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QUALITY OF LIFE AND ASSOCIATED FACTORS OF OLDER ADULTS IN GHANAIAN URBAN SLUMS: A CROSS-SECTIONAL STUDY

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3 1 **QUALITY OF LIFE AND ASSOCIATED FACTORS OF OLDER ADULTS IN GHANAIAN**
4 2 **URBAN SLUMS: A CROSS-SECTIONAL STUDY**

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25 ABSTRACT

26 **Objective** This study provides insight into the QoL of older adults living in Ghanaian urban slums.

27 **Design** The study employed a community-based cross-sectional design study, to assess QoL among older
28 adults in two slums between April and May 2020. QoL was assessed using the WHOQOL-BREF
29 questionnaire.

30 **Settings** Participants were recruited from one slum in a fishing dominated community and another slum
31 in an industrial community in Ghana.

32 **Participants** Four hundred participants 60 years and above living in either slum for at least one month
33 and able to communicate verbally took part in this study.

34 **Results** Participants had a moderate level of QoL in the psychological (mean score 45.7), social (mean
35 score 57.0) and environmental (mean score 51.6). The physical QoL of the older adults was 43.3 which
36 denotes a poor QoL. When looking at the differences between male and female participants, statistically
37 significant differences were found in general QoL ($p<0.001$), general satisfaction with health ($p=.017$),
38 the psychological ($p=.019$), and the environmental domain ($p=.001$). In all domains, male participants
39 have a significantly higher QoL compared to their female counterparts. This study revealed that as age
40 increased, QoL decreased significantly in the physical and environmental domains. However, in the
41 psychological domain, older adults 76-80 years had a better psychological QoL compared to those 66-70
42 years. An ANOVA for regression analysis revealed that QoL was influenced mostly by the environmental
43 domain (46.2%), followed by the psychological (43.7%), physical (31%) and social domain (20.4%).

44 **Conclusions** The findings from this study show that older adults living in slums had a moderate
45 psychological, social, and environmental QoL and a poor physical QoL. Although this finding is better
46 than anticipated, health policy development must consider the specific needs of older adults in slums and
47 direct policies to meet these needs to further improve their overall QoL.

48 **Keywords:** Quality of Life, Older adult, Slums, WHOQOL-BREF

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STRENGTHS AND LIMITATIONS

- This is the first study assessing the QoL of older adults in two different slum communities in Ghana.
- Nonetheless, the data collected from specific slums in Ghana makes it difficult to generalize results.
- A 100% response rate and absence of missing data is a strength for this study. The 100% response rate can be attributed to the breakfast packages given to participants after completing the questionnaires.
- The findings from this study can assist in policy development to include strategies to further improve the QoL of older adults in slums.
- Another limitation can be ascribed to the crowded nature of the slum: there was no privacy during data collection and other slum dwellers were often listening to the interviews.

Introduction

The difference in the life expectancy of people living in developed countries and people living in African countries is approximately ten years [1]. Various factors causing these differences include demographic differences, varying family and social structures, social security arrangements, health infrastructure, and spiritual beliefs [2,3,4]. These factors can influence the actions a person takes to address health issues and other aspects of life. In line with global trends, and despite these differences, the life expectancy of people living in Africa is increasing. However, an increased life expectancy is not necessarily accompanied by an improved quality of life (QoL). Ageing often comes with problems affecting the quality of life, such as loneliness, ill health, and depression [5,6,52]. Therefore, as people in African societies are ageing, the QoL of older adults in African countries is becoming an increasingly important issue [7,8].

The World Health Organisation defines the quality of life as “an individual's perception of their position in life in the context of the culture and value systems in which they live and with their goals, expectations,

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3 79 standards and concerns” [9]. Older adults are vulnerable people, who are especially sensitive to poor
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5 80 QoL, as a result of changes and events in their physical health, psychological state, social circumstances
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7 81 and relationship to their environment [7,10,11]. With the physiological changes of the human system, as
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10 82 people age, most body functions decrease, and therefore they may become frail and dependent on others.
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12 83 Moreover, frailty may express itself also in the psychological and social domains. When this is combined
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14 84 with deplorable living conditions the quality of life of these older adults becomes an issue of concern.

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17 85 Slums are pictorial evidence of deplorable living conditions. In developing countries, mainly African
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19 86 countries, rural-urban migration is one of the causes of slum communities [12,13,14,15].

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22 87 Slums often lack basic amenities, are overcrowded, polluted and show threats of violence, disrespect and
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24 88 aggression [13,16]. Additionally, the overall health status of older adults in slums is low compared to
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27 89 older adults living in formal settlements [17,18,19]. Due to unsanitary conditions, in slums, older adults
28
29 90 are susceptible to all forms of communicable and non-communicable diseases and often lack access to
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31 91 healthcare [13,14,20,21].

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34 92 Supporting older people in slums is an important objective of the WHO Global strategy and action plan
35
36 93 on ageing and health 2016-2030 [22] aims at “Strengthening long-term care (supporting supporters of
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38 94 older people)”. One of the targets of the Sustainable Development Goal (SDG) 11, is to achieve a
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40 95 significant improvement in the lives of at least 100 million slum dwellers worldwide by 2020. However,
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42 96 there haven’t been any changes in Ghanaian slums currently [23,24].

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46 97 Many studies have been conducted globally, on the QoL of older adults either in the community or in
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48 98 care homes [25,26], and also in those with different health conditions [27,28,29]. However, there is a
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50 99 lack of research on the QoL of older adults in developing countries and those living in slums in particular.
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53 100 Therefore, by assessing the level of quality of life of older adults living in two Ghanaian slums, this study
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55 101 aims to raise awareness and provide insight into the QoL of these older adults.

102

103 **Methods**

104 **Study design and study population**

105 A community-based cross-sectional study was conducted between April and May 2020. The population
106 under consideration involved older adults living in two urban slums in the Greater Accra region of
107 Ghana. These slums are in the Ashaiman and Teshie communities. The reason for including these two
108 specific slums is that the level of education is comparable, but differences exist in the type of housing
109 structures and socioeconomic activities in these communities. Ashaiman is located close to an industrial
110 city in Ghana and consists of people from different regions and tribes in Ghana. Teshie is mainly a
111 fishing community with a majority of the population being indigenous.

112 Participants were included if they were older adults (60 years [retirement age] or older), living in slums
113 in Ashaiman or Teshie for at least one month and were able to communicate verbally. Critically, ill
114 older adults and people with speech impairments who were not able to express themselves verbally
115 were excluded from the study.

116 **Study Instrument**

117 The primary outcome measure of this study is quality of life, assessed using the World Health
118 Organisation Quality of Life -brief version (WHOQOL-BREF) (Field trial WHO, 2014). This
119 instrument was chosen based on the results of a scoping review of instruments assessing QoL in
120 African countries [30]. Detailed information on psychometric properties is lacking from previous
121 studies, but the included domains, the feasibility and the length of the instrument nevertheless,
122 convinced the authors to use the WHOQOL-BREF in this study.

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2
3 123 The WHOQOL-BREF consists of four domains. The questions in each domain vary from 3 to 7
4
5 124 questions. Every question in each domain is rated on a 5-point Likert scale, where 1 represents ‘very
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7 125 poor’ and 5 represents ‘very good’. The first domain is the ‘Physical Health’ domain. This includes
8
9 126 seven (7) questions related to sleep, energy, mobility, the extent to which pain prevents performance of
10
11 127 necessary tasks, the need for medical treatment to function in daily life, and level of satisfaction with
12
13 128 their work capacity. The second domain is the ‘Psychological’ domain with six (6) questions, focusing
14
15 129 on the ability to concentrate, self-esteem, body image, spirituality, and the frequency of positive or
16
17 130 negative feelings. The third domain covers ‘Social relationships’ and includes three (3) questions
18
19 131 related to satisfaction with personal relationships, social support systems and sexual satisfaction. The
20
21 132 fourth is the ‘Environmental’ domain, which comprises eight (8) questions related to safety and
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23 133 security, satisfaction with one’s home and physical environment satisfaction, finances, availability of
24
25 134 health and /social care availability, access to general information and leisure activities accessibility and
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27 135 satisfaction with transportation.
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33 136 In addition to the 4 domains, the WHOQOL-BREF includes two general questions, one about the
34
35 137 respondents’ rated QoL, and one related to their satisfaction with health. These questions also have five
36
37 138 response options varying from 1 ‘very poor’ to 5 ‘very good’ for rating the QoL and ‘very dissatisfied’
38
39 139 (1) to ‘very satisfied’ (5) for rating the satisfaction with health. Besides using the WHOQOL-BREF,
40
41 140 demographic characteristics of subjects (gender, age, educational level, religion, and marital status)
42
43 141 were collected. In addition, data on access to health care, current health condition, health services
44
45 142 patronized, living arrangements, social support, and sources of income were gathered.
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50 143 **Data collection**

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52
53 144 The WHOQOL-BREF questionnaire was used to conduct face-to-face interviews during data
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55 145 collection, given difficulties with reading (caused by both difficulties in reading and/or poor vision) in
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3 146 the population under consideration. The interviews were done by the first author, PYAA and 4 research
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5 147 assistants' undergraduates of the University of Ghana. The interviewers all have a background in
6
7 148 nursing and were trained before the commencement of data collection. During the training, they were
8
9 149 introduced to the WHOQOL-BREF and taken through the process of intended data collection. The
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11 150 interviewers needed to be conversant with the questions in two local languages (Twi and Ga). During
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13
14 151 the face-to-face interviews with subjects, interviewers read the questions out loud and filled in the
15
16 152 responses of participants. The original English version of the instrument was translated and
17
18 153 administered to participants in the local languages (Ga and Twi). We used the STROBE cross-sectional
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21 154 checklist when writing our report [53].
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27 156 **Sampling method and sample size**

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29 157 Recruitment took place by involving a key informant in each slum. This key informant was a person
30
31 158 working at the Municipal Assembly of the specific community and visiting the slums very often due to
32
33 159 the nature of their work. The key informant used a convenient sampling method to select participants
34
35
36 160 living in the slums. After selecting participants, the snowballing technique was used to increase the
37
38 161 participation rate. The key informant also familiarized the research team with the slum community. The
39
40 162 research team provided study-specific information in person to the participant. Written informed consent,
41
42 163 either by signing or thumb-printing (in the case of those unable to sign) was required for participation.
43
44
45 164 The sample size was calculated to give an estimate of how many participants will be needed as a
46
47 165 representation of the total population. The sample size calculation was done using the Yamane formula
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49 166 [31]. The two slums under consideration consist of approximately 6,000 older inhabitants. Filling in the
50
51
52 167 formula gave an estimated sample size of 375 participants [31].
53

54 168 **Ethical Approval**

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2
3 169 Ethical clearance (37MH-IRB IPN 199/2018) was obtained from the 37 Military Hospitals Institutional
4 170 Review Board. Permission to perform this study in Ashaiman and Teshie was provided by the Municipal
5
6 171 Assemblies of the selected slums.
7

8 172 **Data Analysis**

9
10 173 The data were analysed using Statistical Package for Social Sciences (IBM SPSS) version 24.0.
11 174 Domain scores were scaled in a positive direction (i.e., higher scores denote higher QOL). The mean
12 175 score of items within each domain is used to calculate the domain score. An Excel sheet calculator
13 176 created by Skvarc [32] was used to transform the different WHOQOL-BREF domain scores to a 0-100-
14 177 scale. Cut-off points for QoL in this study were determined based on the literature by Silva and
15 178 colleagues (2014). According to Silva and colleagues [33], a score ≤ 45 is considered poor QoL, 46-64
16 179 is considered moderate QoL and any score > 65 is recorded as a high QoL.
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23 180 In further analysis, the demographic data served as independent variables and the domains of the
24 181 WHOQOL-BREF as dependent variables. Gender and place of residence were depicted as a binominal
25 182 variable where '1' is male/Teshie and '2' is female/Ashaiman respectively. All other demographic data
26 183 are categorical variables. Educational level was categorized into four groups: no formal education,
27 184 elementary school, high school and above high school. Marital status comprised of single, married,
28 185 divorced and widowed depicted with numbers. Age was grouped into five categories (60-65, 66-70, 71-
29 186 75, 76-80, > 81) also depicted with numbers. Finally, the place of residence: Teshie or Ashaiman, was
30 187 documented.
31
32

33 188 Descriptive analyses were performed to describe the background characteristics, as well as the domain
34 189 scores of the WHOQOL-BREF. To compare the mean distribution of participants' characteristics and
35 190 their QOL per domain, an independent *t*-test and analysis of variance (ANOVA) were used. ANOVA for
36 191 regression analysis was done to indicate which domains influence QoL in the various sociodemographic
37 192 characteristics. Transformed scores -to 100%- were used for statistical analyses in four domains. In this
38 193 study, the level of significance was set at $P < 0.05$ for all analyses.
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40

41 194 **Results**

42 195 **Background Characteristics of Participants**

43 196 In total, 400 people were approached for this study and they all agreed to participate. This means that a
44 197 100% response rate was achieved. Three subjects were excluded from the analysis as they were below
45 198 the age of 60 years, resulting in a total sample of 397 respondents.
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199
200 In Table 1 the background characteristics can be found. Of all participants who participated, 240 persons
201 (60.5%) were female, and the largest age group was 60-65 years (47.6%). The majority of the older adults
202 in this population were widowed (38.5%), followed by participants being married (31.7%). In total 44.8%
203 of the participants had no formal education. When asked about their current illnesses/diseases, 25.2%
204 had osteoarthritis, followed by 19.2% with fibromyalgia (pains all over the body), 17.1% had high blood
205 pressure. Participants were also asked about their source of income. Most participants (31.5%) received
206 their income from their children, 22.9% were into trading, 2.0% were either mechanics, electricians, or
207 welders. On the sources of healthcare utilized, most participants 39.8% patronized pharmacies, with
208 herbal preparations being the least accessed 4.5%. When asked the living arrangements of participants
209 lived with, an equal number (33.5%) either lived alone or with extended family members. Those who
210 lived with their children were 17.1% of the total sample population while 2.5% lived with others which
211 include friends and church members. Daughters were the biggest form of social support (28.7%) followed
212 by siblings of older adults (17.4%) and then sons, 16.9% (See Table 2 in Appendix).

213
214 The outcome of the WHOQOL BREF is described in Table 3. When looking at the total population, the
215 perceived overall QoL is neither poor nor good and they are neither satisfied nor dissatisfied with their
216 health. According to Silva and colleagues [33], there is a moderate level of QoL in the psychological
217 (mean score 45.7), social (mean score 57.0) and environmental (mean score 51.6) domains of the
218 WHOQOL-BREF. The physical QoL of the older adults in these slums recorded a mean score of 43.3.
219 Transformed QoL scores were rated poor, moderate and high, based on the literature by Silva and
220 colleagues [33]. Although the means of the transformed scores for all participants were poor on the
221 physical and psychological domains, they were moderate across all other domains.

222 When looking at the differences between male and female participants, statistically significant
223 differences were found in general quality of life ($p<.001$), general satisfaction with health ($p=.017$), the
224 psychological domain ($p=.019$), and the environmental domain ($p=.001$). In all of these domains, male
225 participants have a significantly higher quality of life compared to their female counterparts.

226 In the analysis of the various age groups, there were significant differences in the psychological ($p=.036$),
227 physical ($p=.003$) and environmental ($p=.003$) domains.

228

229 From Table 3, it appears that as age increased, QoL decreased significantly in the physical and
230 environmental domains. Yet, in the psychological domain, those between 76-80 years had a better
231 psychological QoL compared to those 66-70 years.

232 For marital status, significant differences in the various domains were seen, in the perceived QoL
233 ($p<0.001$), psychological ($p<0.001$), social ($p<0.001$), and environmental($p=0.001$) domains.
234 Participants who are married had the highest scores in these domains, followed by participants who are
235 divorced, widowed, and single.

236 In an examination of differences in QoL among the various educational levels, there were significant
237 differences in all domains, except for the social domain. In general, QoL was significantly higher among
238 participants with a higher educational status. Lastly, when looking at the difference in QoL between the
239 place of residence, older adults in the Ashaiman slum showed a statistically significant difference in
240 perceived QoL ($p<0.001$), psychological QoL($p=0.004$) and environmental QoL($p<0.001$).

241 In a one-way analysis of variance (ANOVA) of the mean differences in QoL of participants with different
242 sources of income, there was a statistical significance in the satisfaction with health domain only.
243 Participants who received pensions had higher means in most domains (overall QoL, satisfaction with
244 health, physical QoL) followed by participants who had financial support from family/siblings (higher
245 scores on the environmental and psychological domains). Participants who received financial support
246 from friends had the highest QoL score in the social QoL domain.

247 An ANOVA comparing mean QoL scores of participants, with different sources of social support showed
248 no statistical differences in scores between different sources of social support (Table 2). An ANOVA
249 analysis comparing the living arrangements of participants showed that people who lived with extended
250 family had high environmental QoL scores, overall QoL scores and satisfaction with health scores. Those
251 who lived with their children had high psychological QoL scores.

252
253 An analysis of variance for regression analysis of QoL scores and the demographic characteristics was
254 done to show if certain domains are influencing QoL to a higher extent than other domains (see Table 4).
255 Variances between the various domains showed that the environmental domain had the highest influence
256 of 46.2%, followed by the psychological domain (43.7%), the physical domain (31%) and the social
257 domain (20.4%). When looking at the variances between domains, calculated with the adjusted r square,
258 for females at a significance $p<.001$, the environmental domain had the greatest influence (36.3%
259 variance in QoL), followed by the psychological domain (30.8%), then the physical domain (26.0%) and
260 the social domain (12.9% variance in QoL). Among males at a significance of $p<.001$, the psychological

261 domain has a 59.3% influence on total QoL followed by the environmental domain (58.3%), then the
262 physical domain (37.3%) and the social domain (33.2%).

263 For older adults in the age category 60-65years, environmental QoL has the highest influence (adjusted $r^2=0.488$)
264 on their QoL at a significance of $p<.001$, followed by psychological quality of life with an adjusted $r^2=0.469$ and
265 then physical QoL (adjusted $r^2=0.279$) and lastly the social QoL (adjusted $r^2=0.210$). From Table 4,
266 environmental QoL has a greater influence on the general QoL of older adults between 60-75 years and the
267 psychological QoL has a greater influence on the QoL of participants ≥ 76 years. The QoL of participants with no
268 formal education was likely to be influenced 45.7% by the environmental QoL (adjusted $r^2=0.457$) while those
269 who attained education above the high school had their QoL being impacted 54.4% by the psychological QoL
270 (adjusted $r^2=0.544$). The environmental QoL had a 33.9% influence on the QoL of participants living in slums
271 in the Teshie community (adjusted $r^2=0.339$) while the QoL of participants in Ashaiman was influenced 72.3%
272 by the psychological QoL (adjusted $r^2=0.723$). Results from other subgroup analyses on variance can be found
273 in Table 4.

274

275

276 DISCUSSION

277 This study aimed to assess the QoL of older adults living in two Ghanaian slums using the WHOQOL-
278 BREF questionnaire. Results show that older adults living in slums have a poor to moderate QoL. A
279 moderate QoL was seen in the environmental QoL of the older adults in these slums. This is surprising:
280 in slums, one would have expected a poor environmental QoL because of the lack of safety and security,
281 poor quality of housing, overcrowding, and unavailability of health and /social care. However, a moderate
282 level of QoL was reported. An explanation of this finding could be that most older adults have adapted
283 to their environment and try to make the most of what is at their disposal. Another explanation could be
284 that slum amenities and living conditions are not much worse than prior living arrangements of these
285 older adults

286 In the current study, females constituted the majority (240) of the population, similar to the study by
287 Akosile et.al., [25]. This is expected as females are estimated to live longer than their male counterparts
288 [34,35]. Additionally, the ages of this study population ranged between 60-98 years with a mean age of
289 68.89. Similar to most studies carried out in Africa among older adults, the greater number of participants
290 was between 60-69 years [36]. This is indicative of an increasing life expectancy and the need to promote
291 interest in older adults. Participants in this study mostly had no formal education and this also agrees with

292 studies conducted in slums from various countries like; India [37], Iran [38], Bangladesh [39] and sub-
293 Saharan Africa [40,36,41,42].

294 Low QoL scores were seen for all participants in the physical and psychological domains. This result is
295 in agreement with a study by Alaazi, and colleagues [18] comparing slum and non-slum dwellers, where
296 participants had low QoL mean scores in both psychological and physical health domains. Poor health
297 conditions and increased dependency, as well as low self-esteem and frequency of negative feelings,
298 could account for the low scores. Although older adults may receive social support from their family
299 members, older adults might feel as if they pose a burden on their children. This may also account for
300 low scores in the psychological QoL domain.

301 Furthermore, males scored higher than females in all domains of the WHOQOL-BREF which is similar
302 to Vietnamese findings by van Nguyen and colleagues [43]. The psychological and environmental
303 domains had statistically significant differences for gender on QoL. This is consistent with the findings
304 of Alaazi, and colleagues [18]. The gender differences could be attributed to the roles males and females
305 play in society. Anecdotal evidence suggests that males show dominance and supremacy in Ghanaian
306 culture. Therefore, when it comes to issues of safety and money, they portray confident capabilities
307 compared to females. For females, the lowest mean score was shown in the psychological health domain
308 (mean = 41.95), implying negative feelings, low self-esteem, low body image and appearance. Females
309 living in slum communities might feel they have not achieved much and feel demeaned because of the
310 stigma of living in slums [44] and societal upbringing [45].

311 The highest overall QoL score was found for the social relationship domain (mean= 57.77) an indication
312 of relative satisfaction of both males and females with personal relationships and support received. A
313 reason for this could be that the extended family system is still playing a big role in slum settings, and
314 children offer support to their older family members.

315 QoL of participants generally decreased with age similar to previous studies [7,18,25,46,47,48]. This
316 could be attributed to the gradual degeneration and weakness of the human body as individuals age. This
317 makes older adults more dependent on others. However similar to findings of Charles, & Kulandai [49],
318 the psychological QoL participants between 76-80 years had a better psychological QoL compared to
319 those 66-70 years, implying they had better self-esteem, body image, spirituality, and the frequency of
320 positive or negative feelings. This could be attributed to older adults at this stage feeling they are
321 preparing to exit the world content with their previous life, they usually may not have considerable doubts
322 and are living their life with a lot of insight [6,15,18,40,41].

323 With the sociodemographic characteristics of the current study population, both the marital status and
324 educational level of participants had a significant effect on the QoL of participants. Married participants
325 had higher means in all domains compared to all the other categories especially the single participants.
326 This confirms findings of studies by Lee, Xu, & Wu, [50] and Yaya, Idriss-Wheeler, Vezina, & Bishwajit,
327 [47]. Except for the physical health domain, higher educational levels could be equated to better QoL in
328 the other domains similar to findings by Ejiakor, et.al., [51].

329 Comparing the two slums, older adults in Ashaiman had a better QoL in the perceived overall QoL,
330 psychological and environmental domains. This could be attributed to the proximity of Ashaiman to the
331 industrial city and therefore inhabitants could get access to the resources the non-slum dwellers in the
332 industrial city enjoy. Additionally, caregivers of these older adults engage in various economic activities
333 compared to the restricted/narrower options (fishing, fish mongering and small-scale trading) of those in
334 Teshie. However, there were no significant differences in the physical and social relationship domains
335 possibly because they share similar characteristics in these domains.

337 **CONCLUSION**

338 By assessing QoL in this target group, groups with physical, psychological, social, or environmental
339 health problems can be identified. Male older adults reported better QoL than women in all domains,
340 and quality of life deteriorated with advancing age. The findings from this study show that older adults
341 living in slums in Ghana had a moderate psychological, social, and environmental quality of life and a
342 poor physical quality of life. Although this finding is better than anticipated, health policy development
343 must consider the specific needs of older adults in slums and direct policies to meet these needs to
344 further improve their overall QoL.

346 **IMPLICATIONS FOR PRACTICE AND RESEARCH**

347 In all domains, females have a lower quality of life than males. There should be a continuous focus on
348 helping women get better self-esteem. Education of females is being encouraged but attention to the
349 psychological aspect is necessary to improve their QoL in that domain. Also, poor scores in physical QoL
350 among study participants are observed. Further research, is needed to assess which factors could contribute
351 to the poor physical QoL in old people in slums.

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3 352 **List of Abbreviations**

4 353 QoL: Quality of Life

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6 354 SDG: Sustainable Development Goal

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8 355 WHOQOL-BREF: World Health Organisation Quality of Life -brief version

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10 356 SPSS: Statistical Package for Social Sciences

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12 357 ANOVA: Analysis of variance analysis

13 358 **Declarations:**

14
15 359 Ethics approval and consent to participate: Ethics approval was received from the Institutional review
16 360 board of the 37 Military Hospital. Participants also signed or thumb printed to show consent.

17
18 361 Consent for publication: Not applicable

19
20 362 Availability of data and materials: The datasets used and/or analysed during the current study are
21 363 available from the corresponding author on reasonable request.

22
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27
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TABLES

Table 1: Background characteristics of participants by residence

| Characteristics | Teshie | Ashaiman | Total n (%) |
|-----------------------------|-----------|-----------|-------------|
| Gender | | | |
| Male | 43(21.6) | 114(57.6) | 157(39.5) |
| Female | 156(78.4) | 84(42.4) | 240(60.5) |
| Age group (in years) | | | |
| 60-65 | 90(45.2) | 99(50.0) | 189(47.6) |
| 66-70 | 36(18.1) | 39(19.7) | 75(18.9) |
| 71-75 | 32(16.1) | 23(11.6) | 55(13.9) |
| 76-80 | 18(9.0) | 20(10.1) | 38(9.6) |
| >81 | 23(11.6) | 17(8.6) | 40(10.1) |
| Marital Status | | | |
| Single | 28(14.1) | 9(4.5) | 37(9.3) |
| Married | 41(20.6) | 85(42.9) | 126(31.7) |
| Divorced | 25(12.6) | 56(28.3) | 81(20.4) |
| Widowed | 105(52.7) | 48(24.3) | 153(38.5) |
| Education | | | |
| No formal | 82(41.2) | 96(48.5) | 178(44.8) |
| Elementary | 38(19.1) | 56(28.3) | 94(23.7) |
| High School | 73(36.7) | 24(12.1) | 97(24.4) |
| Above High School | 6(3.0) | 22(11.1) | 28(7.1) |

Table 2

| Characteristics | Frequency | % |
|---------------------------------|-----------|------|
| Current Illness | | |
| Body Pains | 76 | 19.2 |
| Diabetes | 19 | 4.8 |
| Difficulty Walking | 33 | 8.3 |
| High Blood Pressure | 68 | 17.1 |
| Joint Pains | 100 | 25.2 |
| Old Age | 26 | 6.5 |
| Poor EyeSight | 43 | 10.8 |
| Others | 32 | 8.1 |
| Sources of Income | | |
| Children | 125 | 31.5 |
| Farming | 38 | 9.6 |
| Fishing | 52 | 13.1 |
| Friends | 37 | 9.3 |
| Pension | 27 | 6.8 |
| Siblings | 19 | 4.7 |
| Trading | 91 | 22.9 |
| Others | 8 | 2.0 |
| Source of healthcare | | |
| Clinic | 63 | 15.9 |
| Drug Ped | 37 | 9.3 |
| Herbalist | 18 | 4.5 |
| Hospital | 121 | 30.5 |
| Pharmacy | 158 | 39.8 |
| Source of Social Support | | |
| Sibling | 69 | 17.4 |
| Daughter | 114 | 28.7 |
| Son | 67 | 16.9 |
| Grandchild | 44 | 11.1 |
| Other | 21 | 5.3 |

Table 3: Participants Mean scores and Association of background characteristics with QoL scores

| | General QoL | General Health | Psychological domain ** | Physical domain** | Social domain** | Environmental domain** |
|-----------------------|----------------|-------------------|----------------------------|----------------------|--------------------|---------------------------|
| Total group (n=397) | 2.73 | 2.90 | 45.07 ^b | 43.25 ^a | 56.97 ^b | 51.63 ^b |
| Gender | | | | | | |
| Female | 2.53 | 2.78 | 41.95 ^a | 44.63 ^a | 56.44 ^b | 49.21 ^b |
| Male | 3.04 | 3.09 | 45.22 ^b | 45.75 ^b | 57.77 ^b | 55.30 ^b |
| Mean difference | .515 | .310 | 3.27 | 1.11 | 1.33 | 6.09 |
| p-value | .000* | .017* | .019* | .611 | .506 | .001* |
| Age group | | | | | | |
| 60-65 years | 2.08 | 2.98 | 45.44 | 49.14 | 57.11 | 54.41 |
| 66-70 years | 2.84 | 3.04 | 41.89 | 43.65 | 58.48 | 51.69 |
| 71-75 years | 2.80 | 2.95 | 40.31 | 42.49 | 57.47 | 49.75 |
| 76-80 years | 2.58 | 2.66 | 42.34 | 40.11 | 53.97 | 48.95 |
| >80 years | 2.25 | 2.45 | 40.30 | 36.89 | 55.60 | 43.26 |
| F | 2.139 | 1.966 | 2.600 | 4.180 | .397 | 4.111 |
| p-value | .075 | .099 | .036* | .003* | .811 | .003* |
| Marital status | | | | | | |
| Single | 2.43 | 2.54 | 35.97 | 37.46 | 48.41 | 46.89 |
| Married | 3.00 | 3.02 | 47.44 | 47.66 | 62.18 | 56.13 |
| Divorced | 2.95 | 2.95 | 44.52 | 46.05 | 49.57 | 52.34 |
| Widowed | 2.47 | 2.86 | 40.88 | 44.27 | 58.66 | 48.69 |
| F | 6.370 | 1.420 | 9.861 | 2.359 | 10.385 | 5.583 |
| p-value | .000* | .237 | .000* | .071 | .000* | .001* |
| Education | | | | | | |
| No formal education | 2.61 | 2.66 | 39.51 | 40.73 | 54.76 | 47.71 |
| Elementary school | 2.78 | 2.96 | 45.81 | 46.73 | 57.63 | 52.19 |
| High school | 2.72 | 3.14 | 45.02 | 50.23 | 58.60 | 54.41 |
| Above high school | 3.39 | 3.43 | 52.25 | 49.25 | 63.14 | 64.86 |
| F | 3.498 | 4.990 | 10.938 | 5.084 | 1.982 | 10.241 |
| p-value | .016* | .002* | .000* | .002* | .116 | .000* |
| Residence | | | | | | |
| Teshie slum | 2.29 | 2.87 | 41.28 | 45.99 | 58.19 | 47.59 |
| Ashaiman slum | 3.18 | 2.93 | 45.22 | 44.15 | 55.74 | 55.71 |
| Mean difference | -.885 | -.065 | -3.94 | 1.84 | 2.44 | -8.12 |

| | | | | | | |
|---------------------------------|-------|-------|-------|-------|-------|-------|
| p-value | .000* | .618 | .004* | .389 | .211 | .000* |
| Sources of Income | | | | | | |
| Pension | 3.04 | 3.33 | 44.96 | 50.96 | 56.52 | 53.56 |
| Fishing/Farming | 2.76 | 2.81 | 42.39 | 44.00 | 56.09 | 49.47 |
| Trading | 2.48 | 2.58 | 41.75 | 41.47 | 54.55 | 49.74 |
| Children | 2.86 | 3.06 | 44.88 | 44.79 | 58.49 | 53.22 |
| Friends | 2.65 | 3.24 | 41.97 | 49.92 | 59.27 | 52.62 |
| Family/Siblings | 2.90 | 3.05 | 46.35 | 50.70 | 59.10 | 55.45 |
| Other | 2.25 | 1.75 | 37.00 | 46.13 | 56.25 | 51.75 |
| F | 1.500 | 3.434 | 1.118 | 1.389 | .518 | .842 |
| p-value | .177 | .003* | .351 | .218 | .794 | .538 |
| Source of Social Support | | | | | | |
| Sibling | 2.72 | 2.88 | 44.06 | 43.62 | 53.35 | 52.93 |
| Daughter | 2.61 | 2.74 | 42.73 | 42.21 | 57.16 | 49.07 |
| Son | 2.84 | 3.07 | 42.52 | 48.87 | 58.03 | 54.09 |
| Grandchild | 2.66 | 2.68 | 41.86 | 44.61 | 55.18 | 50.64 |
| Other | 2.86 | 3.38 | 47.05 | 53.95 | 62.19 | 53.48 |
| F | .481 | 1.761 | .695 | 2.134 | 1.049 | 1.192 |
| p-value | .749 | .137 | .596 | .076 | .382 | .314 |
| Living Arrangements | | | | | | |
| Extended family | 3.10 | 3.10 | 45.15 | 46.28 | 56.92 | 54.59 |
| Family | 2.45 | 2.60 | 42.87 | 36.08 | 56.57 | 48.70 |
| Alone | 2.41 | 2.81 | 40.27 | 47.21 | 55.96 | 49.36 |
| Children | 2.91 | 2.96 | 45.37 | 46.62 | 58.53 | 52.18 |
| Others | 2.50 | 2.70 | 45.10 | 37.80 | 62.40 | 54.33 |
| F | 7.080 | 1.72 | 2.747 | 3.275 | .396 | 2.067 |
| p-value | .000* | .144 | .028* | .012* | .811 | .084 |

**All raw scores are transformed to a 1-100 score, *Significant p-value ≤ 0.05 , ^a = poor QoL, ^b = moderate QoL

Table 4: ANOVA for Regression analysis showing the influence of demographic characteristics and Participants QoL in the 4 domains of the WHOQOL-BREF

| | Psychological domain Mean | Physical domain Mean | Social domain Mean | Environmental domain Mean |
|----------------------------|------------------------------|---------------------------|---------------------------|------------------------------|
| Total group (n=397) | 45.07 | 43.25 | 56.97 | 51.63 |
| Gender | | | | |
| Female | 41.95 | 44.63 | 56.44 | 49.21 |
| <i>Difference in means</i> | $F(3,235)=36.118; p<.001$ | $F(3,235)=28.856; p<.001$ | $F(3,235)=12.619; p<.001$ | $F(3,235)=46.027; p<.001$ |
| <i>Adjusted R square</i> | .307 | .260 | .128 | .363 |
| Male | 45.22 | 45.75 | 57.77 | 55.30 |
| <i>Difference in means</i> | $F(3,153)=76.702; p<.001$ | $F(3,153)=31.965; p<.001$ | $F(3,153)=26.887; p<.001$ | $F(3,153)=73.028; p<.001$ |
| <i>Adjusted R square</i> | .593 | .373 | .345 | .583 |
| Age group | | | | |
| 60-65 years | 45.44 | 49.14 | 57.11 | 54.41 |
| <i>Difference in means</i> | $F(3,185)=56.458; p<.001$ | $F(3,185)=25.285; p<.001$ | $F(3,185)=17.656; p<.001$ | $F(3,185)=60.783; p<.001$ |
| <i>Adjusted R square</i> | .469 | .279 | .210 | .488 |
| 66-70 years | 41.89 | 43.65 | 58.48 | 51.69 |
| <i>Difference in means</i> | $F(3,71)=14.223; p<.001$ | $F(3,71)=12.154; p<.001$ | $F(3,71)=6.713; p<.001$ | $F(3,71)=16.321; p<.001$ |
| <i>Adjusted R square</i> | .349 | .311 | .188 | .383 |
| 71-75 years | 40.31 | 42.49 | 57.47 | 49.75 |
| <i>Difference in means</i> | $F(3,51)=12.850; p<.001$ | $F(3,51)=5.413; p=.003$ | $F(3,51)=2.143; p=.106$ | $F(3,51)=15.924; p<.001$ |
| <i>Adjusted R square</i> | .397 | .197 | .112 | .453 |
| 76-80 years | 42.34 | 40.11 | 53.97 | 48.95 |
| <i>Difference in means</i> | $F(3,34)=7.977; p<.001$ | $F(3,34)=2.285; p=.096$ | $F(3,34)=12.850; p=.002$ | $F(3,34)=6.292; p=.002$ |
| <i>Adjusted R square</i> | .361 | .094 | .288 | .300 |
| >80 years | 40.30 | 36.89 | 55.60 | 43.26 |
| <i>Difference in means</i> | $F(3,35)=13.315; p<.001$ | $F(3,35)=11.896; p<.001$ | $F(3,35)=7.288; p=.001$ | $F(3,35)=10.723; p<.001$ |
| <i>Adjusted R square</i> | .493 | .462 | .332 | .435 |
| Marital status | | | | |
| Single | 35.97 | 37.46 | 48.41 | 46.89 |
| <i>Difference in means</i> | $F(3,33)=13.087; p<.001$ | $F(3,33)=3.797; p=.019$ | $F(3,33)=1.971; p=.137$ | $F(3,33)=17.125; p<.001$ |
| <i>Adjusted R square</i> | .502 | .189 | .075 | .573 |
| Married | 47.44 | 47.66 | 62.18 | 56.13 |
| <i>Difference in means</i> | $F(3,122)=47.457; p<.001$ | $F(3,122)=18.805; p<.001$ | $F(3,122)=32.156; p<.001$ | $F(3,122)=49.001; p<.001$ |
| <i>Adjusted R square</i> | .527 | .299 | .428 | .538 |
| Divorced | 44.52 | 46.05 | 49.57 | 52.34 |
| <i>Difference in means</i> | $F(3,76)=30.952; p<.001$ | $F(3,76)=18.004; p<.001$ | $F(3,76)=9.245; p<.001$ | $F(3,76)=39.424; p<.001$ |

| | | | | |
|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|
| <i>Adjusted R square</i> | .532 | .392 | .238 | .593 |
| Widowed | 40.88 | 44.27 | 58.66 | 48.69 |
| <i>Difference in means</i> | $F(3,76)=18.283; p<.001$ | $F(3,149)=20.969; p<.001$ | $F(3,149)=8.231; p<.001$ | $F(3,149)=25.410; p<.001$ |
| <i>Adjusted R square</i> | .254 | .283 | .125 | .330 |
| Education | | | | |
| No formal education | 39.51 | 40.73 | 54.76 | 47.71 |
| <i>Difference in means</i> | $F(3,173)=36.902; p<.001$ | $F(3,173)=25.547; p<.001$ | $F(3,173)=16.669; p<.001$ | $F(3,173)=50.471; p<.001$ |
| <i>Adjusted R square</i> | .380 | .295 | .211 | .457 |
| Elementary school | 45.81 | 46.73 | 57.63 | 52.19 |
| <i>Difference in means</i> | $F(3,90)=32.867; p<.001$ | $F(3,90)=20.298; p<.001$ | $F(3,90)=11.102; p<.001$ | $F(3,90)=24.720; p<.001$ |
| <i>Adjusted R square</i> | .507 | .384 | .246 | .433 |
| High school | 45.02 | 50.23 | 58.60 | 54.41 |
| <i>Difference in means</i> | $F(3,93)=16.478; p<.001$ | $F(3,93)=10.946; p<.001$ | $F(3,93)=3.902; p=.011$ | $F(3,93)=21.926; p<.001$ |
| <i>Adjusted R square</i> | .326 | .237 | .083 | .396 |
| Above high school | 52.25 | 49.25 | 63.14 | 64.86 |
| <i>Difference in means</i> | $F(3,24)=11.757; p<.001$ | $F(3,24)=4.401; p=.013$ | $F(3,24)=7.112; p=.001$ | $F(3,24)=4.332; p=.014$ |
| <i>Adjusted R square</i> | .544 | .274 | .404 | .270 |
| Residence | | | | |
| Teshie slum | 41.28 | 45.99 | 58.19 | 47.59 |
| <i>Difference in means</i> | $F(3,195)=11.276; p<.001$ | $F(3,195)=28.819; p<.001$ | $F(3,195)=6.570; p<.001$ | $F(3,195)=34.411; p<.001$ |
| <i>Adjusted R square</i> | .135 | .297 | .078 | .339 |
| Ashaiman slum | 45.22 | 44.15 | 55.74 | 55.71 |
| <i>Difference in means</i> | $F(3,193)=171.779; p<.001$ | $F(3,193)=56.292; p<.001$ | $F(3,193)=47.252; p<.001$ | $F(3,193)=116.083; p<.001$ |
| <i>Adjusted R square</i> | .723 | .458 | .414 | .644 |

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

| | | Reporting Item | Page Number |
|---------------------------|---------------------|---|-------------|
| Title and abstract | | | |
| Title | #1a | Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| Abstract | #1b | Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| Introduction | | | |
| Background / rationale | #2 | Explain the scientific background and rationale for the investigation being reported | 3-4 |
| Objectives | #3 | State specific objectives, including any prespecified hypotheses | 4 |
| Methods | | | |
| Study design | #4 | Present key elements of study design early in the paper | 4 |
| Setting | #5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| Eligibility criteria | #6a | Give the eligibility criteria, and the sources and methods of | 5 |

| | | | |
|----|--------------------|--|-----|
| 1 | | selection of participants. | |
| 2 | | | |
| 3 | | | |
| 4 | #7 | Clearly define all outcomes, exposures, predictors, potential | 5 |
| 5 | | confounders, and effect modifiers. Give diagnostic criteria, if | |
| 6 | | applicable | |
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| 10 | | | |
| 11 | Data sources / | #8 For each variable of interest give sources of data and details of | N/A |
| 12 | measurement | methods of assessment (measurement). Describe | |
| 13 | | comparability of assessment methods if there is more than one | |
| 14 | | group. Give information separately for for exposed and | |
| 15 | | unexposed groups if applicable. | |
| 16 | | | |
| 17 | | | |
| 18 | Bias | #9 Describe any efforts to address potential sources of bias | 14 |
| 19 | | | |
| 20 | Study size | #10 Explain how the study size was arrived at | 7 |
| 21 | | | |
| 22 | | | |
| 23 | Quantitative | #11 Explain how quantitative variables were handled in the | 8 |
| 24 | variables | analyses. If applicable, describe which groupings were chosen, | |
| 25 | | and why | |
| 26 | | | |
| 27 | Statistical | #12a Describe all statistical methods, including those used to control | 8 |
| 28 | methods | for confounding | |
| 29 | | | |
| 30 | Statistical | #12b Describe any methods used to examine subgroups and | 8 |
| 31 | methods | interactions | |
| 32 | | | |
| 33 | Statistical | #12c Explain how missing data were addressed | 13 |
| 34 | methods | | |
| 35 | | | |
| 36 | Statistical | #12d If applicable, describe analytical methods taking account of | 7 |
| 37 | methods | sampling strategy | |
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| 1 | Statistical | #12e | Describe any sensitivity analyses | N/A |
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| 3 | methods | | | |
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| 6 | Results | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | Participants | #13a | Report numbers of individuals at each stage of study—eg | 7-8 |
| 11 | | | numbers potentially eligible, examined for eligibility, confirmed | |
| 12 | | | eligible, included in the study, completing follow-up, and | |
| 13 | | | analysed. Give information separately for for exposed and | |
| 14 | | | unexposed groups if applicable. | |
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| 22 | Participants | #13b | Give reasons for non-participation at each stage | N/A |
| 23 | | | | |
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| 25 | Participants | #13c | Consider use of a flow diagram | N/A |
| 26 | | | | |
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| 28 | Descriptive data | #14a | Give characteristics of study participants (eg demographic, | 8 |
| 29 | | | clinical, social) and information on exposures and potential | |
| 30 | | | confounders. Give information separately for exposed and | |
| 31 | | | unexposed groups if applicable. | |
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| 38 | Descriptive data | #14b | Indicate number of participants with missing data for each | N/A |
| 39 | | | variable of interest | |
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| 43 | Outcome data | #15 | Report numbers of outcome events or summary measures. | n/a |
| 44 | | | Give information separately for exposed and unexposed | |
| 45 | | | groups if applicable. | |
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| 51 | Main results | #16a | Give unadjusted estimates and, if applicable, confounder- | 23 |
| 52 | | | adjusted estimates and their precision (eg, 95% confidence | |
| 53 | | | interval). Make clear which confounders were adjusted for and | |
| 54 | | | why they were included | |
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| 1 | Main results | #16b | Report category boundaries when continuous variables were | 8 |
| 2 | | | | |
| 3 | | | | |
| 4 | | | categorized | |
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| 6 | Main results | #16c | If relevant, consider translating estimates of relative risk into | n/a |
| 7 | | | | |
| 8 | | | absolute risk for a meaningful time period | |
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| 10 | Other analyses | #17 | Report other analyses done—e.g., analyses of subgroups and | n/a |
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| 12 | | | interactions, and sensitivity analyses | |
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| 17 | Discussion | | | |
| 18 | | | | |
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| 20 | Key results | #18 | Summarise key results with reference to study objectives | 13 |
| 21 | | | | |
| 22 | | | | |
| 23 | Limitations | #19 | Discuss limitations of the study, taking into account sources of | 13-14 |
| 24 | | | | |
| 25 | | | potential bias or imprecision. Discuss both direction and | |
| 26 | | | magnitude of any potential bias. | |
| 27 | | | | |
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| 31 | Interpretation | #20 | Give a cautious overall interpretation considering objectives, | 13 |
| 32 | | | | |
| 33 | | | limitations, multiplicity of analyses, results from similar studies, | |
| 34 | | | and other relevant evidence. | |
| 35 | | | | |
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| 39 | Generalisability | #21 | Discuss the generalisability (external validity) of the study | 14 |
| 40 | | | | |
| 41 | | | results | |
| 42 | | | | |
| 43 | | | | |
| 44 | Other Information | | | |
| 45 | | | | |
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| 47 | Funding | #22 | Give the source of funding and the role of the funders for the | n/a |
| 48 | | | | |
| 49 | | | present study and, if applicable, for the original study on which | |
| 50 | | | the present article is based | |
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3 CC-BY. This checklist was completed on 08. September 2021 using <https://www.goodreports.org/>, a
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5 tool made by the [EQUATOR Network](#) in collaboration with [Penelope.ai](#)
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BMJ Open

QUALITY OF LIFE AND ASSOCIATED FACTORS OF OLDER ADULTS IN GHANAIAN URBAN SLUMS: A CROSS-SECTIONAL STUDY

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|---------------------------------|---|
| Journal: | <i>BMJ Open</i> |
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| Primary Subject Heading: | Geriatric medicine |
| Secondary Subject Heading: | Health policy, Public health |
| Keywords: | PUBLIC HEALTH, SOCIAL MEDICINE, GERIATRIC MEDICINE |
| | |

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3 1 **QUALITY OF LIFE AND ASSOCIATED FACTORS OF OLDER ADULTS IN GHANAIAN URBAN SLUMS: A CROSS-**
4
5 2 **SECTIONAL STUDY**

6
7 3 Authors: Priscilla Yeye Adumoah Attafuah*^{1,2}, Irma HJ Everink², Aaron Abuosi³, Christa Lohrmann⁴, Jos MGA Schols^{2,5}

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37 16 Word count 3966 excluding abstract, references and tables

18 ABSTRACT

19 **Objective** This study provides insight into the QoL of older adults living in Ghanaian urban slums.

20 **Design** A community-based cross-sectional design study, assessed QoL among older adults in two slums using the WHOQOL-BREF
21 questionnaire.

22 **Settings** Participants were recruited from one slum in a fishing dominated community and another slum in an industrial community in Ghana.

23 **Participants** Four hundred participants 60 years and above living in either slum for at least one month and able to communicate verbally
24 took part in this study.

25 **Results** Participants had a moderate level of QoL in the psychological (mean score 45.7), social (mean score 57.0) and environmental (mean
26 score 51.6). The physical QoL of the older adults was 43.3 which denotes a poor QoL. Between male and female participants, statistically
27 significant differences were found in general QoL ($p<0.001$), general satisfaction with health ($p=.017$), the psychological ($p=.019$), and the
28 environmental domain ($p=.001$). In all domains, male participants have a significantly higher QoL compared to their female counterparts. In
29 the psychological domain, older adults 76-80 years had a better psychological QoL compared to those 66-70 years. An ANOVA analysis
30 showed that people who lived with extended family members had high scores in the environmental QoL, overall QoL scores and satisfaction
31 with health scores. Those who lived with their children had higher psychological QoL scores. An ANOVA for regression analysis revealed
32 that QoL was influenced mostly by the environmental domain (46.2%), followed by the psychological (43.7%), physical (31%) and social
33 domain (20.4%).

34 **Conclusions** The findings show that older adults living in slums had a moderate psychological, social, and environmental QoL and a poor
35 physical QoL. Although findings are better than anticipated, health policy development on the specific needs of older adults in slums and
36 direct policies to meet these needs to further improve their overall QoL.

37 **Keywords:** Quality of Life, Older adult, Slums, WHOQOL-BREF

38 Introduction

39 The difference in the life expectancy of people living in developed countries and people living in African countries is approximately ten
40 years [1]. Various factors causing these differences include demographic differences, varying family and social structures, social security
41 arrangements, health infrastructure, and spiritual beliefs [2-4]. These factors can influence the actions a person takes to address health issues
42 and other aspects of life. In line with global trends, and despite these differences, the life expectancy of people living in Africa is increasing.
43 However, an increased life expectancy is not necessarily accompanied by an improved quality of life (QoL). Ageing often comes with
44 problems affecting the quality of life, such as loneliness, ill health, and depression [5, 6, 7]. Therefore, as people in African societies are
45 ageing, the QoL of older adults in African countries is becoming an increasingly important issue [8,9].

46 The World Health Organisation defines the quality of life as “an individual's perception of their position in life in the context of the culture
47 and value systems in which they live and with their goals, expectations, standards and concerns” [10]. Older adults are vulnerable people,
48 who are especially sensitive to poor QoL, as a result of changes and events in their physical health, psychological state, social circumstances
49 and relationship to their environment [8, 11, 12]. With the physiological changes of the human system, as people age, most body functions
50 decrease, and therefore they may become frail and dependent on others. Moreover, frailty may express itself also in the psychological and
51 social domains. When this is combined with deplorable living conditions the quality of life of these older adults becomes an issue of concern.

52 Slums are pictorial evidence of deplorable living conditions. In developing countries, mainly African countries, rural-urban migration is one
53 of the causes of slum communities [13-16].

54 Slums often lack basic amenities, are overcrowded, polluted and show threats of violence, disrespect and aggression [14, 17]. Due to
55 unsanitary conditions, in slums, older adults are susceptible to all forms of communicable and non-communicable diseases and often lack
56 access to healthcare [14, 15, 18, 19]. Hence the overall health status of older adults in slums has been reported to be lower than older adults
57 living in formal settlements [20-22].

Supporting older people in slums is an important objective of the WHO “Global strategy and action plan on ageing and health 2016-2030” [23]. One of the targets of the Millennium Development Goals (MDG) 7, is to achieve a significant improvement in the lives of at least 100 million slum dwellers worldwide by 2020. However, there haven’t been any changes in Ghanaian slums currently [24,25].

Many studies have been conducted globally, on the QoL of older adults either in the community or in care homes [26, 27], and also in those with different health conditions [28-30]. To improve the lives of slum dwellers, it is necessary to assess their QoL, to ascertain which aspects need improvement for an overall QoL improvement. However, there is a lack of research on the QoL of older adults in developing countries and those living in slums. Therefore, by assessing the level of quality of life of older adults living in two Ghanaian slums, this study aims to raise awareness and provide insight into the QoL of these older adults.

Methods

Study design and study population

A community-based cross-sectional study was conducted between April and May 2020. The population under consideration involved older adults living in two urban slums in the Greater Accra region of Ghana. These slums are in the Ashaiman and Teshie communities. The reason for including these two specific slums is that the level of education is comparable, but differences exist in the type of housing structures and socioeconomic activities in these communities. Ashaiman is located close to an industrial city in Ghana and consists of people from different regions and tribes in Ghana. Teshie is mainly a fishing community with a majority of the population being indigenous.

Participants were included if they were older adults (60 years [retirement age] or older), living in slums in Ashaiman or Teshie for at least one month and were able to communicate verbally. Critically ill older adults and people with speech impairments who were not able to express themselves verbally were excluded from the study.

Study Instrument

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3 77 The primary outcome measure of this study is quality of life, assessed using the World Health Organisation Quality of Life -brief version
4 (WHOQOL-BREF) [31]. This instrument was chosen based on the results of a scoping review of instruments assessing QoL in African
5 78 countries [32]. Detailed information on psychometric properties is lacking from previous studies, but the included domains, the feasibility
6 79 and the length of the instrument, nevertheless, convinced the authors to use the WHOQOL-BREF in this study.
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11 81 The WHOQOL-BREF consists of four domains. The questions in each domain vary from 3 to 7. Every question in each domain is rated on
12 82 a 5-point Likert scale, where 1 represents 'very poor' and 5 represents 'very good'. The first domain is the 'Physical Health' domain. This
13 82 includes seven (7) questions related to sleep, energy, mobility, the extent to which pain prevents performance of necessary tasks, the need
14 83 for medical treatment to function in daily life, and level of satisfaction with their work capacity. The second domain is the 'Psychological'
15 84 domain with six (6) questions, focusing on the ability to concentrate, self-esteem, body image, spirituality, and the frequency of positive or
16 84 negative feelings. The third domain covers 'Social relationships' and includes three (3) questions related to satisfaction with personal
17 85 relationships, social support systems and sexual satisfaction. The fourth is the 'Environmental' domain, which comprises eight (8) questions
18 85 related to safety and security, satisfaction with one's home and physical environment satisfaction, finances, availability of health and /social
19 86 care availability, access to general information and leisure activities accessibility and satisfaction with transportation.
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27 90 In addition to the 4 domains, the WHOQOL-BREF includes two general questions, one about the respondents' own QoL in general, and one
28 90 related to their satisfaction with health. These questions also have five response options varying from 1 'very poor' to 5 'very good' for
29 91 rating the QoL and 'very dissatisfied' (1) to 'very satisfied' (5) for rating the satisfaction with health. Besides using the WHOQOL-BREF,
30 92 demographic characteristics of subjects (gender, age, educational level, religion, and marital status) were collected. In addition, data on
31 92 access to health care, current health condition, health services patronized, living arrangements, social support, and sources of income were
32 93 gathered.
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38 96 **Data collection**

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3 97 The WHOQOL-BREF questionnaire was used to conduct face-to-face interviews during data collection, given difficulties with reading
4 (caused by both difficulties in reading and/or poor vision) in the population under consideration. The interviews were done by the first author,
5 98 PYAA and 4 research assistants' undergraduates of the University of Ghana. The interviewers all have a background in nursing and were
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7 99 trained before the commencement of data collection. During the training, they were introduced to the WHOQOL-BREF and taken through
8 100 the process of intended data collection. The interviewers needed to be conversant with the questions in two local languages (Twi and Ga).
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10 102 During the face-to-face interviews with subjects, interviewers read the questions out loud and filled in the responses of participants. The
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12 103 original English version of the instrument was translated and administered to participants in the local languages (Ga and Twi). Local language
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14 104 experts translated and back-translated the WHOQOL-BREF questionnaire to be sure that the intended meaning of the original content was
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16 105 intact. Additionally, a pretest of the questionnaire was carried out in a nearby slum and no changes were made afterwards. We used the
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18 106 STROBE cross-sectional checklist when writing our report [33].
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21 107 **Sampling method and sample size**

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23 108 Recruitment took place by involving a key informant in each slum. This key informant was a person working at the Municipal Assembly
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25 109 of the specific community and visiting the slums very often due to the nature of their work. The key informant used a convenient sampling
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27 110 method to select participants living in the slums. After selecting participants, the snowballing technique was used to increase the
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29 111 participation rate. This technique is not new as previous QoL studies involving older adults also used the snowballing sampling techniques
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31 112 during sample recruitment [21, 34]. The key informant also familiarized the research team with the slum community. The research team
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33 113 provided study-specific information in person to the participant. The sample size was calculated to get the number of participants that will
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35 114 be representative of the entire population of older adults in the slums. The sample size is an estimate of how many participants will be
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37 115 needed as a representation of the total sample population. The sample size calculation was done using the Yamane formula [35]. The two
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39 116 slums under consideration consist of approximately 6,000 older inhabitants. Filling in the formula gave an estimated sample size of 375
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41 117 participants [35].
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43 118 **Ethical Approval**

Ethical clearance (37MH-IRB IPN 199/2018) was obtained from the 37 Military Hospitals Institutional Review Board. Permission to perform this study in Ashaiman and Teshie was provided by the Municipal Assemblies of the selected slums. Written informed consent, either by signing or thumb-printing (in the case of those unable to sign) was required for participation.

Patient and Public Involvement

Patients and the public were not involved in the development of the research questions, the design, and the conduct of the study. However, participants were involved in the recruitment of others through the snowball method. The study results will be shared with the participants and other relevant stakeholders through various social media handles and conferences.

Data Analysis

The data were analysed using Statistical Package for Social Sciences (IBM SPSS) version 24.0. Domain scores were scaled in a positive direction (i.e., higher scores denote higher QOL). The mean score of items within each domain is used to calculate the domain score. An Excel sheet calculator created by Skvarc [36] was used to transform the different WHOQOL-BREF domain scores to a 0-100-scale. Cut-off points for QoL in this study were determined based on the literature by Silva and colleagues[37]. According to Silva and colleagues [37], a score ≤ 45 is considered poor QoL, 46-64 is considered moderate QoL and any score > 65 is recorded as a high QoL.

In further analysis, the demographic data served as independent variables and the domains of the WHOQOL-BREF as dependent variables. Gender and place of residence were depicted as a binominal variable where '1' is male/Teshie and '2' is female/Ashaiman respectively. All other demographic data are categorical variables. Educational level was categorized into four groups: no formal education, elementary school, high school, and above high school. Marital status comprised of single, married, divorced, and widowed depicted with numbers. Age in years was grouped into five categories (60-65, 66-70, 71-75, 76-80, > 81) also depicted with numbers. Finally, the place of residence: Teshie or Ashaiman, was documented.

Descriptive analyses were performed to describe the background characteristics, as well as the domain scores of the WHOQOL-BREF. To compare the mean distribution of participants' characteristics and their QOL per domain, an independent *t*-test and analysis of variance

(ANOVA) were used. ANOVA for regression analysis was done to indicate which domains influence QoL in the various sociodemographic characteristics. Transformed scores -to 100%- were used for statistical analyses in four domains. In this study, the level of significance was set at $P < 0.05$ for all analyses.

Results

Background Characteristics of Participants

In total, 400 people were approached for this study and they all agreed to participate. This means that a 100% response rate was achieved. Three subjects were excluded from the analysis as they were below the age of 60 years, resulting in a total sample of 397 respondents.

In Table 1 the background characteristics can be found. Of all participants who participated, 240 persons (60.5%) were female, and the largest age group was 60-65 years (47.6%). The majority of the older adults in this population were widowed (38.5%), followed by participants being married (31.7%). In total 44.8% of the participants had no formal education. When asked about their current illnesses/diseases, 25.2% had osteoarthritis, followed by 19.2% with body pains (pains all over the body), 17.1% had high blood pressure. Participants were also asked about their source of income. Most participants (31.5%) received their income from their children, 22.9% were into trading, 2.0% were either mechanics, electricians, or welders. On the sources of healthcare utilized, most participants 39.8% patronized pharmacies, with herbal preparations being the least accessed 4.5%. When asked about the living arrangements of participants, 33.5% each either lived alone or with extended family members. Those who lived with their children were 17.1% of the total sample population while 2.5% lived with others which include friends and church members. Daughters were the biggest form of social support (28.7%) followed by siblings of older adults (17.4%) and then sons, 16.9% (See Appendix Table 1).

The outcomes of the WHOQOL BREF are described in Table 2. When looking at the total population, the perceived overall QoL is neither poor nor good and they are neither satisfied nor dissatisfied with their health. According to Silva and colleagues [37], there is a moderate level of QoL in the psychological (mean, 45.7), social (mean, 57.0) and environmental (mean, 51.6) domains of the WHOQOL-BREF. The

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3 162 physical QoL of the older adults in these slums recorded a mean score of 43.3. Transformed QoL scores were rated poor, moderate and high,
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5 163 based on the literature by Silva and colleagues [37]. Although the means of the transformed scores for all participants were poor on the
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7 164 physical and psychological domains, they were moderate across all other domains.

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9 165 When looking at the differences between male and female participants, statistically significant differences were found in general quality of
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11 166 life ($p<.001$), general satisfaction with health ($p=.017$), the psychological domain ($p=.019$), and the environmental domain ($p=.001$). In all
12 167 of these domains, male participants have a significantly higher quality of life compared to their female counterparts.

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14 168 In the analysis of the various age groups, there were significant differences in the psychological ($p=.015$), physical ($p=.003$) and
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16 169 environmental ($p=.003$) domains.

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19 171 From Table 2, it appears that as age increased, QoL decreased significantly in the physical and environmental domains. Yet, in the
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21 172 psychological domain, those between 76-80 years had a better psychological QoL compared to those 66-70 years.

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23 173 For marital status, significant differences in the various domains were seen, in the perceived QoL ($p<0.001$), psychological ($p<0.001$), social
24 174 ($p<0.001$), and environmental ($p=0.001$) domains. Participants who are married had the highest scores in these domains, followed by
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26 175 participants who are divorced, widowed, and single.

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28 176 In an examination of differences in QoL among the various educational levels, there were significant differences in all domains, except for
29 177 the social domain. In general, QoL was significantly higher among participants with a higher educational status. Lastly, when looking at the
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31 178 difference in QoL between the place of residence, older adults in the Ashaiman slum showed a statistically significant difference in perceived
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33 179 QoL ($p<0.001$), psychological QoL ($p=0.004$) and environmental QoL ($p<0.001$).

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35 180 In a one-way analysis of variance (ANOVA) of the mean differences in QoL of participants with different sources of income, there was a
36 181 statistical significance in the satisfaction with health domain only. Participants who received pensions had higher means in most domains
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38 182 (overall QoL, satisfaction with health, physical QoL) followed by participants who had financial support from family/siblings (higher scores
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40 183 on the environmental and psychological domains). Participants who received financial support from friends had the highest QoL score in the
41 184 social QoL domain.
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3 185 An ANOVA comparing mean QoL scores of participants, with different sources of social support showed no statistical differences in scores
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5 186 between different sources of social support (Table 2). An ANOVA analysis comparing the living arrangements of participants showed that
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7 187 people who lived with extended family had high environmental QoL scores, overall QoL scores and satisfaction with health scores. Those
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9 188 who lived with their children had high psychological QoL scores.

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12 190 An analysis of variance for regression analysis of QoL scores and the demographic characteristics was done to show if certain domains are
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14 191 influencing QoL to a higher extent than other domains (see Table 3). Variances between the various domains showed that the environmental
15 192 domain had the highest influence of 46.2%, followed by the psychological domain (43.7%), the physical domain (31%) and the social domain
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17 193 (20.4%). When looking at the variances between domains, calculated with the adjusted r square, for females at a significance $p < .001$, the
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19 194 environmental domain had the greatest influence (36.3% variance in QoL), followed by the psychological domain (30.8%), then the physical
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21 195 domain (26.0%) and the social domain (12.9% variance in QoL). Among males at a significance of $p < .001$, the psychological domain has a
22 196 59.3% influence on total QoL followed by the environmental domain (58.3%), then the physical domain (37%) and the social domain
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24 197 (33.2%).

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26 198 For older adults in the age category 60-65 years, environmental QoL has the highest influence (adjusted $r^2 = 0.488$) on their QoL at a
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28 199 significance of $p < .001$, followed by psychological quality of life with an adjusted $r^2 = 0.469$ and then physical QoL (adjusted $r^2 = 0.279$) and
29 200 lastly the social QoL (adjusted $r^2 = 0.210$). From Table 3, environmental QoL has a greater influence on the general QoL of older adults
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31 201 between 60-75 years and the psychological QoL has a greater influence on the QoL of participants ≥ 76 years. The QoL of participants with
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33 202 no formal education was likely to be influenced 45.7% by the environmental QoL (adjusted $r^2 = 0.457$) while those who attained education
34 203 above the high school had their QoL being impacted 54.4% by the psychological QoL (adjusted $r^2 = 0.544$). The environmental QoL had a
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36 204 33.9% influence on the QoL of participants living in slums in the Teshie community (adjusted $r^2 = 0.339$) while the QoL of participants in
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38 205 Ashaiman was influenced 72.3% by the psychological QoL (adjusted $r^2 = 0.723$). Results from other subgroup analyses on variance can be
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40 206 found in Table 3.

41 207 **DISCUSSION**

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3 208 This study aimed to assess the QoL of older adults living in two Ghanaian slums using the WHOQOL-BREF questionnaire. Results indicate
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5 209 that more attention is needed in the environmental QoL of the older adults in the Teshie slum and the psychological QoL of those in the
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7 210 Ashaiman slums. Overall, older adults living in slums have a poor to moderate QoL. A moderate QoL was also seen in the environmental
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9 211 QoL of the older adults in these slums. This is remarkable because, in slums, one would have expected a very poor environmental QoL due
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11 212 to confirmed [38-40] well-known characteristics of slums such as the lack of safety and security, poor quality of housing, overcrowding,
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13 213 and unavailability of health and /social care. An explanation of this finding could be that most older adults might have adapted to their
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15 214 environment and tried to make the best of what is at their disposal. Another explanation could be that slum amenities and living conditions
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17 215 are not much worse than the prior living arrangements (rural life) of these older adults.

18 216 In the current study, females constituted the majority (240) of the population, similar to the study by Akosile et al., [26]. This is expected as
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20 217 females are estimated to live longer than their male counterparts [41, 42] even in underdeveloped countries. Additionally, the ages of this
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22 218 study population ranged between 60-98 years with a mean age of 68.89. Similar to most studies carried out in Africa among older adults,
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24 219 the age of most participants was between 60-69 years [43]. This is indicative of an increasing life expectancy and the need to promote interest
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26 220 in older adults. Participants in this study mostly had no formal education and this also agrees with studies conducted in slums from various
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28 221 countries like; India [44], Iran [45], Bangladesh [46] and sub-Saharan Africa [43, 47-49].

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30 222 Low QoL scores were seen for all participants in the physical and psychological domains. This result is in agreement with a study by Alaazi,
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32 223 and colleagues [21] comparing slum and non-slum dwellers, where participants had low QoL mean scores in both psychological and physical
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34 224 health domains. Poor health conditions and increased dependency, as well as low self-esteem and frequency of negative feelings, as
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36 225 postulated by Pathak, Deshpande, & Manapurath [50] could account for the low scores. Although older adults may receive social support
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38 226 from their family members, older adults might feel more comfortable if this support is from their children. This may also account for low
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40 227 scores in the psychological QoL domain of those living with their extended family compared to high psychological scores of those living
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42 228 with their children.

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3 229 Males scored higher than females in all domains of the WHOQOL-BREF which is similar to Vietnamese findings by van Nguyen and
4 colleagues [51]. They suggested that similarities of their results to other studies could be that their research settings were comparable in
5 230 terms of cultural, economic and environmental characteristics. The psychological and environmental domains had statistically significant
6 differences for gender on QoL, where males showed higher QoL compared to females. In the psychological domain, males in the slum have
7 231 better self-esteem and often have positive feelings as they try to make ends meet in their current settlement. The gender differences could be
8 232 attributed to the roles males and females play in Ghanaian society. Anecdotal evidence suggests that males show dominance and supremacy
9 in Ghanaian culture. Additionally, most males in the slums first migrated from the village and brought their spouses to live with them after
10 233 they settled in the slums [52, 53]. In the environmental domain, males who often leave the slums to work are more financially sound and
11 have access to general information compared to females. Moreover, as the breadwinners' Ghanaian men usually put up the expression of "all
12 234 is well" even when it is not therefore do not easily admit failure compared to females. Moreover, when it comes to issues of safety and
13 money, females are often dependent on their husbands. For females, the lowest mean score was shown in the psychological health domain
14 235 (mean = 41.95), implying negative feelings, low self-esteem, low body image and appearance. Females living in slum communities might
15 feel they have not achieved much and feel demeaned because of the stigma of living in slums [54] and social upbringing [55]. This is
16 consistent with the findings of Alaazi, and colleagues [21].

17 237 The highest overall QoL score was found for the social relationship domain (mean= 57.77) an indication of relative satisfaction of both males
18 and females with personal relationships and support received. A reason for this could be that the extended family system in Ghana, is still
19 238 playing a big role in slum settings, and children offer support to their older family members. Children were the highest sources of income
20 for the older adults in this study. Nonetheless, older adults in this study who received pensions were most satisfied with their health. This
21 239 could be attributed to the ability of such individuals to access and afford healthcare when ill as their previous employers will usually, refund
22 240 hospital bills.

23 241 QoL of participants generally decreased with age similar to previous studies [8, 21, 26, 56-58]. This could be attributed to the gradual
24 242 degeneration and weakness of the human body as individuals age. Diagnosed osteoarthritis was the prevalent condition among the study
25 population. Considering the uneven walkways in the slums the degeneration of joint cartilage and the underlying bone causes pain especially
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3 252 in the hip, and knee older adults are more dependent on others. However similar to findings of Charles, & Kulander [59], participants between
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5 253 76-80 years had a better psychological QoL compared to those 66-70 years, implying they had better self-esteem, body image, spirituality,
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7 254 and the frequency of positive or negative feelings. Spirituality in the Ghanaian culture is very prevalent most especially among older adults
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9 255 as they draw closer to their Maker as they feel the end is nearby. This could account partly for this result as older adults at this stage feel they
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11 256 are ready to exit the world accepting their previous life, by which they may not have considerable doubts anymore [6,16, 21, 47, 48].

12 257 With the sociodemographic characteristics of the current study population, both the marital status and educational level of participants had
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14 258 a significant effect on the QoL of participants. Married participants had higher means in all domains compared to all the other categories
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16 259 especially the single participants. This confirms findings of studies by Lee, Xu, & Wu, [60] and Yaya, Idriss-Wheeler, Vezina, & Bishwajit,
17 260 [57]. Except for the physical health domain, higher educational levels could be equated to better QoL in the other domains similar to findings
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19 261 by Ejiakor, et.al., [61].

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21 262 Comparing the two slums, older adults in Ashaiman showed a better QoL in the perceived overall QoL and the psychological and
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23 263 environmental domains. This could be attributed to the proximity of Ashaiman to the industrial city and therefore inhabitants could more
24 264 easily get access to the resources the non-slum dwellers in the industrial city enjoy. Additionally, caregivers of these older adults engage
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26 265 more frequently in various economic activities compared to the restricted/narrower options (fishing, fish mongering and small-scale trading)
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28 266 of those in Teshie. However, there were no significant differences in the physical and social relationship domains between participants of
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30 267 both slums.

31 268 **STRENGTHS AND LIMITATIONS**

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33 269 A strength of this study is that it is the first study assessing the QoL of older adults in two different slum communities in Ghana.

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35 270 A 100% response rate and there was no data missing, which contributes to the methodological strength of this study. However, what could
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37 271 have biased our results is the fact that a convenient sampling technique was used to select participants, instead of a probability sampling
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39 272 method. The reason for this is the nature of the slum set-up and the frail population involved. It was not possible to obtain a sampling frame
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41 273 of the older adults living in the slums, and therefore, convenience sampling was used. This could influence the generalizability of our results.

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3 274 However, the results of our analyses, therefore, indicate associations and should be treated with caution. Nonetheless, when comparing the
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5 275 background characteristics with other studies focused on older adults in slum settings [21, 51], they seem rather comparable.
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7 276 Another limitation could be ascribed to the crowded nature of the slum setting: there was no privacy during data collection and other slum
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9 277 dwellers were often listening to the interviews. This could have influenced the answers given by participants. Lastly, even though the
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11 278 WHOQOL-BREF questionnaire is validated in various languages, this is not the case for the languages used in this study. We did perform a
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13 279 translation–back translation procedure, and the instrument was pre-tested in a neighbouring slum, we expect this did not influence our results
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15 280 to a large extent.
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17 281 **IMPLICATIONS FOR PRACTICE AND RESEARCH**

18 282 In all domains, females have a lower quality of life than males. Therefore, we advise governmental and non-governmental agencies to focus
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20 283 on helping women get better self-esteem and increase the frequency of positive feelings. An important method to achieve this is generally
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22 284 through education. Also, poor scores in physical QoL among study participants are observed. Further research is needed to assess which
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24 285 factors could contribute to the poor physical QoL in old people in slums. The findings from this study can assist in policy development to
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26 286 include strategies to further improve the QoL of older adults in slums.
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28 287 **CONCLUSION**

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30 288 The findings from this study show that older adults living in slums in Ghana had a moderate psychological, social, and environmental quality
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32 289 of life and a poor physical quality of life. Therefore, health policy development must consider the specific needs of older adults in slums and
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34 290 direct policies to meet these needs to further improve their overall QoL.

35 291 **List of Abbreviations**

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37 292 QoL: Quality of Life

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39 293 MDGs: Millennium Development Goals

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41 294 WHOQOL-BREF: World Health Organisation Quality of Life -brief version
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3 295 SPSS: Statistical Package for Social Sciences

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5 296 ANOVA: Analysis of variance analysis

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7 297 **Declarations:**

8 298 Ethics approval and consent to participate: Ethics approval was received from the Institutional review board of the 37 Military Hospital.

9
10 299 Participants also signed or thumb printed to show consent.

11
12 300 Consent for publication: Not applicable

13
14 301 Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author
15 302 on reasonable request.

16
17 303 Competing interests: Authors have no conflicts of interest.

18
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20 305 not-for-profit sectors.

21
22 306 Authors' contributions: PYAA, IHJE, CL and JMGAS conceptualized the study. PYAA collected data. PYAA, IHJE and AAA analysed the
23 307 data. All authors reviewed the literature and read through the final manuscript before submission.

24
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26 309 also goes to all participants in this study.

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TABLES

Table 1

Background characteristics of participants by residence

| Characteristics | Teshie | Ashaiman | Total n (%) |
|-----------------------------|-----------|-----------|-------------|
| Gender | | | |
| Male | 43(21.6) | 114(57.6) | 157(39.5) |
| Female | 156(78.4) | 84(42.4) | 240(60.5) |
| Age group (in years) | | | |
| 60-65 | 90(45.2) | 99(50.0) | 189(47.6) |
| 66-70 | 36(18.1) | 39(19.7) | 75(18.9) |
| 71-75 | 32(16.1) | 23(11.6) | 55(13.9) |
| 76-80 | 18(9.0) | 20(10.1) | 38(9.6) |
| >81 | 23(11.6) | 17(8.6) | 40(10.1) |
| Marital Status | | | |
| Single | 28(14.1) | 9(4.5) | 37(9.3) |
| Married | 41(20.6) | 85(42.9) | 126(31.7) |
| Divorced | 25(12.6) | 56(28.3) | 81(20.4) |
| Widowed | 105(52.7) | 48(24.3) | 153(38.5) |

| Education | | | |
|-------------------|----------|----------|-----------|
| No formal | 82(41.2) | 96(48.5) | 178(44.8) |
| Elementary | 38(19.1) | 56(28.3) | 94(23.7) |
| High School | 73(36.7) | 24(12.1) | 97(24.4) |
| Above High School | 6(3.0) | 22(11.1) | 28(7.1) |

Table 2**Participants Mean scores and Association of background characteristics with QoL scores**

| | General QoL | General Health | Psychological domain ** | Physical domain** | Social domain** | Environmental domain** |
|---------------------|----------------|-------------------|----------------------------|----------------------|--------------------|---------------------------|
| Total group (n=397) | 2.73 | 2.90 | 45.07 ^b | 43.25 ^a | 56.97 ^b | 51.63 ^b |
| Gender | | | | | | |
| Female | 2.53 | 2.78 | 41.95 ^a | 44.63 ^a | 56.44 ^b | 49.21 ^b |
| Male | 3.04 | 3.09 | 45.22 ^b | 45.75 ^b | 57.77 ^b | 55.30 ^b |
| Mean difference | .515 | .310 | 3.27 | 1.11 | 1.33 | 6.09 |
| p-value | .000* | .017* | .019* | .611 | .506 | .001* |
| Age group | | | | | | |
| 60-65 years | 2.08 | 2.98 | 45.44 | 49.14 | 57.11 | 54.41 |
| 66-70 years | 2.84 | 3.04 | 41.89 | 43.65 | 58.48 | 51.69 |
| 71-75 years | 2.80 | 2.95 | 40.31 | 42.49 | 57.47 | 49.75 |
| 76-80 years | 2.58 | 2.66 | 42.34 | 40.11 | 53.97 | 48.95 |
| >80 years | 2.25 | 2.45 | 40.30 | 36.89 | 55.60 | 43.26 |
| F | 2.139 | 1.966 | 2.600 | 4.180 | .397 | 4.111 |
| p-value | .075 | .099 | .036* | .003* | .811 | .003* |

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|---------------------------------|-------|-------|--------|-------|--------|--------|
| Marital status | | | | | | |
| Single | 2.43 | 2.54 | 35.97 | 37.46 | 48.41 | 46.89 |
| Married | 3.00 | 3.02 | 47.44 | 47.66 | 62.18 | 56.13 |
| Divorced | 2.95 | 2.95 | 44.52 | 46.05 | 49.57 | 52.34 |
| Widowed | 2.47 | 2.86 | 40.88 | 44.27 | 58.66 | 48.69 |
| F | 6.370 | 1.420 | 9.861 | 2.359 | 10.385 | 5.583 |
| p-value | .000* | .237 | .000* | .071 | .000* | .001* |
| Education | | | | | | |
| No formal education | 2.61 | 2.66 | 39.51 | 40.73 | 54.76 | 47.71 |
| Elementary school | 2.78 | 2.96 | 45.81 | 46.73 | 57.63 | 52.19 |
| High school | 2.72 | 3.14 | 45.02 | 50.23 | 58.60 | 54.41 |
| Above high school | 3.39 | 3.43 | 52.25 | 49.25 | 63.14 | 64.86 |
| F | 3.498 | 4.990 | 10.938 | 5.084 | 1.982 | 10.241 |
| p-value | .016* | .002* | .000* | .002* | .116 | .000* |
| Residence | | | | | | |
| Teshie slum | 2.29 | 2.87 | 41.28 | 45.99 | 58.19 | 47.59 |
| Ashaiman slum | 3.18 | 2.93 | 45.22 | 44.15 | 55.74 | 55.71 |
| Mean difference | -.885 | -.065 | -3.94 | 1.84 | 2.44 | -8.12 |
| p-value | .000* | .618 | .004* | .389 | .211 | .000* |
| Sources of Income | | | | | | |
| Pension | 3.04 | 3.33 | 44.96 | 50.96 | 56.52 | 53.56 |
| Fishing/Farming | 2.76 | 2.81 | 42.39 | 44.00 | 56.09 | 49.47 |
| Trading | 2.48 | 2.58 | 41.75 | 41.47 | 54.55 | 49.74 |
| Children | 2.86 | 3.06 | 44.88 | 44.79 | 58.49 | 53.22 |
| Friends | 2.65 | 3.24 | 41.97 | 49.92 | 59.27 | 52.62 |
| Family/Siblings | 2.90 | 3.05 | 46.35 | 50.70 | 59.10 | 55.45 |
| Other | 2.25 | 1.75 | 37.00 | 46.13 | 56.25 | 51.75 |
| F | 1.500 | 3.434 | 1.118 | 1.389 | .518 | .842 |
| p-value | .177 | .003* | .351 | .218 | .794 | .538 |
| Source of Social Support | | | | | | |
| Sibling | 2.72 | 2.88 | 44.06 | 43.62 | 53.35 | 52.93 |
| Daughter | 2.61 | 2.74 | 42.73 | 42.21 | 57.16 | 49.07 |
| Son | 2.84 | 3.07 | 42.52 | 48.87 | 58.03 | 54.09 |
| Grandchild | 2.66 | 2.68 | 41.86 | 44.61 | 55.18 | 50.64 |
| Other | 2.86 | 3.38 | 47.05 | 53.95 | 62.19 | 53.48 |
| F | .481 | 1.761 | .695 | 2.134 | 1.049 | 1.192 |
| p-value | .749 | .137 | .596 | .076 | .382 | .314 |
| Living Arrangements | | | | | | |
| Extended family | 3.10 | 3.10 | 45.15 | 46.28 | 56.92 | 54.59 |
| Family | 2.45 | 2.60 | 42.87 | 36.08 | 56.57 | 48.70 |
| Alone | 2.41 | 2.81 | 40.27 | 47.21 | 55.96 | 49.36 |

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| Children | 2.91 | 2.96 | 45.37 | 46.62 | 58.53 | 52.18 |
| Others | 2.50 | 2.70 | 45.10 | 37.80 | 62.40 | 54.33 |
| F | 7.080 | 1.72 | 2.747 | 3.275 | .396 | 2.067 |
| p-value | .000* | .144 | .028* | .012* | .811 | .084 |

**All raw scores are transformed to a 1-100 score, *Significant p-value ≤ 0.05 , ^a =poor QoL, ^b = moderate QoL

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Table 3

ANOVA for Regression analysis showing the influence of demographic characteristics and Participants QoL in the 4 domains of the WHOQOL-BREF

| | Psychological domain Mean | Physical domain Mean | Social domain Mean | Environmental domain Mean |
|----------------------------|------------------------------|---------------------------|---------------------------|------------------------------|
| Total group (n=397) | 45.07 | 43.25 | 56.97 | 51.63 |
| Gender | | | | |
| Female | 41.95 | 44.63 | 56.44 | 49.21 |
| <i>Difference in means</i> | $F(3,235)=36.118; p<.001$ | $F(3,235)=28.856; p<.001$ | $F(3,235)=12.619; p<.001$ | $F(3,235)=46.787; p<.001$ |
| <i>Adjusted R square</i> | .307 | .260 | .128 | .363 |
| Male | 45.22 | 45.75 | 57.77 | 55.30 |
| <i>Difference in means</i> | $F(3,153)=76.702; p<.001$ | $F(3,153)=31.965; p<.001$ | $F(3,153)=26.887; p<.001$ | $F(3,153)=73.828; p<.001$ |
| <i>Adjusted R square</i> | .593 | .373 | .345 | .583 |
| Age group | | | | |
| 60-65 years | 45.44 | 49.14 | 57.11 | 54.41 |
| <i>Difference in means</i> | $F(3,185)=56.458; p<.001$ | $F(3,185)=25.285; p<.001$ | $F(3,185)=17.656; p<.001$ | $F(3,185)=60.783; p<.001$ |
| <i>Adjusted R square</i> | .469 | .279 | .210 | .488 |
| 66-70 years | 41.89 | 43.65 | 58.48 | 51.69 |
| <i>Difference in means</i> | $F(3,71)=14.223; p<.001$ | $F(3,71)=12.154; p<.001$ | $F(3,71)=6.713; p<.001$ | $F(3,71)=16.331; p<.001$ |
| <i>Adjusted R square</i> | .349 | .311 | .188 | .383 |
| 71-75 years | 40.31 | 42.49 | 57.47 | 49.75 |
| <i>Difference in means</i> | $F(3,51)=12.850; p<.001$ | $F(3,51)=5.413; p=.003$ | $F(3,51)=2.143; p=.106$ | $F(3,51)=15.924; p<.001$ |
| <i>Adjusted R square</i> | .397 | .197 | .112 | .453 |
| 76-80 years | 42.34 | 40.11 | 53.97 | 48.95 |
| <i>Difference in means</i> | $F(3,34)=7.977; p<.001$ | $F(3,34)=2.285; p=.096$ | $F(3,34)=12.850; p=.002$ | $F(3,34)=6.299; p=.002$ |
| <i>Adjusted R square</i> | .361 | .094 | .288 | .300 |
| >80 years | 40.30 | 36.89 | 55.60 | 43.26 |
| <i>Difference in means</i> | $F(3,35)=13.315; p<.001$ | $F(3,35)=11.896; p<.001$ | $F(3,35)=7.288; p=.001$ | $F(3,35)=10.783; p<.001$ |
| <i>Adjusted R square</i> | .493 | .462 | .332 | .435 |
| Marital status | | | | |
| Single | 35.97 | 37.46 | 48.41 | 46.89 |
| <i>Difference in means</i> | $F(3,33)=13.087; p<.001$ | $F(3,33)=3.797; p=.019$ | $F(3,33)=1.971; p=.137$ | $F(3,33)=17.185; p<.001$ |
| <i>Adjusted R square</i> | .502 | .189 | .075 | .573 |
| Married | 47.44 | 47.66 | 62.18 | 56.13 |
| <i>Difference in means</i> | $F(3,122)=47.457; p<.001$ | $F(3,122)=18.805; p<.001$ | $F(3,122)=32.156; p<.001$ | $F(3,122)=49.001; p<.001$ |
| <i>Adjusted R square</i> | .527 | .299 | .428 | .538 |
| Divorced | 44.52 | 46.05 | 49.57 | 52.34 |
| <i>Difference in means</i> | $F(3,76)=30.952; p<.001$ | $F(3,76)=18.004; p<.001$ | $F(3,76)=9.245; p<.001$ | $F(3,76)=39.464; p<.001$ |

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|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|
| <i>Adjusted R square</i> | .532 | .392 | .238 | .593 |
| Widowed | 40.88 | 44.27 | 58.66 | 48.69 |
| <i>Difference in means</i> | $F(3,76)=18.283; p<.001$ | $F(3,149)=20.969; p<.001$ | $F(3,149)=8.231; p<.001$ | $F(3,149)=25.810; p<.001$ |
| <i>Adjusted R square</i> | .254 | .283 | .125 | .330 |
| Education | | | | |
| No formal education | 39.51 | 40.73 | 54.76 | 47.71 |
| <i>Difference in means</i> | $F(3,173)=36.902; p<.001$ | $F(3,173)=25.547; p<.001$ | $F(3,173)=16.669; p<.001$ | $F(3,173)=50.771; p<.001$ |
| <i>Adjusted R square</i> | .380 | .295 | .211 | .457 |
| Elementary school | 45.81 | 46.73 | 57.63 | 52.19 |
| <i>Difference in means</i> | $F(3,90)=32.867; p<.001$ | $F(3,90)=20.298; p<.001$ | $F(3,90)=11.102; p<.001$ | $F(3,90)=24.720; p<.001$ |
| <i>Adjusted R square</i> | .507 | .384 | .246 | .433 |
| High school | 45.02 | 50.23 | 58.60 | 54.41 |
| <i>Difference in means</i> | $F(3,93)=16.478; p<.001$ | $F(3,93)=10.946; p<.001$ | $F(3,93)=3.902; p=.011$ | $F(3,93)=21.926; p<.001$ |
| <i>Adjusted R square</i> | .326 | .237 | .083 | .396 |
| Above high school | 52.25 | 49.25 | 63.14 | 64.86 |
| <i>Difference in means</i> | $F(3,24)=11.757; p<.001$ | $F(3,24)=4.401; p=.013$ | $F(3,24)=7.112; p=.001$ | $F(3,24)=4.332; p=.014$ |
| <i>Adjusted R square</i> | .544 | .274 | .404 | .270 |
| Residence | | | | |
| Teshie slum | 41.28 | 45.99 | 58.19 | 47.59 |
| <i>Difference in means</i> | $F(3,195)=11.276; p<.001$ | $F(3,195)=28.819; p<.001$ | $F(3,195)=6.570; p<.001$ | $F(3,195)=34.111; p<.001$ |
| <i>Adjusted R square</i> | .135 | .297 | .078 | .339 |
| Ashaiman slum | 45.22 | 44.15 | 55.74 | 55.71 |
| <i>Difference in means</i> | $F(3,193)=171.779; p<.001$ | $F(3,193)=56.292; p<.001$ | $F(3,193)=47.252; p<.001$ | $F(3,193)=116.083; p<.001$ |
| <i>Adjusted R square</i> | .723 | .458 | .414 | .644 |

Table 1

| Characteristics | Frequency | % |
|---------------------------------|-----------|------|
| Current Illness | | |
| Body Pains | 76 | 19.2 |
| Diabetes | 19 | 4.8 |
| Difficulty Walking | 33 | 8.3 |
| High Blood Pressure | 68 | 17.1 |
| Joint Pains | 100 | 25.2 |
| Old Age | 26 | 6.5 |
| Poor Eyesight | 43 | 10.8 |
| Others | 32 | 8.1 |
| Sources of Income | | |
| Children | 125 | 31.5 |
| Farming | 38 | 9.6 |
| Fishing | 52 | 13.1 |
| Friends | 37 | 9.3 |
| Pension | 27 | 6.8 |
| Siblings | 19 | 4.7 |
| Trading | 91 | 22.9 |
| Others | 8 | 2.0 |
| Source of healthcare | | |
| Clinic | 63 | 15.9 |
| Drug Ped | 37 | 9.3 |
| Herbalist | 18 | 4.5 |
| Hospital | 121 | 30.5 |
| Pharmacy | 158 | 39.8 |
| Source of Social Support | | |
| Sibling | 69 | 17.4 |
| Daughter | 114 | 28.7 |
| Son | 67 | 16.9 |
| Grandchild | 44 | 11.1 |
| Other | 21 | 5.3 |

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

| | | Reporting Item | Page Number |
|---------------------------|---------------------|---|-------------|
| Title and abstract | | | |
| Title | #1a | Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| Abstract | #1b | Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| Introduction | | | |
| Background / rationale | #2 | Explain the scientific background and rationale for the investigation being reported | 3-4 |
| Objectives | #3 | State specific objectives, including any prespecified hypotheses | 4 |
| Methods | | | |
| Study design | #4 | Present key elements of study design early in the paper | 4 |
| Setting | #5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| Eligibility criteria | #6a | Give the eligibility criteria, and the sources and methods of | 5 |

| | | | |
|----|----------------|--|-----|
| 1 | | selection of participants. | |
| 2 | | | |
| 3 | | | |
| 4 | | #7 Clearly define all outcomes, exposures, predictors, potential | 5 |
| 5 | | confounders, and effect modifiers. Give diagnostic criteria, if | |
| 6 | | applicable | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | Data sources / | #8 For each variable of interest give sources of data and details of | N/A |
| 12 | measurement | methods of assessment (measurement). Describe | |
| 13 | | comparability of assessment methods if there is more than one | |
| 14 | | group. Give information separately for for exposed and | |
| 15 | | unexposed groups if applicable. | |
| 16 | | | |
| 17 | | | |
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| 20 | | | |
| 21 | | | |
| 22 | | | |
| 23 | Bias | #9 Describe any efforts to address potential sources of bias | 14 |
| 24 | | | |
| 25 | | | |
| 26 | Study size | #10 Explain how the study size was arrived at | 7 |
| 27 | | | |
| 28 | | | |
| 29 | Quantitative | #11 Explain how quantitative variables were handled in the | 8 |
| 30 | variables | analyses. If applicable, describe which groupings were chosen, | |
| 31 | | and why | |
| 32 | | | |
| 33 | | | |
| 34 | | | |
| 35 | | | |
| 36 | | | |
| 37 | Statistical | #12a Describe all statistical methods, including those used to control | 8 |
| 38 | methods | for confounding | |
| 39 | | | |
| 40 | | | |
| 41 | | | |
| 42 | Statistical | #12b Describe any methods used to examine subgroups and | 8 |
| 43 | methods | interactions | |
| 44 | | | |
| 45 | | | |
| 46 | | | |
| 47 | | | |
| 48 | Statistical | #12c Explain how missing data were addressed | 13 |
| 49 | methods | | |
| 50 | | | |
| 51 | | | |
| 52 | | | |
| 53 | Statistical | #12d If applicable, describe analytical methods taking account of | 7 |
| 54 | methods | sampling strategy | |
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| 1 | Statistical | #12e | Describe any sensitivity analyses | N/A |
| 2 | | | | |
| 3 | methods | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | Results | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | Participants | #13a | Report numbers of individuals at each stage of study—eg | 7-8 |
| 11 | | | numbers potentially eligible, examined for eligibility, confirmed | |
| 12 | | | eligible, included in the study, completing follow-up, and | |
| 13 | | | analysed. Give information separately for for exposed and | |
| 14 | | | unexposed groups if applicable. | |
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| 22 | Participants | #13b | Give reasons for non-participation at each stage | N/A |
| 23 | | | | |
| 24 | | | | |
| 25 | Participants | #13c | Consider use of a flow diagram | N/A |
| 26 | | | | |
| 27 | | | | |
| 28 | Descriptive data | #14a | Give characteristics of study participants (eg demographic, | 8 |
| 29 | | | clinical, social) and information on exposures and potential | |
| 30 | | | confounders. Give information separately for exposed and | |
| 31 | | | unexposed groups if applicable. | |
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| 38 | Descriptive data | #14b | Indicate number of participants with missing data for each | N/A |
| 39 | | | variable of interest | |
| 40 | | | | |
| 41 | | | | |
| 42 | | | | |
| 43 | Outcome data | #15 | Report numbers of outcome events or summary measures. | n/a |
| 44 | | | Give information separately for exposed and unexposed | |
| 45 | | | groups if applicable. | |
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| 50 | | | | |
| 51 | Main results | #16a | Give unadjusted estimates and, if applicable, confounder- | 23 |
| 52 | | | adjusted estimates and their precision (eg, 95% confidence | |
| 53 | | | interval). Make clear which confounders were adjusted for and | |
| 54 | | | why they were included | |
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| 1 | Main results | #16b | Report category boundaries when continuous variables were | 8 |
| 2 | | | categorized | |
| 3 | | | | |
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| 6 | Main results | #16c | If relevant, consider translating estimates of relative risk into | n/a |
| 7 | | | absolute risk for a meaningful time period | |
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| 12 | Other analyses | #17 | Report other analyses done—e.g., analyses of subgroups and | n/a |
| 13 | | | interactions, and sensitivity analyses | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | Discussion | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | Key results | #18 | Summarise key results with reference to study objectives | 13 |
| 21 | | | | |
| 22 | | | | |
| 23 | Limitations | #19 | Discuss limitations of the study, taking into account sources of | 13-14 |
| 24 | | | potential bias or imprecision. Discuss both direction and | |
| 25 | | | magnitude of any potential bias. | |
| 26 | | | | |
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| 31 | Interpretation | #20 | Give a cautious overall interpretation considering objectives, | 13 |
| 32 | | | limitations, multiplicity of analyses, results from similar studies, | |
| 33 | | | and other relevant evidence. | |
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| 39 | Generalisability | #21 | Discuss the generalisability (external validity) of the study | 14 |
| 40 | | | results | |
| 41 | | | | |
| 42 | | | | |
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| 44 | Other Information | | | |
| 45 | | | | |
| 46 | | | | |
| 47 | Funding | #22 | Give the source of funding and the role of the funders for the | n/a |
| 48 | | | present study and, if applicable, for the original study on which | |
| 49 | | | the present article is based | |
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3 CC-BY. This checklist was completed on 08. September 2021 using <https://www.goodreports.org/>, a
4
5 tool made by the [EQUATOR Network](#) in collaboration with [Penelope.ai](#)
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BMJ Open

QUALITY OF LIFE OF OLDER ADULTS AND ASSOCIATED FACTORS IN GHANAIAN URBAN SLUMS: A CROSS-SECTIONAL STUDY

| | |
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| Secondary Subject Heading: | Health policy, Public health |
| Keywords: | PUBLIC HEALTH, SOCIAL MEDICINE, GERIATRIC MEDICINE |
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3 1 **QUALITY OF LIFE OF OLDER ADULTS AND ASSOCIATED FACTORS IN GHANAIAN**
4 2 **URBAN SLUMS: A CROSS-SECTIONAL STUDY**

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38 17 Word count 3966 excluding abstract, references and tables
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25 ABSTRACT

26 **Objective** This study provides insight into the QoL of older adults living in urban slums in Ghana.

27 **Design** The study employed a community-based cross-sectional design study to assess QoL among older
28 adults in two slums between April and May 2020. QoL was assessed using the WHOQOL-BREF
29 questionnaire.

30 **Settings** Participants were drawn from two slums in Ghana, one in a fishing-dominated community and
31 the other in an industrial community.

32 **Participants** This study included 400 participants aged 60 and above who had lived in either slum for at
33 least one month and were able to communicate verbally.

34 **Results** Although the means of all participants' transformed scores were poor in the physical and
35 psychological domains, they were moderate in all other domains. When viewed as a whole, the perceived
36 overall QoL is neither poor nor good and participants are neither satisfied nor dissatisfied with their
37 health. Participants had a moderate level of QoL in the WHOQOL-BREF psychological (mean score
38 45.7), social (mean score 57.0) and environmental (mean score 51.6) domains. The mean score for
39 physical QoL of the older adults was 43.3 which denotes a poor QoL. In all domains, male participants
40 have a significantly higher mean QoL than their female counterparts. An ANOVA analysis comparing
41 the living arrangements of participants showed that those who lived with extended family had high mean
42 scores in the environmental QoL, overall QoL and satisfaction with health. Regression analysis revealed
43 that QoL was influenced mostly by the environmental (46.2%), followed by the psychological (43.7%),
44 physical (31%) and social domain (20.4%).

45 **Conclusions** The findings from this study show that older adults living in slums had moderate
46 psychological, social, and environmental QoL and a poor physical QoL. Although the mean scores for
47 QoL are higher than anticipated, health policy development must take into account the specific needs of
48 older adults.

49 **Keywords:** Quality of Life, Older adult, Slums, WHOQOL-BREF

50 Article Summary

51 Strengths and limitations of this study

- 52 • This is the first study assessing the QoL of older adults in two different slum communities in
53 Ghana.

- 1
2
3 54 • A 100% response rate and there was no data missing, which contributes to the methodological
4 55 strength of this study. The 100% response rate can be attributed to the fact that all participants
5 56 were approached personally and the presence of the first author and research assistants'
6 57 encouraged respondents.
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8
9
10 58 • The findings from this study can assist in policy development to include strategies to further
11 59 improve the QoL of older adults in slums.
12
13 60 • There was no privacy during data collection due to the crowded nature of the slum and this
14 61 could be a limitation as other slum dwellers were often listening to the interviews.
15
16 62 • Another limitation could be ascribed to the crowded nature of the slum setting: there was no
17 63 privacy during data collection and other slum dwellers were often listening to the interviews. This
18 64 could have influenced the answers given by participants.
19
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21

22 65 **Introduction**

23
24 66 The difference in life expectancy of people in developed countries and people living in African countries
25 67 is approximately ten years [1]. These differences are caused by a variety of factors, including
26 68 demographic differences, varying family and social structures, social security arrangements, health
27 69 infrastructure, and spiritual beliefs [2 - 4]. These factors impact how a person addresses health issues and
30 70 other aspects of their life. Life expectancy in Africa is rising, in line with global trends and despite
31 71 regional differences. However, an increased life expectancy does not always imply an improved quality
32 72 of life (QoL). Ageing often comes with problems affecting the quality of life, such as loneliness, ill health,
33 73 and depression [5, 6, 7]. As a result, as people in African societies are ageing, the QoL of older adults in
34 74 African countries is increasingly becoming an important issue [8,9].

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41 75 Quality of life is defined by the World Health Organization as “an individual's perception of their position
42 76 in life in the context of the culture and value systems in which they live and with their goals, expectations,
43 77 standards and concerns” [10]. Older adults are particularly vulnerable to poor QoL as a result of changes
44 78 and events in their physical health, psychological state, social circumstances and relationship to their
45 79 environment [8, 11, 12]. Ageing may decrease human vitality, which leads to frail health and
46 80 dependency. Moreover, frailty may express itself as cognitive impairment and neglect in the
47 81 psychological and social domains respectively. When this is combined with deplorable living conditions,
48 82 the quality of life of these older adults can be affected.
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83 Slums are a visible evidence of deplorable living conditions. Slums often lack basic amenities, are
84 overcrowded, and polluted [13,14]. In developing countries, mainly African countries, rural-urban
85 migration is one of the causes of slum communities [13-17]. Slum-dwelling older adults are predisposed
86 to non-communicable diseases as they age. They are also susceptible to different forms of communicable
87 diseases due to unsanitary conditions and lack of access to healthcare. [14, 15, 18, 19]. As a result, the
88 overall health status of older adults in slums has been reported to be lower than that of older adults living
89 in formal settlements [20-22].

90 Supporting older people in slums is an important objective of the WHO “Global strategy and action plan
91 on ageing and health 2016-2030” [23]. One of the targets of the Millennium Development Goals (MDG)
92 7, was to achieve a significant improvement in the lives of at least 100 million slum dwellers worldwide
93 by 2020. However, there have not been any marked improvements in Ghanaian slums as of yet [24, 25,].

94 Many studies have been conducted globally, on the QoL of older adults either in the community or in
95 care homes [26, 27], and also in those with different health conditions [28- 30]. However, there is a dearth
96 of research on the QoL of older adults living in slums in developing countries. It is hypothesized that
97 older adults living in slums generally have a poor QoL. To improve the lives of slum dwellers, it is
98 necessary to assess their QoL to determine which aspects require improvement. Therefore, this
99 exploratory study aims to provide insight into the QoL of slum-dwelling older adults using the
100 WHOQOL-BREF questionnaire to assess the QoL of older adults living in two Ghanaian slums.
101 Additionally, associated factors which influence their QoL were explored post-hoc.

102 **Methods**

103 **Study design and study population**

104 A community-based cross-sectional study was conducted between April and May 2020. The population
105 under consideration involved older adults living in two urban slums in the Greater Accra region of Ghana.
106 These slums are in the Ashaiman and Teshie communities. The two slums were adopted for this study
107 due to the comparable literacy rates, despite the prevailing disparities in the type of housing structures
108 and socio-economic activities.

109 Ashaiman is located close to an industrial city in Ghana and consists of people from different regions
110 and tribes in Ghana. Teshie is mainly a fishing community with a majority of the population being
111 indigenous.

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3 112 Participants were included if they were older adults aged 60years (retirement age) or older, who have
4 113 lived in the slums of Ashaiman or Teshie for at least one month and could communicate verbally.
5
6 114 Critically ill older adults and people with speech impairments who were not able to express themselves
7
8 115 verbally were excluded from the study.

10 116 **Study Instrument**

11
12 117 The primary outcome measure of this study is quality of life, assessed using the World Health
13
14 118 Organisation Quality of Life -brief version (WHOQOL-BREF) [31]. This instrument was chosen based
15
16 119 on the results of a scoping review of instruments assessing QoL in African countries [32]. Detailed
17
18 120 information on psychometric properties, related to the use for the slum population, is lacking from
19
20 121 previous studies, but the included domains, the feasibility and the length of the instrument, nevertheless,
21
22 122 convinced the authors to use the WHOQOL-BREF in this study.

23
24 123 The WHOQOL-BREF consists of four domains. The questions in each domain vary from 3 to 7. Every
25
26 124 question in each domain is rated on a 5-point Likert scale, where 1 represents 'very poor' and 5 represents
27
28 125 'very good'. The first domain is the 'Physical Health' domain. This includes seven (7) questions related
29
30 126 to sleep, energy, mobility, the extent to which pain prevents performance of necessary tasks, the need for
31
32 127 medical treatment to function in daily life, and level of satisfaction with their work capacity. The second
33
34 128 domain is the 'Psychological' domain with six (6) questions, focusing on the ability to concentrate, self-
35
36 129 esteem, body image, spirituality, and the frequency of positive or negative feelings. The third domain
37
38 130 covers 'Social relationships' and includes three (3) questions related to satisfaction with personal
39
40 131 relationships, social support systems and sexual satisfaction. The fourth is the 'Environmental' domain,
41
42 132 which comprises eight (8) questions related to safety and security, satisfaction with one's home and
43
44 133 physical environment satisfaction, finances, availability of health and /social care availability, access to
45
46 134 general information and leisure activities accessibility and satisfaction with transportation.

47
48 135 In addition to the 4 domains, the WHOQOL-BREF includes two general questions, one about the
49
50 136 respondents' QoL in general, and one related to their satisfaction with health. These questions also have
51
52 137 five response options varying from 1 'very poor' to 5 'very good' for rating the QoL and 'very
53
54 138 dissatisfied' (1) to 'very satisfied' (5) for rating the satisfaction with health. Besides using the
55
56 139 WHOQOL-BREF, demographic characteristics of subjects (gender, age, educational level, religion, and
57
58 140 marital status) were collected. In addition, data on access to health care, current health condition, health
59
60 141 services patronized, living arrangements, social support, and sources of income were gathered.

142 **Data collection**

143 The WHOQOL-BREF questionnaire was used to conduct face-to-face interviews during data collection,
144 given difficulties with reading (caused by both difficulties in reading and/or poor vision) in the population
145 under consideration. The interviews were done by the first author, PYAA and 4 research assistants'
146 undergraduates of the University of Ghana. The interviewers all have a background in nursing and were
147 trained before the commencement of data collection. During the training, they were introduced to the
148 WHOQOL-BREF and taken through the process of intended data collection. The interviewers needed to
149 be conversant with the questions in two local languages (Twi and Ga). During the face-to-face interviews
150 with subjects, interviewers read the questions out loud and filled in the responses of participants. The
151 original English version of the instrument was translated and administered to participants in the local
152 languages (Ga and Twi). Local language experts translated and back-translated the WHOQOL-BREF
153 questionnaire to be sure that the intended meaning of the original content was intact. Additionally, a
154 pretest of the questionnaire was carried out in a nearby slum and no changes were made afterwards. We
155 used the STROBE cross-sectional checklist when writing our report [33].

157 **Sampling method and sample size**

158 Recruitment took place by involving a key informant in each slum. This key informant was a person
159 working at the Municipal Assembly of the specific community and visiting the slums very often due to
160 the nature of their work. The key informant used a convenient sampling method to select participants
161 living in the slums. After selecting participants, the snowballing technique was used to increase the
162 participation rate. This technique is not new as previous QoL studies involving older adults also used
163 snowballing sampling techniques during sample recruitment [21, 34]. The key informant also
164 familiarized the research team with the slum community. Eligible participants were invited and the
165 research team provided study-specific information personally to the participant. The sample size was
166 calculated to get the number of participants that will be representative of the entire population of older
167 adults in the slums. The sample size is an estimate of how many participants will be needed as a
168 representation of the total sample population. The sample size calculation was done using the Yamane
169 formula [35]. The two slums under consideration consist of approximately 6,000 older inhabitants.
170 Filling in the formula gave an estimated sample size of 375 participants [35].

171 **Ethical Approval**

1
2
3 172 Ethical clearance (37MH-IRB IPN 199/2018) was obtained from the 37 Military Hospitals Institutional
4 173 Review Board. Permission to perform this study in Ashaiman and Teshie was provided by the Municipal
5
6 174 Assemblies of the selected slums. Written informed consent, either by signing or thumb-printing (in the
7
8 175 case of those who were unable to sign) was required for participation.
9

10 176 **Patient and Public Involvement**

11
12 177 Patients and the public were not involved in the development of the research questions, the design, and
13
14 178 the conduct of the study. However, participants were involved in the recruitment of others through the
15
16 179 snowball method. The study results will be shared with the participants and other relevant stakeholders
17
18 180 through various social media handles and conferences.
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20 181 21 22 182 **Data Analysis**

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25 183 The data were analysed using Statistical Package for Social Sciences (IBM SPSS) version 24.0. Domain
26
27 184 scores were scaled in a positive direction (i.e., higher scores denote higher QoL). The mean score of
28
29 185 items within each domain is used to calculate the domain score. An Excel sheet calculator created by
30
31 186 Skvarc [36] was used to transform the different WHOQOL-BREF domain scores to a 0-100-scale. Cut-
32
33 187 off points for QoL in this study were determined based on the literature by Silva and colleagues [37].
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35 188 According to Silva and colleagues [37], a score ≤ 45 is considered poor QoL, 46-64 is considered
36
37 189 moderate QoL and any score > 65 is recorded as a high QoL.

38
39 190 In further analyses, the demographic data served as independent variables and the domains of the
40
41 191 WHOQOL-BREF as dependent variables. Gender and place of residence were depicted as a binominal
42
43 192 variable where '1' is male/Teshie and '2' is female/Ashaiman respectively. All other demographic data
44
45 193 were categorical variables. Educational level was categorized into four groups: no formal education,
46
47 194 elementary school, high school, and above high school. Marital status comprised of single, married,
48
49 195 divorced, and widowed depicted with numbers. Age was grouped into five categories (60-65, 66-70, 71-
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51 196 75, 76-80, > 81) also depicted with numbers. Finally, the place of residence: Teshie or Ashaiman, was
52
53 197 documented.

54
55 198 Descriptive analyses were performed to describe the background characteristics, as well as the domain
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57 199 scores of the WHOQOL-BREF. To compare the mean distribution of participants' characteristics and
58
59 200 their QoL per domain, an independent *t*-test and analysis of variance (ANOVA) were used. Regression

201 analysis was done to assess the relationship between sociodemographic characteristics and the QoL
202 domains. Analyses of QoL scores in the four domains were performed after transformation to a 0-100%
203 scale. For the primary hypothesis in this study, the level of significance was set at $P < 0.05$. For all other
204 analyses, p-values are reported for generating hypotheses and high false positives were controlled for
205 using multiple comparison adjustments. Nonetheless results should be interpreted with caution.

206 Results

207 Background Characteristics of Participants

208 In total, 400 people were approached for this exploratory study and they all agreed to participate. This
209 means that a 100% response rate was achieved. Three subjects were excluded from the analysis as they
210 were below the age of 60 years, resulting in a total sample of 397 respondents.

211
212 In Appendix: Table 1 the background characteristics can be found. Of all participants who participated,
213 240 persons (60.5%) were female, and the largest age group was 60-65 years (47.6%). The majority of
214 the older adults in this population were widowed (38.5%), followed by participants being married
215 (31.7%). In total 44.8% of the participants had no formal education. When asked about their current
216 illnesses/diseases, 25.2% had osteoarthritis, followed by 19.2% with body pains, 17.1% had high blood
217 pressure. Participants were also asked about their source of income. Most participants (31.5%) received
218 their income from their children, 22.9% were into trading, 2.0% were either mechanics, electricians, or
219 welders. On the sources of healthcare utilized, most participants 39.8% patronized pharmacies, with
220 herbal preparations being the least accessed 4.5%. When asked about the living arrangements of
221 participants, 33.5% each, either lived alone or with extended family members. Those who lived with their
222 children were 17.1% of the total sample population while 2.5% lived with others, which include friends
223 and church members. Daughters were the biggest form of social support (28.7%), followed by siblings
224 of older adults (17.4%), and then sons, 16.9% (See Table 2 in Appendix).

225
226 The outcomes of the WHOQOL-BREF are described in Appendix: Table 3. When looking at the total
227 population, the perceived overall QoL is neither poor nor good, with participants neither satisfied nor
228 dissatisfied with their health. Transformed QoL scores were rated poor, moderate and high, based on the
229 literature by Silva and colleagues [37]. According to Silva and colleagues [37], the participants in these
230 slums recorded a moderate level of QoL in the psychological (mean, 45.7), social (mean, 57.0) and
231 environmental (mean, 51.6) domains of the WHOQOL-BREF. The physical QoL of the older adults in
232 these slums recorded a mean score of 43.3.

233 When looking at the differences between male and female participants, statistically significant
234 differences were found in general quality of life ($p<.001$), general satisfaction with health ($p=.017$), the
235 psychological domain ($p=.019$), and the environmental domain ($p=.001$). In all of these domains, male
236 participants showed a significantly higher quality of life compared to their female counterparts.

237 In the analysis of the various age groups, there were significant differences in the psychological ($p=.036$),
238 physical ($p=.003$) and environmental ($p=.003$) domains.

239
240 From Appendix: Table 3, it appears that as age increased, QoL decreased significantly in the physical
241 and environmental domains. Yet, in the psychological domain, those between 76-80 years had a better
242 psychological QoL compared to those 66-70 years.

243 For marital status, significant differences in the various domains were seen, in the perceived QoL
244 ($p<0.001$), psychological ($p<0.001$), social ($p<0.001$), and environmental ($p=0.001$) domains.
245 Participants who are married had the highest scores in these domains, followed by participants who are
246 divorced, widowed, and single.

247 In an examination of differences in QoL among the various educational levels, there were significant
248 differences in all domains, except for the social domain. In general, QoL was significantly higher among
249 participants with a higher educational status. Lastly, when looking at the difference in QoL between the
250 place of residence, older adults in the Ashaiman slum showed a statistically significant difference in
251 perceived QoL ($p<0.001$), psychological QoL ($p=0.004$) and environmental QoL ($p<0.001$).

252 In a one-way analysis of variance (ANOVA) of the mean differences in QoL of participants with different
253 sources of income, there was a statistical significance in the satisfaction with health domain only.
254 Participants who received pensions had higher means in most domains (overall QoL, satisfaction with
255 health, physical QoL) followed by participants who had financial support from family/siblings (higher
256 scores on the environmental and psychological domains). Participants who received financial support
257 from friends had the highest QoL score in the social QoL domain.

258 An ANOVA comparing mean QoL scores of participants, with different sources of social support showed
259 no statistical differences in scores between different sources of social support (See Table 2 in Appendix).

260 An ANOVA analysis comparing the living arrangements of participants showed that people who lived
261 with extended family had high environmental QoL scores, overall QoL scores and satisfaction with health
262 scores. Those who lived with their children had high psychological QoL scores.

263

264 An analysis of variance for regression analysis of QoL scores and the demographic characteristics was
265 done to show if certain domains are influencing QoL to a higher extent than other domains (see Appendix:
266 Table 4). Variances between the various domains showed that the environmental domain had the highest
267 influence of 46.2%, followed by the psychological domain (43.7%), the physical domain (31%) and the
268 social domain (20.4%). When looking at the variances between domains, calculated with the adjusted r
269 square, for females at a significance $p < .001$, the environmental domain had the greatest influence (36.3%
270 variance in QoL), followed by the psychological domain (30.8%), the physical domain (26.0%) and the
271 social domain (12.9% variance in QoL). Among males at a significance of $p < .001$, the psychological
272 domain has a 59.3% influence on total QoL followed by the environmental domain (58.3%), the physical
273 domain (37.3%) and the social domain (33.2%).

274 For older adults in the age category 60-65years, environmental QoL had the highest influence (adjusted
275 $r^2 = 0.488$) on their QoL at a significance of $p < .001$, followed by psychological quality of life with an
276 adjusted $r^2 = 0.469$ and then physical QoL (adjusted $r^2 = 0.279$) and lastly the social QoL (adjusted
277 $r^2 = 0.210$). Environmental QoL has a greater influence on the general QoL of older adults between 60-
278 75 years and the psychological QoL has a greater influence on the QoL of participants ≥ 76 years (See
279 Appendix: Table 4). The QoL of participants with no formal education was likely to be influenced 45.7%
280 by the environmental QoL (adjusted $r^2 = 0.457$), while those who attained education above the high school
281 had their QoL being impacted 54.4% by the psychological QoL (adjusted $r^2 = 0.544$). The environmental
282 QoL had a 33.9% influence on the QoL of participants living in slums in the Teshie community (adjusted
283 $r^2 = 0.339$), while the QoL of participants in Ashaiman was influenced 72.3% by the psychological QoL
284 (adjusted $r^2 = 0.723$). Results from other subgroup analyses on variance can be found in Appendix: Table
285 4.

287 DISCUSSION

288 This study aimed to assess the QoL of older adults living in two Ghanaian slums using the WHOQOL-
289 BREF questionnaire. It was hypothesized that older adults living in slums generally have a poor QoL.
290 Overall, there is an indication that older adults living in slums have a poor to moderate QoL indeed. As
291 previously indicated, this study is exploratory and additional hypotheses were generated post-hoc. The
292 first is that the physical QoL of older adults in slums is poor. Secondly, males have higher mean scores
293 on all domains than females. Thirdly, educational level and marital status influence the QoL of older
294 adults in most domains. Additionally, receiving financial support positively impacts QoL. Also, the
295 population recorded an average rating of neither poor nor good in the overall QoL question and neither

296 satisfied nor dissatisfied for the health satisfaction question. Finally, results from a comparison of the
297 two slums, underscore the need to pay particular attention to the environmental QoL of older adults in
298 the Teshie slum and the psychological QoL domain of those in the Ashaiman slums.

299 Overall, there is an indication that older adults living in slums have a moderate QoL in the environmental
300 QoL domain. The results underscore the need to pay particular attention to the environmental QoL of
301 older adults in the Teshie slum and the psychological QoL domain of those in the Ashaiman slums to
302 improve the QoL in total. Overall, there is an indication that older adults living in slums have a poor
303 physical QoL. Averagely, a moderate QoL level was observed in the environmental QoL domain of the
304 older adults in the slums. This is remarkable because, in slums, one would have expected a very poor
305 QoL in the environmental domain due to confirmed [38-40] well-known characteristics of slums such as
306 the lack of safety and security, poor quality of housing, overcrowding, and unavailability of health and
307 social care. An explanation of this finding could be that most older adults might have adapted to their
308 environment and tried to make the best of what is at their disposal. Another explanation could be that
309 slum amenities and living conditions are not much worse than the prior living arrangements (rural life)
310 of these older adults.

311 In the current study, females constituted the majority (61%) of the population, similar to the study by
312 Akosile et.al., [26]. This was expected as females are estimated to live longer than their male counterparts
313 [41,42] even in underdeveloped countries. Additionally, the ages of this study population ranged between
314 60-98 years with a mean age of 68.89. Similar to most studies carried out in Africa among older adults,
315 the age of most participants was between 60-69 years [43]. This is indicative of an increasing life
316 expectancy and the need to promote interest in older adults. Participants in this study mostly had no
317 formal education and this is consistent with studies conducted in slums from various countries like India
318 [44], Iran [45], Bangladesh [46] and sub-Saharan Africa [43,47 - 49 -].

319 Low QoL scores were observed for all participants in the physical and psychological domains. This result
320 affirms a study by Alaazi, and colleagues [21] comparing slum and non-slum dwellers, where participants
321 had low QoL mean scores in both psychological and physical health domains. Poor health conditions and
322 increased dependency, as well as low self-esteem and frequency of negative feelings, as postulated by
323 Pathak, Deshpande, and Manapurath [50] could account for the low scores. Although older adults may
324 receive social support from their family members, older adults might feel more comfortable if this support
325 is from their children. This may also account for low scores in the psychological QoL domain of those

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3 326 living with their extended family compared to high psychological scores of those living with their
4 327 children.

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6 328 Males recorded higher means than females in all domains of the WHOQOL-BREF. This is similar to
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8 329 findings by van Nguyen and colleagues [51], who suggested comparable cultural, economic and
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10 330 environmental contexts could yield a similar outcome. The psychological and environmental domains
11 331 had statistically significant differences for gender on QoL, where males showed higher QoL compared
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13 332 to females. In the psychological domain, males in the slum have better self-esteem and often have positive
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15 333 feelings as they try to make ends meet in their current settlement. The gender differences could be
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17 334 attributed to the roles males and females play in the Ghanaian society. Anecdotal evidence suggests that
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19 335 males show dominance and supremacy in Ghanaian culture. Additionally, most males in the slums first
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21 336 migrated from the village and brought their spouses to live with them after settling in the slums [52, 53].
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23 337 In the environmental domain, males who often leave the slums to work are more financially sound and
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25 338 have access to general information compared to females. Moreover, as breadwinners, Ghanaian men
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27 339 usually put up the expression of “all is well” even when it is not, and, therefore do not easily admit failure
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29 340 compared to females. In addition, when it comes to issues of safety and money, females are often
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31 341 dependent on their husbands. For females, the lowest mean score was shown in the psychological health
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33 342 domain (mean = 41.95), implying negative feelings, low self-esteem, low body image and appearance.
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35 343 Females living in slum communities might feel they have not achieved much and feel demeaned because
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37 344 of the stigma of living in slums [54] and societal upbringing [55]. This is consistent with the findings of
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39 345 Alaaazi, and colleagues [21].

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43 347 The highest overall QoL score was found for the social relationship domain (mean= 57.77), an indication
44
45 348 of relative satisfaction of both males and females with personal relationships and support received. This
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47 349 may be attributed to the potential role of the Ghanaian extended family system, in which children offer
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49 350 support to their older family members even in the slum. Children were the highest sources of income for
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51 351 the older adults in this study. Nonetheless, older adults in this study who received pensions were most
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53 352 satisfied with their health. This could be attributed to the ability of such individuals to access and afford
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55 353 healthcare when ill as their previous employers will usually, refund hospital bills.

56
57 354 QoL of participants generally decreased with age similar to previous studies [8, 21, 26, 56 - 58]. This
58
59 355 could be attributed to the gradual degeneration and weakness of the human body as individuals age.
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356 Medically diagnosed osteoarthritis was the prevalent condition among the study population. Considering
357 the uneven walkways in the slums, the degeneration of joint cartilage and the underlying bone causes

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3 358 pain especially in the hip, and knee making older adults more dependent on others. Participants between
4 359 76-80 years had a better psychological QoL compared to those 66-70 years, implying they had better
5 360 self-esteem, body image, spirituality, and the frequency of positive or negative feelings similar to a study
6 361 by Charles, & Kulandai [59]. Spirituality in the Ghanaian culture is very prevalent most especially among
7
8 362 older adults as they draw closer to their Maker. This could account partly for this result as older adults at
9 363 this stage feel they are ready to exit the world accepting their previous life, by which they may not have
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11 364 considerable doubts anymore [6, 16, 21, 47, 48].

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14 365 With the sociodemographic characteristics of the current study population, both the marital status and
15 366 educational level of participants had a significant effect on the QoL of participants. Married participants
16
17 367 had higher means in all domains compared to all the other categories, especially the single participants.
18 368 This confirms findings of studies by Lee, Xu, & Wu, [60] and Yaya, Idriss-Wheeler, Vezina, & Bishwajit,
19 369 [57]. Except for the physical health domain, higher educational levels could be equated to better QoL in
20
21 370 the other domains similar to findings by Ejiakor, et.al., [61].

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23
24 371 Comparing the two slums, older adults in Ashaiman showed a better QoL in the perceived overall QoL
25 372 and the psychological and environmental domains. This could be attributed to the proximity of Ashaiman
26 373 to the industrial city and therefore inhabitants could more easily get access to the resources the non-slum
27 374 dwellers in the industrial city enjoy. Additionally, caregivers of these older adults engage more
28 375 frequently in various economic activities compared to the restricted/narrower options (fishing, fish
29 376 mongering and small-scale trading) of those in Teshie. However, there were no significant differences in
30 377 the physical and social relationship domains between participants of both slums.

378 **STRENGTHS AND LIMITATIONS**

379 A strength of this study is that this is the first study assessing the QoL of older adults in two different
380 slum communities in Ghana.

381 A 100% response rate and there was no data missing, which contributes to the methodological strength
382 of this study. The 100% response rate can be attributed to the fact that all participants were approached
383 personally and the presence of the first author and research assistants' encouraged respondents.
384 Additionally, breakfast packages given to participants after completing the questionnaires could have
385 contributed to the 100% response rate. However, what could have biased our results is the fact that a
386 convenient sampling technique was used to select participants, instead of a probability sampling method.
387 The reason for this is the nature of the slum set-up and the frail population involved. It was not possible
388 to apply a probability sampling method among the older adults living in the slums, and therefore,

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3 389 convenience sampling was used. Additionally, when comparing the background characteristics with other
4 390 studies focused on older adults in slum settings [21, 51], they are comparable to our findings, which
5 391 makes it likely that our convenience sampling method did not affect the generalizability of our results.
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8 392 Another limitation could be ascribed to the crowded nature of the slum setting: there was no privacy
9 393 during data collection and other slum dwellers were often listening to the interviews. This could have
10 394 influenced the answers given by participants. Lastly, even though the WHOQOL-BREF questionnaire is
11 395 validated in various languages, this is not the case for the languages used in this study. We did perform
12 396 a translation–back translation procedure and the instrument was pre-tested in a neighbouring slum, we
13 397 therefore expect that this did not influence our results to a large extent.
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20 21 399 **IMPLICATIONS FOR PRACTICE AND RESEARCH**

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23 400 In all domains of the WHOQOL-BREF, females have a lower quality of life than males. Therefore, we
24 401 advise governmental and non-governmental agencies to focus on helping women in slums get better self-
25 402 esteem and increase the frequency of positive feelings. An important method to achieve this is generally
26 403 through education. Also, poor scores in physical QoL among study participants are observed. Further
27 404 research is needed to determine what could account for the moderate QoL recorded in this slum setting.
28 405 Additionally, assessing which factors could contribute to the poor physical QoL of old people in slums.
29 406 Policymakers on health are also encouraged to incorporate structures to assist community health workers
30 407 to strategize home visits to these older adults. Establishment of community facilities well equipped to
31 408 meet the QoL in totality. The findings from this study can assist in policy development to include
32 409 strategies to further improve the QoL of older adults in slums.
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41 410 **CONCLUSION**

42 411 The findings from this study show that older adults living in slums in Ghana had a moderate
43 412 psychological, social, and environmental quality of life and a poor physical quality of life. Therefore,
44 413 health policy development must consider the specific needs of older adults in slums and direct policies
45 414 to meet these needs to further improve their overall QoL.
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50 415 **List of Abbreviations**

51 416 QoL: Quality of Life

52 417 MDGs: Millennium Development Goals

53 418 WHOQOL-BREF: World Health Organisation Quality of Life -brief version
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3 419 SPSS: Statistical Package for Social Sciences

4 420 ANOVA: Analysis of variance analysis

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6 421 **Declarations:**

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8 422 Ethics approval and consent to participate: Ethics approval was received from the Institutional review
9 423 board of the 37 Military Hospital. Participants also signed or thumb printed to show consent.

10
11 424 Consent for publication: Not applicable

12
13 425 Availability of data and materials: The datasets used and/or analysed during the current study are
14 426 available from the corresponding author on reasonable request.

15
16 427 Competing interests: Authors have no conflicts of interest.

17
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21 430 Authors' contributions: PYAA, IHJE, CL and JMGAS conceptualized the study. PYAA collected data.
22 431 PYAA, IHJE and AAA analysed the data. All authors reviewed the literature and read through the final
23 432 manuscript before submission.

24
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26 434 spearheading the process.

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Appendix:Table 1: Background characteristics of participants by residence

| Characteristics | Teshie | Ashaiman | Total n (%) |
|-----------------------------|-----------|-----------|-------------|
| Gender | | | |
| Male | 43(21.6) | 114(57.6) | 157(39.5) |
| Female | 156(78.4) | 84(42.4) | 240(60.5) |
| Age group (in years) | | | |
| 60-65 | 90(45.2) | 99(50.0) | 189(47.6) |
| 66-70 | 36(18.1) | 39(19.7) | 75(18.9) |
| 71-75 | 32(16.1) | 23(11.6) | 55(13.9) |
| 76-80 | 18(9.0) | 20(10.1) | 38(9.6) |
| >81 | 23(11.6) | 17(8.6) | 40(10.1) |
| Marital Status | | | |
| Single | 28(14.1) | 9(4.5) | 37(9.3) |
| Married | 41(20.6) | 85(42.9) | 126(31.7) |
| Divorced | 25(12.6) | 56(28.3) | 81(20.4) |
| Widowed | 105(52.7) | 48(24.3) | 153(38.5) |
| Education | | | |
| No formal | 82(41.2) | 96(48.5) | 178(44.8) |
| Elementary | 38(19.1) | 56(28.3) | 94(23.7) |
| High School | 73(36.7) | 24(12.1) | 97(24.4) |
| Above High School | 6(3.0) | 22(11.1) | 28(7.1) |

Appendix: Table 2: Associated factors

| Characteristics | Frequency | % |
|---------------------------------|-----------|------|
| Current Illness | | |
| Body Pains | 76 | 19.2 |
| Diabetes | 19 | 4.8 |
| Difficulty Walking | 33 | 8.3 |
| High Blood Pressure | 68 | 17.1 |
| Joint Pains | 100 | 25.2 |
| Old Age | 26 | 6.5 |
| Poor EyeSight | 43 | 10.8 |
| Others | 32 | 8.1 |
| Sources of Income | | |
| Children | 125 | 31.5 |
| Farming | 38 | 9.6 |
| Fishing | 52 | 13.1 |
| Friends | 37 | 9.3 |
| Pension | 27 | 6.8 |
| Siblings | 19 | 4.7 |
| Trading | 91 | 22.9 |
| Others | 8 | 2.0 |
| Source of healthcare | | |
| Clinic | 63 | 15.9 |
| Drug Ped | 37 | 9.3 |
| Herbalist | 18 | 4.5 |
| Hospital | 121 | 30.5 |
| Pharmacy | 158 | 39.8 |
| Source of Social Support | | |
| Sibling | 69 | 17.4 |
| Daughter | 114 | 28.7 |
| Son | 67 | 16.9 |
| Grandchild | 44 | 11.1 |
| Other | 21 | 5.3 |

Appendix: Table 3: Participants Mean scores and Association of background characteristics with QoL scores

| | General QoL | General Health | Psychological domain ** | Physical domain** | Social domain** | Environmental domain** |
|-----------------------|----------------|-------------------|----------------------------|----------------------|--------------------|---------------------------|
| Total group (n=397) | 2.73 | 2.90 | 45.07 ^b | 43.25 ^a | 56.97 ^b | 51.63 ^b |
| Gender | | | | | | |
| Female | 2.53 | 2.78 | 41.95 ^a | 44.63 ^a | 56.44 ^b | 49.21 ^b |
| Male | 3.04 | 3.09 | 45.22 ^b | 45.75 ^b | 57.77 ^b | 55.30 ^b |
| Mean difference | .515 | .310 | 3.27 | 1.11 | 1.33 | 6.09 |
| p-value | .000* | .017* | .019* | .611 | .506 | .001* |
| Age group | | | | | | |
| 60-65 years | 2.08 | 2.98 | 45.44 | 49.14 | 57.11 | 54.41 |
| 66-70 years | 2.84 | 3.04 | 41.89 | 43.65 | 58.48 | 51.69 |
| 71-75 years | 2.80 | 2.95 | 40.31 | 42.49 | 57.47 | 49.75 |
| 76-80 years | 2.58 | 2.66 | 42.34 | 40.11 | 53.97 | 48.95 |
| >80 years | 2.25 | 2.45 | 40.30 | 36.89 | 55.60 | 43.26 |
| F | 2.139 | 1.966 | 2.600 | 4.180 | .397 | 4.111 |
| p-value | .075 | .099 | .036* | .003* | .811 | .003* |
| Marital status | | | | | | |
| Single | 2.43 | 2.54 | 35.97 | 37.46 | 48.41 | 46.89 |
| Married | 3.00 | 3.02 | 47.44 | 47.66 | 62.18 | 56.13 |
| Divorced | 2.95 | 2.95 | 44.52 | 46.05 | 49.57 | 52.34 |
| Widowed | 2.47 | 2.86 | 40.88 | 44.27 | 58.66 | 48.69 |
| F | 6.370 | 1.420 | 9.861 | 2.359 | 10.385 | 5.583 |
| p-value | .000* | .237 | .000* | .071 | .000* | .001* |
| Education | | | | | | |
| No formal education | 2.61 | 2.66 | 39.51 | 40.73 | 54.76 | 47.71 |
| Elementary school | 2.78 | 2.96 | 45.81 | 46.73 | 57.63 | 52.19 |
| High school | 2.72 | 3.14 | 45.02 | 50.23 | 58.60 | 54.41 |
| Above high school | 3.39 | 3.43 | 52.25 | 49.25 | 63.14 | 64.86 |
| F | 3.498 | 4.990 | 10.938 | 5.084 | 1.982 | 10.241 |
| p-value | .016* | .002* | .000* | .002* | .116 | .000* |
| Residence | | | | | | |
| Teshie slum | 2.29 | 2.87 | 41.28 | 45.99 | 58.19 | 47.59 |
| Ashaiman slum | 3.18 | 2.93 | 45.22 | 44.15 | 55.74 | 55.71 |
| Mean difference | -.885 | -.065 | -3.94 | 1.84 | 2.44 | -8.12 |

| | | | | | | |
|---------------------------------|-------|-------|-------|-------|-------|-------|
| p-value | .000* | .618 | .004* | .389 | .211 | .000* |
| Sources of Income | | | | | | |
| Pension | 3.04 | 3.33 | 44.96 | 50.96 | 56.52 | 53.56 |
| Fishing/Farming | 2.76 | 2.81 | 42.39 | 44.00 | 56.09 | 49.47 |
| Trading | 2.48 | 2.58 | 41.75 | 41.47 | 54.55 | 49.74 |
| Children | 2.86 | 3.06 | 44.88 | 44.79 | 58.49 | 53.22 |
| Friends | 2.65 | 3.24 | 41.97 | 49.92 | 59.27 | 52.62 |
| Family/Siblings | 2.90 | 3.05 | 46.35 | 50.70 | 59.10 | 55.45 |
| Other | 2.25 | 1.75 | 37.00 | 46.13 | 56.25 | 51.75 |
| F | 1.500 | 3.434 | 1.118 | 1.389 | .518 | .842 |
| p-value | .177 | .003* | .351 | .218 | .794 | .538 |
| Source of Social Support | | | | | | |
| Sibling | 2.72 | 2.88 | 44.06 | 43.62 | 53.35 | 52.93 |
| Daughter | 2.61 | 2.74 | 42.73 | 42.21 | 57.16 | 49.07 |
| Son | 2.84 | 3.07 | 42.52 | 48.87 | 58.03 | 54.09 |
| Grandchild | 2.66 | 2.68 | 41.86 | 44.61 | 55.18 | 50.64 |
| Other | 2.86 | 3.38 | 47.05 | 53.95 | 62.19 | 53.48 |
| F | .481 | 1.761 | .695 | 2.134 | 1.049 | 1.192 |
| p-value | .749 | .137 | .596 | .076 | .382 | .314 |
| Living Arrangements | | | | | | |
| Extended family | 3.10 | 3.10 | 45.15 | 46.28 | 56.92 | 54.59 |
| Family | 2.45 | 2.60 | 42.87 | 36.08 | 56.57 | 48.70 |
| Alone | 2.41 | 2.81 | 40.27 | 47.21 | 55.96 | 49.36 |
| Children | 2.91 | 2.96 | 45.37 | 46.62 | 58.53 | 52.18 |
| Others | 2.50 | 2.70 | 45.10 | 37.80 | 62.40 | 54.33 |
| F | 7.080 | 1.72 | 2.747 | 3.275 | .396 | 2.067 |
| p-value | .000* | .144 | .028* | .012* | .811 | .084 |

**All raw scores are transformed to a 1-100 score, *Significant p-value ≤ 0.05 , ^a = poor QoL, ^b = moderate QoL

Appendix: Table 4: ANOVA for Regression analysis showing the influence of demographic characteristics and Participants QoL in the 4 domains of the WHOQOL-BREF

| | Psychological domain Mean | Physical domain Mean | Social domain Mean | Environment Mean |
|----------------------------|------------------------------|---------------------------|---------------------------|---------------------|
| Total group (n=397) | 45.07 | 43.25 | 56.97 | 51.63 |
| Gender | | | | |
| Female | 41.95 | 44.63 | 56.44 | 49.21 |
| <i>Difference in means</i> | $F(3,235)=36.118; p<.001$ | $F(3,235)=28.856; p<.001$ | $F(3,235)=12.619; p<.001$ | $F(3,235)=14.6$ |
| <i>Adjusted R square</i> | .307 | .260 | .128 | .363 |
| Male | 45.22 | 45.75 | 57.77 | 55.30 |
| <i>Difference in means</i> | $F(3,153)=76.702; p<.001$ | $F(3,153)=31.965; p<.001$ | $F(3,153)=26.887; p<.001$ | $F(3,153)=27.3$ |
| <i>Adjusted R square</i> | .593 | .373 | .345 | .583 |
| Age group | | | | |
| 60-65 years | 45.44 | 49.14 | 57.11 | 54.41 |
| <i>Difference in means</i> | $F(3,185)=56.458; p<.001$ | $F(3,185)=25.285; p<.001$ | $F(3,185)=17.656; p<.001$ | $F(3,185)=16.0$ |
| <i>Adjusted R square</i> | .469 | .279 | .210 | .488 |
| 66-70 years | 41.89 | 43.65 | 58.48 | 51.69 |
| <i>Difference in means</i> | $F(3,71)=14.223; p<.001$ | $F(3,71)=12.154; p<.001$ | $F(3,71)=6.713; p<.001$ | $F(3,71)=7.6.3$ |
| <i>Adjusted R square</i> | .349 | .311 | .188 | .383 |
| 71-75 years | 40.31 | 42.49 | 57.47 | 49.75 |
| <i>Difference in means</i> | $F(3,51)=12.850; p<.001$ | $F(3,51)=5.413; p=.003$ | $F(3,51)=2.143; p=.106$ | $F(3,51)=5.9$ |
| <i>Adjusted R square</i> | .397 | .197 | .112 | .453 |
| 76-80 years | 42.34 | 40.11 | 53.97 | 48.95 |
| <i>Difference in means</i> | $F(3,34)=7.977; p<.001$ | $F(3,34)=2.285; p=.096$ | $F(3,34)=12.850; p=.002$ | $F(3,34)=6.29$ |
| <i>Adjusted R square</i> | .361 | .094 | .288 | .300 |
| >80 years | 40.30 | 36.89 | 55.60 | 43.26 |
| <i>Difference in means</i> | $F(3,35)=13.315; p<.001$ | $F(3,35)=11.896; p<.001$ | $F(3,35)=7.288; p=.001$ | $F(3,35)=10.7$ |
| <i>Adjusted R square</i> | .493 | .462 | .332 | .435 |
| Marital status | | | | |
| Single | 35.97 | 37.46 | 48.41 | 46.89 |
| <i>Difference in means</i> | $F(3,33)=13.087; p<.001$ | $F(3,33)=3.797; p=.019$ | $F(3,33)=1.971; p=.137$ | $F(3,33)=7.1$ |
| <i>Adjusted R square</i> | .502 | .189 | .075 | .573 |
| Married | 47.44 | 47.66 | 62.18 | 56.13 |
| <i>Difference in means</i> | $F(3,122)=47.457; p<.001$ | $F(3,122)=18.805; p<.001$ | $F(3,122)=32.156; p<.001$ | $F(3,122)=49.$ |
| <i>Adjusted R square</i> | .527 | .299 | .428 | .538 |
| Divorced | 44.52 | 46.05 | 49.57 | 52.34 |
| <i>Difference in means</i> | $F(3,76)=30.952; p<.001$ | $F(3,76)=18.004; p<.001$ | $F(3,76)=9.245; p<.001$ | $F(3,76)=9.4$ |
| <i>Adjusted R square</i> | .532 | .392 | .238 | .593 |
| Widowed | 40.88 | 44.27 | 58.66 | 48.69 |
| <i>Difference in means</i> | $F(3,76)=18.283; p<.001$ | $F(3,149)=20.969; p<.001$ | $F(3,149)=8.231; p<.001$ | $F(3,149)=25.$ |
| <i>Adjusted R square</i> | .254 | .283 | .125 | .330 |
| Education | | | | |
| No formal education | 39.51 | 40.73 | 54.76 | 47.71 |
| <i>Difference in means</i> | $F(3,173)=36.902; p<.001$ | $F(3,173)=25.547; p<.001$ | $F(3,173)=16.669; p<.001$ | $F(3,173)=50.$ |
| <i>Adjusted R square</i> | .380 | .295 | .211 | .457 |
| Elementary school | 45.81 | 46.73 | 57.63 | 52.19 |
| <i>Difference in means</i> | $F(3,90)=32.867; p<.001$ | $F(3,90)=20.298; p<.001$ | $F(3,90)=11.102; p<.001$ | $F(3,90)=14.7$ |
| <i>Adjusted R square</i> | .507 | .384 | .246 | .433 |
| High school | 45.02 | 50.23 | 58.60 | 54.41 |
| <i>Difference in means</i> | $F(3,93)=16.478; p<.001$ | $F(3,93)=10.946; p<.001$ | $F(3,93)=3.902; p=.011$ | $F(3,93)=11.9$ |
| <i>Adjusted R square</i> | .326 | .237 | .083 | .396 |

| | | | | |
|----------------------------|----------------------------|---------------------------|---------------------------|------------------|
| Above high school | 52.25 | 49.25 | 63.14 | 64.86 |
| <i>Difference in means</i> | $F(3,24)=11.757; p<.001$ | $F(3,24)=4.401; p=.013$ | $F(3,24)=7.112; p=.001$ | $F(3,24)=11.33$ |
| <i>Adjusted R square</i> | .544 | .274 | .404 | .270 |
| Residence | | | | |
| Teshie slum | 41.28 | 45.99 | 58.19 | 47.59 |
| <i>Difference in means</i> | $F(3,195)=11.276; p<.001$ | $F(3,195)=28.819; p<.001$ | $F(3,195)=6.570; p<.001$ | $F(3,195)=5.34$ |
| <i>Adjusted R square</i> | .135 | .297 | .078 | .339 |
| Ashaiman slum | 45.22 | 44.15 | 55.74 | 55.71 |
| <i>Difference in means</i> | $F(3,193)=171.779; p<.001$ | $F(3,193)=56.292; p<.001$ | $F(3,193)=47.252; p<.001$ | $F(3,193)=11.11$ |
| <i>Adjusted R square</i> | .723 | .458 | .414 | .644 |

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Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

| | | Reporting Item | Page Number |
|---------------------------|---------------------|---|-------------|
| Title and abstract | | | |
| Title | #1a | Indicate the study's design with a commonly used term in the title or the abstract | 1 |
| Abstract | #1b | Provide in the abstract an informative and balanced summary of what was done and what was found | 2 |
| Introduction | | | |
| Background / rationale | #2 | Explain the scientific background and rationale for the investigation being reported | 3-4 |
| Objectives | #3 | State specific objectives, including any prespecified hypotheses | 4 |
| Methods | | | |
| Study design | #4 | Present key elements of study design early in the paper | 4 |
| Setting | #5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| Eligibility criteria | #6a | Give the eligibility criteria, and the sources and methods of | 5 |

| | | | |
|----|--------------------|--|-----|
| 1 | | selection of participants. | |
| 2 | | | |
| 3 | | | |
| 4 | #7 | Clearly define all outcomes, exposures, predictors, potential | 5 |
| 5 | | confounders, and effect modifiers. Give diagnostic criteria, if | |
| 6 | | applicable | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | Data sources / | #8 For each variable of interest give sources of data and details of | N/A |
| 12 | measurement | methods of assessment (measurement). Describe | |
| 13 | | comparability of assessment methods if there is more than one | |
| 14 | | group. Give information separately for for exposed and | |
| 15 | | unexposed groups if applicable. | |
| 16 | | | |
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| 23 | Bias | #9 Describe any efforts to address potential sources of bias | 14 |
| 24 | | | |
| 25 | | | |
| 26 | Study size | #10 Explain how the study size was arrived at | 7 |
| 27 | | | |
| 28 | | | |
| 29 | Quantitative | #11 Explain how quantitative variables were handled in the | 8 |
| 30 | variables | analyses. If applicable, describe which groupings were chosen, | |
| 31 | | and why | |
| 32 | | | |
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| 34 | | | |
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| 36 | | | |
| 37 | Statistical | #12a Describe all statistical methods, including those used to control | 8 |
| 38 | methods | for confounding | |
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| 40 | | | |
| 41 | | | |
| 42 | Statistical | #12b Describe any methods used to examine subgroups and | 8 |
| 43 | methods | interactions | |
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| 47 | | | |
| 48 | Statistical | #12c Explain how missing data were addressed | 13 |
| 49 | methods | | |
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| 53 | Statistical | #12d If applicable, describe analytical methods taking account of | 7 |
| 54 | methods | sampling strategy | |
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| 1 | Statistical | #12e | Describe any sensitivity analyses | N/A |
| 2 | | | | |
| 3 | methods | | | |
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| 5 | | | | |
| 6 | Results | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | Participants | #13a | Report numbers of individuals at each stage of study—eg | 7-8 |
| 11 | | | numbers potentially eligible, examined for eligibility, confirmed | |
| 12 | | | eligible, included in the study, completing follow-up, and | |
| 13 | | | analysed. Give information separately for for exposed and | |
| 14 | | | unexposed groups if applicable. | |
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| 22 | Participants | #13b | Give reasons for non-participation at each stage | N/A |
| 23 | | | | |
| 24 | | | | |
| 25 | Participants | #13c | Consider use of a flow diagram | N/A |
| 26 | | | | |
| 27 | | | | |
| 28 | Descriptive data | #14a | Give characteristics of study participants (eg demographic, | 8 |
| 29 | | | clinical, social) and information on exposures and potential | |
| 30 | | | confounders. Give information separately for exposed and | |
| 31 | | | unexposed groups if applicable. | |
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| 38 | Descriptive data | #14b | Indicate number of participants with missing data for each | N/A |
| 39 | | | variable of interest | |
| 40 | | | | |
| 41 | | | | |
| 42 | | | | |
| 43 | Outcome data | #15 | Report numbers of outcome events or summary measures. | n/a |
| 44 | | | Give information separately for exposed and unexposed | |
| 45 | | | groups if applicable. | |
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| 51 | Main results | #16a | Give unadjusted estimates and, if applicable, confounder- | 23 |
| 52 | | | adjusted estimates and their precision (eg, 95% confidence | |
| 53 | | | interval). Make clear which confounders were adjusted for and | |
| 54 | | | why they were included | |
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| 1 | Main results | #16b | Report category boundaries when continuous variables were | 8 |
| 2 | | | | |
| 3 | | | | |
| 4 | | | categorized | |
| 5 | | | | |
| 6 | Main results | #16c | If relevant, consider translating estimates of relative risk into | n/a |
| 7 | | | | |
| 8 | | | absolute risk for a meaningful time period | |
| 9 | | | | |
| 10 | Other analyses | #17 | Report other analyses done—e.g., analyses of subgroups and | n/a |
| 11 | | | | |
| 12 | | | interactions, and sensitivity analyses | |
| 13 | | | | |
| 14 | Discussion | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | Key results | #18 | Summarise key results with reference to study objectives | 13 |
| 18 | | | | |
| 19 | Limitations | #19 | Discuss limitations of the study, taking into account sources of | 13-14 |
| 20 | | | | |
| 21 | | | potential bias or imprecision. Discuss both direction and | |
| 22 | | | magnitude of any potential bias. | |
| 23 | | | | |
| 24 | Interpretation | #20 | Give a cautious overall interpretation considering objectives, | 13 |
| 25 | | | | |
| 26 | | | limitations, multiplicity of analyses, results from similar studies, | |
| 27 | | | and other relevant evidence. | |
| 28 | Generalisability | #21 | Discuss the generalisability (external validity) of the study | 14 |
| 29 | | | | |
| 30 | | | results | |
| 31 | Other Information | | | |
| 32 | | | | |
| 33 | | | | |
| 34 | Funding | #22 | Give the source of funding and the role of the funders for the | n/a |
| 35 | | | | |
| 36 | | | present study and, if applicable, for the original study on which | |
| 37 | | | the present article is based | |
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2
3 CC-BY. This checklist was completed on 08. September 2021 using <https://www.goodreports.org/>, a
4
5 tool made by the [EQUATOR Network](#) in collaboration with [Penelope.ai](#)
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