adverse relationship between being affected by the post-election violence and subjective wellbeing. These findings contrast those of a qualitative study in the Nairobi slums with adults of all ages that highlighted the critical role of family and friends in providing practical help and social and emotional support in the context of shocks such as bereavement and ill health (Amuyunzu-Nyamongo and Ezeh, 2005). These differences may relate to the type of shock of being studied. While bereavement and ill health are adversities largely experienced at the micro level where friends and neighbours not directly affected may be able to provide support, the post-election violence was an adversity which affected the majority of community members. Given the large scale of the impact of the post-election violence community-based organisations may have been best-placed to provide support. Amuyunzu-Nyamongo and Ezeh's (2005) qualitative study highlighted that while some slum residents support from and to friends followed ethnic lines, others highlighted that willingness to help transcends ethnic group to include workmates, immediate neighbours and individuals of a common religion. However, the study was conducted prior to the post-election violence, an episode which was associated with heightened mistrust between ethnic groups. Community-based organisations played a very important role in reconciliation and recovery in the aftermath of the violence including diffusing tensions and rebuilding trust (Okombo and Sana, 2010). Therefore the finding that formal local networks were particularly important for mediating the adverse impact of the violence for older people's wellbeing may relate not only to the direct benefits of membership of community organisation, such as practical advice and regular social interaction, but also to indirect benefits for strengthening the quality and ethnic diversity of informal relationships between slum dwellers.

In Greene (2007)'s qualitative work exploring the resilience of older people affected by Hurricane Katrina in the United States, being part of community organisations played an important role in longer term recovery but family support was paramount in the immediate aftermath. The findings of the current study should be interpreted in the context of the timing of the adversity and the times at which wellbeing was measured. The second wave of data collection was over a year from when the shock occurred; hence the results highlight the role of formal local networks for longer term recovery from adversity.

Studies of the impact of disasters on mental health outcomes have shown the impact diminishes with time and those who are the worse affected experience poorer outcomes for longest period of time (van Griensven et al., 2006; Do and Iyer, 2009). The second wave of data collection in this study was one to two years from the shock and a strong association was found between reduced wellbeing and being affected by the violence even after controlling for

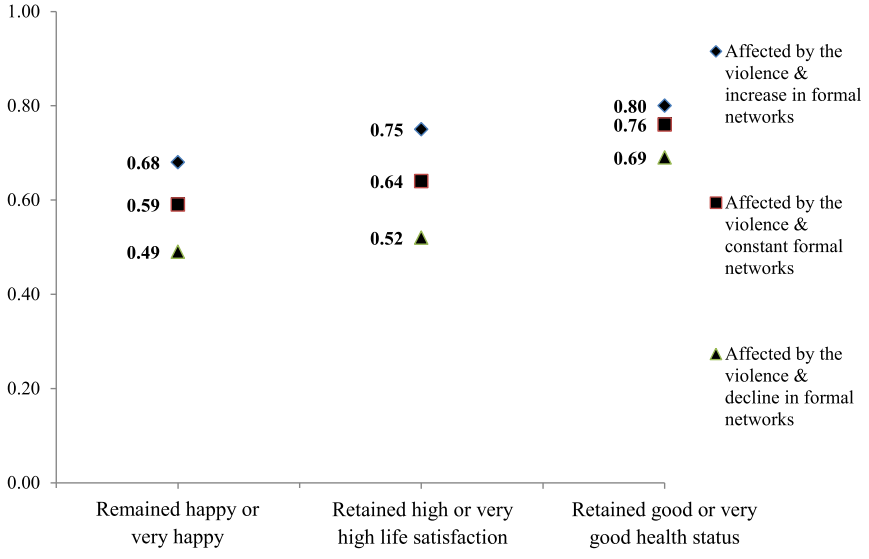
**Table 4**
Binary logistic conditional change model for self-rated health status amongst older people (50 + years) in Korogocho, 2006/07–2009.

| | OR | S.E. | p-value |
|---|---|---|---|
| *Affected by the violence & continuity in formal networks* | | | |
| (Not affected by the violence) | | | |
| Affected by violence & decrease in formal networks | 0.54 | 0.10 | 0.001 |
| Affected by violence & constant formal networks | 0.76 | 0.14 | 0.122 |
| Affected by violence & increase in formal networks | 0.95 | 0.17 | 0.762 |
| *Formal local networks 2006/07* | | | |
| (0) | | | |
| 1 | 0.92 | 0.21 | 0.726 |
| 2 | 0.55 | 0.15 | 0.029 |
| 3 | 0.68 | 0.19 | 0.162 |
| 4 | 1.27 | 0.33 | 0.358 |
| *Ethnicity* | | | |
| (Kamba) | | | |
| Kikuyu | 0.57 | 0.08 | <0.001 |
| Luhya | 0.82 | 0.13 | 0.223 |
| Luo | 0.76 | 0.14 | 0.139 |
| Other | 0.59 | 0.14 | 0.023 |
| *Gender* | | | |
| (Male) | | | |
| Female | 0.49 | 0.11 | 0.001 |
| *Age (years)* | | | |
| (50–54) | | | |
| 55–59 | 1.34 | 0.33 | 0.243 |
| 60–64 | 1.74 | 0.48 | 0.045 |
| 65–69 | 1.34 | 0.36 | 0.283 |
| 70+ | 1.77 | 0.52 | 0.050 |
| *Disability status* | | | |
| (None) | | | |
| Mild | 0.76 | 0.13 | 0.115 |
| Moderate | 0.89 | 0.16 | 0.525 |
| Severe/extreme | 0.68 | 0.20 | 0.191 |
| *Baseline self-rated health status* | | | |
| (Very bad, bad or moderate) | | | |
| Good or very good | 1.34 | 0.18 | 0.029 |
| Constant | 1.70 | 0.63 | 0.152 |

'O.R' Odds Ratio, 'S.E.' Standard Error. Reference categories shown in brackets.

affected by the violence was linked to disruption to networks. If these two factors were associated, this would suggest the experience of the adversity was not independent of continuity in networks. Therefore the results of this study would be showing that older people who were very badly affected experienced a reduction in both their networks and wellbeing. However it was possible to test whether being affected by the post-election violence (regardless of severity) was associated with continuity in networks, and the findings revealed older people affected by the violence were actually more likely than those not affected by the violence to increase their formal networks.

A criticism of resilience research is the danger of placing responsibility for coping on the individual (Massey et al., 1998). Seccombe (2002) advocates the value of taking an ecological approach in order to appreciate the role of structural factors in experiences of adversity and outcomes following adversity. In the case of the post-election violence, the successive election was held predominately peacefully in 2013. However addressing the root causes of the violence, including inequalities and land allocation grievances, and strengthening the capacities of authorities to maintain a state of peace, constitute important ecological strategies for reducing the risk and impact of similar catastrophes. Furthermore resilience is a multifaceted phenomenon (Béné, 2013; Wild et al., 2013) and by focussing on the protective role of social networks for subjective wellbeing, the current study has only examined one part of the resilience of older slum dwellers. Important future research avenues include examining other aspects of resilience in this population group, such as economic resilience; how older people can adapt in order to reduce economic losses during adversity (Rose, 2004) and resilience on different scales, for example what factors enable whole slum communities to increase their collective resilience, while also exploring the interactions between different aspects and scales of resilience. Furthermore, qualitative research would be useful for providing a more nuanced




[1]Calculated by converting the probability of the logit to the probability scale.

**Fig. 3.** Predicted probabilities[1] of retaining high wellbeing 2006/07–2009 amongst older people (50 + years) in Korogocho affected by the post-election violence by continuity in formal local networks.

baseline wellbeing. However the study is limited by the fact that there is no data available on the intensity of the effects of the shock, so it is not possible to assess whether being particularly badly and contextualised understanding of how social networks and other protective factors operate.

While there are structural factors to consider in addressing

experiences of shocks and outcomes following shocks, the results of this study point to direct policy implications for helping older people cope with shocks. A key theme of the World Bank's 2012–2022 social protection strategy is the promotion of resilience through social protection schemes and informal arrangements including community assistance (World Bank, 2012). The findings of this study provide evidence that formal networks can successfully mediate the impact of adversity for older people in low income urban settings. Such community organisations are commonly run by local people; therefore providing even small-scale investment to enhance their sustainability over the long-term is a valuable way to support older people's resilience. Furthermore, the results indicate older people who decreased their formal local networks were most affected by the adversity, therefore a focus on the inclusivity of community organisations will be important for enabling all older people to benefit.

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