

Evaluation of the Psychometric Properties of the Swiss French Version of Older People's Quality Of Life Questionnaire (OPQOL-35-SF)

Sophie Carrard (✉ sophie.carrard@hevs.ch)

HES-SO Valais-Wallis Haute Ecole de Sante <https://orcid.org/0000-0002-3147-5848>

Claudia Mooser

Institut Notre-Dame de Lourdes

Roger Hilfiker

HES-SO Valais-Wallis Haute Ecole de Sante

Anne-Gabrielle Mittaz Hager

HES-SO Valais-Wallis Haute Ecole de Sante

Research

Keywords: older people, quality of life, questionnaire, psychometric properties

Posted Date: November 9th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1030056/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published at Health and Quality of Life Outcomes on March 9th, 2022. See the published version at <https://doi.org/10.1186/s12955-022-01950-w>.

1 Title page

2

3 Evaluation of the psychometric properties of the Swiss French version of Older People's

4 Quality Of Life questionnaire (OPQOL-35-SF)

5

6

7 Sophie Carrard, HES-SO Valais-Wallis, School of Health Sciences, Physiotherapy,

8 Rathausstrasse 25, 3954 Leukerbad (VS-Switzerland), sophie.carrard@hevs.ch

9

10 Claudia Mooser, Institut Notre-Dame de Lourdes, 3960 Sierre, (VS-Switzerland),

11 claudia.mooser@hotmail.ch

12

13 Hilfiker Roger, HES-SO Valais-Wallis, School of Health Sciences, Physiotherapy,

14 Rathausstrasse 25, 3954 Leukerbad (VS-Switzerland), roger.hilfiker@hevs.ch

15

16 Anne-Gabrielle Mittaz Hager, Caphri-Care and Public Health Research Institute and HES-SO

17 Valais-Wallis, School of Health Sciences, Physiotherapy, Rathausstrasse 25, 3954 Leukerbad

18 (VS-Switzerland), gaby.mittaz@hevs.ch

19

20 Corresponding Author:

21 Sophie Carrard, HES-SO Valais-Wallis, School of Health Sciences, Physiotherapy,

22 Rathausstrasse 25, 3954 Leukerbad (VS-Switzerland), sophie.carrard@hevs.ch

23

1 Abstract (max 350 words)

2

3 Background: The proportion of older people aged more than 65 years old is continuously
4 increasing in the world population. The quality of life is an important factor in their
5 biopsychosocial handling. The questionnaire “Older People’s Quality of Life-35” (OPQOL-35)
6 has been specially developed for the assessment of the senior’s quality of life. The aim of this
7 study is to translate and evaluate the psychometric properties of the transcultural Swiss
8 French version of the OPQOL-35 questionnaire (OPQOL-35-SF).

9

10 Method: Forward-backward procedure was applied to translate the original questionnaire
11 from English into Swiss French. Then, a sample of older people completed the questionnaire.
12 The construct validity was evaluated by comparing the results of the OPQOL-35-SF with the
13 scores of three other questionnaires (WHOQOL-OLD, CASP-12 and EQ-5D-5L) and two visual
14 analogue scales (health and quality of life). The questionnaire’s structure has been assessed
15 through exploratory and confirmatory factor analysis. The OPQOL-35-SF questionnaire was
16 submitted a second time after 7 to 23 days to evaluate the reliability.

17

18 Results: 264 older people completed all the questionnaires once and 262 the OPQOL-35-SF a
19 second time. The mean age of participants was 76.8 (SD = 7.1). Most of them were women
20 (73,9%). KMO is of 0.86 and the Bartlett’s test of sphericity is significant ($p < 0.001$). The result
21 of EFA shows 8 factors with eigenvalues greater than one, which explained 58% of the
22 observed variance. All the items have a significant impact (< 0.30) in at least one factor. The
23 convergent validity presents low to moderate correlations (ρ : 0.384-0.663). Internal

24 consistency is good with a Cronbach's alpha at 0.875 for test and at 0.902 for retest. Test-
25 retest reliability presents an ICC_{2,1} at 0.83 (IC 0.78 to 0.87).

26

27 Conclusion: The Swiss French version of the questionnaire OPQOL-35 shows psychometric
28 properties which permit its use in the clinical practice or for research purposes. A
29 supplementary sample would be necessary for a better repartition of the items in the different
30 factors.

31

32 Keyword: older people, quality of life, questionnaire, psychometric properties

1 Background

2

3 As the world population is ageing faster than in the past, the World Health Assembly endorsed,
4 in August 2020, the “Decade of healthy ageing” (2020-2030). This acceleration in ageing will
5 have an impact on almost all aspects of the society.(1) Between 2015 and 2050, the proportion
6 of the world’s population over 60 years is expected to nearly double from 12% to 22%.(2) In
7 the European Union, people over 60 represented around 15% in 2014 and could reach 30% by
8 2050.(3)

9

10 Ageing is associated with the decline of health (4) and often related to multiple chronic and
11 acute diseases.(5) This overloads the health care system, both in hospitals and in community
12 care. (6) Due to the ever-increasing costs of health care, older people leave the hospital earlier
13 than before.(7) Therefore home-based cares are increasingly required to provide assistance
14 for daily tasks and enable older adults to age at home.(8, 9) In 2018, 1,5% of Swiss people aged
15 between 65 and 79 years were living in a health care institution and there were 15,3% of the
16 over 80.(10) In the future, most of the older people, healthy or not, will live at home as long
17 as possible. In addition to their care role, one goal for caregivers is to enhance quality of life
18 (QoL).(11) Maintaining QoL is one of the most important outcomes of care services for older
19 adults.(8) Measuring QoL could help to predict adverse health outcome, such as death and
20 nursing home placement in older people, even after adjustment for frailty.(12) However, it is
21 not evident how QoL should be defined and how it should be assessed in older people still
22 living at home.

23

24 Quality of life can inherently be defined as *“a dynamic, multi-level and complex concepts,*
25 *reflecting objective, subjective, macro-societal, and micro-individual, positive and negative*
26 *influences which interact together”*.(13) Quality of life is also a network of objectives and
27 subjective factors, that includes relationships between psychological and social indicators,
28 objectives living conditions and the subjective well-being.(14) In their recent thematic
29 synthesis, Van Leeuwen et al. categorized and described the QoL aspects into nine domains
30 and thirty-eight subthemes.(8)

31

32 There is a multitude of questionnaires permitting the evaluation of quality of life. Some of
33 them have been developed specifically for older adults.(15) The most used questionnaires in
34 this field differ in the number of dimensions analyzed as well as in the number of items. The
35 questionnaire WHOQOL-OLD contains 24 items distributed in six dimensions.(16) The CASP
36 questionnaires evaluate four dimensions (Control, Autonomy, Self-realization and Pleasure)
37 standing for the acronym. It exists with 19 (CASP-19) (17) or 12 (CASP-12) items.(18) The
38 WHOQOL-AGE, two dimensions and 30 items (19), was constructed with five items of
39 WHOQOL-OLD and the eight items from the EUROHIS-QOL.(20) The OPQOL-35 questionnaire
40 (21) is composed of 35 items in eight dimensions. It exists in a brief version of it with 13
41 items.(22)

42

43 Most of these questionnaires have been conceptualized and validated in English. Some of
44 them have been translated into different languages. To our knowledge, the OPQOL-35 has
45 been translated and validated to be used in Iran (23), Czech Republic (24), China (25) and
46 Uganda (26). It was also used in several studies in Albania (27), India (28), Sri Lanka (29),
47 Pakistan (30), Malesia (31) and Indonesia (32). Some countries, such as Turkey (33), Iran (34)

48 and Norway (35), translated and used the OPQOL-brief with thirteen items. Although French
49 is spoken by about 300 millions of people in the world, making it the fifth most widely used
50 language in the world (36), the OPQOL-35 is not yet available in French. The aim of this study
51 was to evaluate the psychometric properties of the Swiss French version of Older People's
52 Quality of Life questionnaire (OPQOL-35-SF).

53 Methods

54 The original version of the OPQOL questionnaire

55 The OPQOL-35 was developed by Ann Bowling.(21, 37, 38) It consists of 35 statements for
56 which older people must select their agreement between "*strongly agree*", "*agree*", "*neither*
57 *agree nor disagree*", "*disagree*", "*strongly disagree*" or with a score ranking from 1 to 5.

58 Scoring needs reverse coding of positive items. Higher score represents better quality of life.

59 The total score ranges from 35 (worst possible QoL) to 175 (best possible QoL). This
60 questionnaire covers eight domains: a. Life overall (4 items), b. Health (4 items), c. Social
61 relationships and participation (8 items), d. Independence, control over life and freedom (5
62 items), e. Home and neighborhood (4 items), f. Psychological and emotional well-being (4
63 items), g. Financial circumstances (4 items) and h. Culture and religion (2 items.)

64 Psychometrics proprieties of the original English version of the OPQOL-35 were analyzed by
65 Bowling. (21) Cronbach's alpha statistic ranged between 0.70 and 0.90 for internal consistency
66 without item redundancy. Test-retest correlations (four weeks) ranged from moderate to high
67 (r 0.403-0.782). Convergent construct validity was tested with CASP-19 (17) and WHOQOL-
68 OLD (16). OPQOL-35 showed moderate to high correlations (ρ 0.380-0.732, $p < .01$) for total
69 scores.

70 There is no consensus for the factorial structure of this questionnaire. Although the English
71 version includes eight dimensions, principle components analysis (PCA) identify mainly two or
72 four dimensions (21) but also nine (38). Chinese and Persian authors of the both translated
73 versions of OPQOL-35 identified eight dimensions (23, 25) while Czech authors of the Czech
74 translation estimate seven dimensions as optimal (24).

75

76 The Swiss French version of the OPQOL questionnaire

77 With the consent of Ms. Ann Bowling, the author of the original version, a research team
78 translated the OPQOL-35 questionnaire into French according to the current guidelines.(39) A
79 health professional and a naive translator translated forward the English version into Swiss
80 French (resp. translation 1 (T1) and translation 2 (T2)). Both translators and a recording
81 observer produced a synthesis of the translation, resulting into a first Swiss French version of
82 the questionnaire (T-12). Two persons translated T-12 back. Both were native English speakers
83 and not informed of the concept explored. Both back translations (BT1 and BT2), both forward
84 translations (T1 and T2), T-12 and the original English version of the questionnaire were
85 submitted to an expert committee to consolidate all the versions and develop the prefinal
86 version of the Swiss French OPQOL-35. This prefinal version was then submitted to 19 older
87 adults which gave comments and remarks. These feedbacks were included in the second
88 prefinal version. Bütikofer & Rausis (40) submitted the second prefinal version to 37 older
89 people. As no comprehension issues were pointed out, this version is effective as the final
90 Swiss French version.

91

92 Participants

93 We recruited older adults, aged 65 years or more, living in their own home and able to
94 understand and write French language in two French speaking cantons of Switzerland (Vaud
95 and Valais) during two periods: from April 2017 to May 2017 and from June 2018 to December
96 2018. They were recruited from medical-social centers, physiotherapy practices, associations
97 of elderly people and personal contacts.

98 Recommendations for sample size for exploratory factor analysis (EFA) differs widely in the
99 literature: from 50 to 1'000 subjects (41) ; or between five and ten subjects per items (42, 43);
100 or more than 100 (44). Two hundred subjects seems to be necessary for a confirmatory factor
101 analysis (42). Considering a minimum of 50 subjects (45) and between three and ten subjects
102 pro items (23), we opted for seven to eight subjects per item, i.e. between 245 subjects and
103 280 subjects.

104

105 Measures

106 To evaluate the construct validity of the Swiss French version of the OPQOL-35, total scores
107 have been correlated with the French versions of the Visual Analogue Scale (VAS), WHOQOL-
108 OLD (46), CASP-12 (18) and EQ-5D-5L (47). Authorizations have been received by the World
109 Health Organization (WHO) for the use of the WHOQOL-OLD and by EuroQol for the EQ-5D-
110 5L. CASP-12 was free of use.

111

112 VASs are single-item self-reported measurement tools. They are often used in health care
113 practice to assess pain (48), patient satisfaction (49), anxiety (50) and health related quality of
114 life (51). The scientific literature does not permit us to attribute one or more authors to it, but
115 it seems to have been developed and then used empirically by physicians and caregivers.(52)

116 VAS global quality of life shows a good validity and an excellent reliability. It is recommended

117 to measure global quality of life in clinical trials.(53) It was represented by a horizontal line of
118 100-mm ranging from 0 “*worst imaginable quality of life*” to 100 “*perfect quality of life*”.

119

120 The WHOQOL-OLD was developed from WHOQOL-100, which is a questionnaire of the
121 WHOQoL Group within the World Health Organization.(16) It measures QoL with 24 items in
122 seven subscales: sensory abilities; autonomy; past, present and future activities; social
123 participation; death and dying; and intimacy (four items per subscale). Items are scored with
124 reverse coding of positive responses, so that higher score means higher QoL between 24
125 (lowest possible QoL) to 120 (highest possible QoL). Response scales are all 5-point but vary
126 in their wording (“*Not at all*” to “*An extreme amount*” / “*Completely*” / “*Extremely*”; “*Very*
127 *poor*” to “*Very good*”; “*Very dissatisfied*” to “*Very satisfied*”; “*Very unhappy*” to “*Very happy*”).

128

129 CASP questionnaires were developed on the theories of Maslow and Giddens about the
130 satisfaction of the human needs.(17) Quality of life is evaluated in four domains: control,
131 autonomy, self-realization, and pleasure. The original version contains 19 items and two short
132 versions with twelve items have been developed: one in 2005, specifically for the Survey of
133 Health, Aging and retirement in Europe (54) and a second one in 2008 (55). Items are scored
134 on a 4-point Likert response scale “*Often*”, “*Sometimes*”, “*Not often*” and “*Never*”, with
135 reverse coding of positive responses, so that higher scores mean higher QoL. The scale of the
136 CASP-12 ranges from 0 (complete absence of QoL) to 36 (total satisfaction in all four domains).

137

138 EuroQol Group developed in the 90’s the EQ-5D to evaluate the quality of life related to health.

139 Later the questionnaire was added three levels (3L) and in 2009, EuroQol Group introduced

140 five levels (5L) to improve the instrument’s sensitivity and to reduce the ceiling effects. The

141 tool consists of two parts: one for the descriptive system and the second for the visual
142 analogue scale (EQ VAS). The descriptive system comprises five dimensions: mobility, self-care,
143 usual activities, pain/discomfort, and anxiety/depression. Each dimension has five levels: “no
144 problems”, “slight problems”, “moderate problems”, “severe problems” and “extreme
145 problems”. The EQ VAS records the patient’s self-rated health on a vertical visual analogue
146 scale, where the Endpoints are labelled “The best health you can imagine” and “The worst
147 health you can imagine”.(56) Scoring is calculated with an algorithm specific to each country.

148

149 Data collection

150 The questionnaires were self-administrated under the supervision of a research assistant (SC
151 or CM), sometimes individually and sometimes in group. There were completed on electronic
152 tablets, laptops or in paper format, at the subjects' homes or in another location of their
153 convenience. To analyze the test-retest reliability, the OPQOL-35-SF was administrated twice
154 within a time interval of 6 to 23 days. There is no significant difference, clinical or statistical,
155 with an interval of two days or two weeks between two administrations.(57) In some
156 exceptional situations, and for logistical reasons, the questionnaire for the retest was handed
157 out at the end of the first meeting with a pre-stamped and pre-addressed envelope.
158 Instructions were to complete the questionnaire in seven days and send it back.

159 During the first meeting, the research assistant explained in detail the course of the study. The
160 participants completed, in this order, their personal data and general information about
161 health status, the questionnaires WHOQOL-OLD, CASP-12, EQ-5D-5L and OPQOL-35-SF. The
162 first meeting lasted between 30 minutes (individual meeting) and two hours (group meeting).

163 During the second meeting, the participants completed only the OPQOL-35-SF and answered
164 to the question: “Since our first meeting, have you experienced any events that could have

165 *influenced your quality of life?*". If the answer was "Yes", it was asked: "*Does this event*
166 *influence your quality of life positively or negatively?*" and the participant was asked to
167 describe this event. The second meeting lasted between 10 and 30 minutes.

168

169 Data have been collected online on the software REDCap (*Research Electronic Data Capture*)
170 (58) and have been saved on a secure server in the University of Applied Sciences in Fribourg.

171 All data have been exported in EXCEL to be cleaned before analysis with the software R,
172 version 3.5.2 (within R-Studio), and Stata version 15.1.

173

174 Data analysis

175 **Construct validity:** The factor structure of the OPQOL-35-SF was evaluated by performing EFA
176 with varimax rotation.(59) It permits to group the variables by factors and eliminate those that
177 are not related to the construct.(44, 60) In brief, it permits to measure the coefficient of
178 variance of items between two populations. A large variance shows a difference in the
179 meaning of the question which may be due either to the translation or to cultural
180 variation.(61) Factor analysis could be exploratory or confirmatory; both could be
181 complementary.(44) For factor analysis, the Kaiser-Meyer-Olkin Measure of Sampling
182 Adequacy (KMO) should exceed the threshold of 0.8 (62, 63) and the correlation matrix must
183 contain correlations = 0 ($p < 0.05$) with the Bartlett's Test of Sphericity (41, 64). EFA permits the
184 identification of the different factors that define the construct.(60) There is no expectation as
185 to the nature and number of factors and this helps to purify questionnaires by grouping inter-
186 correlated questions.(41, 42, 44) It is measured using Principal Component Analysis (PCA) and
187 Varimax rotation. It is expressed by eigenvalues > 1.0 and variance coefficients > 0.40 from the
188 correlation matrix.(23, 25, 42) The weight of the variables represents the correlation between

189 the original variable and the factor. The weight should be greater than 0.35 for a sample of
190 250 to 350 individuals. Our analysis is based on a threshold of 0.30, as in the study by Bowling
191 et al.(38) *Scree plots* permit the identification of the ideal number of factors, either the one
192 before the inflection point of the curve, or the one at the level of the ideal eigenvalue, equal
193 to 1.(64)

194

195 **Convergence validity** was evaluated using Spearman's rank correlations between scores of
196 VAS for QoL, the OPQOL-35-SF, WHOQOL-OLD, CASP-12 and EQ-5D-5L, including its VAS for
197 health.(65) Because the scoring scales of these questionnaires aren't similar, they all were
198 converted on the scale used for the OPQOL-35 (Additional material I) for the analysis.

199 Cronbach's alpha tests the strength of the association between each scale item and the full
200 scale. It was used to evaluate the **internal consistency**.(65) The closer the Cronbach alpha is
201 to 1, the more reliable it is. It should be between 0.7 and 0.9.(21, 45, 66)

202 Intra-class correlation coefficient, two-way random effects, absolute agreement, single rater
203 (ICC_{2,1}) has been used for the **test-retest reliability**.(67) Terwee et al. (45) and De Vet et al.(61)
204 consider an ICC of 0.70 as acceptable to demonstrate good reliability. Koo and Li (68) suggest
205 that ICC values less than 0.5 are indicative of poor reliability, values between 0.5 and 0.75
206 indicate moderate reliability, values between 0.75 and 0.9 indicate good reliability, and values
207 greater than 0.90 indicate excellent reliability. Agreement was analyzed in percentage, with
208 weighted Cohen's kappa coefficient and with *prevalence-adjusted bias-adjusted kappa*
209 (PABAK). The use of PABAK minimizes the influence of a response difference of 1, as the
210 responses to the items range from 1 to 5.(69, 70) Landis and Koch consider a score >0.80 as
211 almost perfect, and for Fleiss, a score >0.75 is excellent.(61)

212 Results

213 Sample characteristics

214 The characteristics of the participants are presented in Table 1. 264 older people completed
215 the questionnaires at the first meeting, 262 at the second one. The average age of the
216 participants was 76.8 years +/- 7.1 years ranging from 65 to 96 years old. 87.1% were native
217 French speakers. The remaining elderly (n=34) had been speaking French for an average of
218 55 years. Most of the participants were women (73.9%), rural residents (67%), practiced
219 physical activity (87.1%) and took medication (73.5%).

220

221 **Title:** Table 1: Characteristics of participants (n= 264)

222 **Legend:** SD=standard deviation; n=number of participants

223

224 Twenty-four participants reported events that have strongly influenced their quality of life
225 between the first and the second meeting. Their scores were excluded for the Principal
226 Component Analysis of the OPQOL-35-SF retest (n=238).

227

228 Construct validity

229 EFA was performed to test the structure of the OPQOL-35-SF. The ratio of participants to items
230 was 7.54:1. The KMO value of sampling adequacy was 0.86 for OPQOL-35-SF test and 0.88 for
231 OPQOL-35 retest, exceeding the recommended value of 0.8. (62, 63) Bartlett's Test of
232 Sphericity was statistically significant for OPQOL-35-SF test (Chi-square 3424.096, 595 degrees
233 of freedom, P<.001) and for OPQOL-35-SF retest (Chi-square 4117.709, 595 degrees of
234 freedom, p<.001), supporting the factorability of the correlation matrix. (62) Eight factors
235 were extracted and identified using a minimal eigenvalue of 1 as the factor criterion. The eight

236 factors explained 58% of the variance observed. Scree plots of OPQOL-35-SF test and retest
237 show an ideal number of eight factors (Figure 1a and 1b). This is more explicit in the test than
238 in the retest.

239 **Title:** Figure 1: Scree plot of eigenvalues from the exploratory factor analysis.

240 **Legend:** 1a: OPQOL-35-SF test; 1b: OPQOL-35-SF retest

241

242 PCA and Varimax rotation for OPQOL-35-SF test and retest (Additional material II and III)
243 present the repartition of the items with a significative weight (<0.30) in eight factors.

244 Component 1 explained the largest explained proportion of the variance for the test (0.21)
245 and component 1 and 8 for the retest (0.19). In the Swiss French version of the questionnaire,
246 the distribution of items in the dimensions (Figure 2) differs from the original English version
247 of Bowling.(21) The dimension "Life overall" disappears and its four items (Q1-Q4) are
248 integrated into the dimension "Psychological and emotional well-being" with items Q26-Q28.

249 Item Q19 *"The cost of the things compared to my pension/income restricts my life"* joins the
250 dimension "Financial circumstances" with items Q30-Q33. A new dimension, entitled "Physical
251 condition" appears. It includes three items (Q5-Q7) from the original "Health" dimension,
252 three items (Q14-Q16) from the original "Social relationships/leisure and social activities"
253 dimension, and three items (Q17, Q18 and Q20) from the original "Independence, control over
254 life, freedom" dimension. The original dimension "Social relations/leisure and social activities"
255 is divided into two new separate dimensions: a dimension "Social relationship" which includes
256 items Q10, Q12 and Q21 and a dimension "Family context" which includes items Q9, Q11 and
257 Q13. Item Q22 *"I feel safe where I live"* disappears from the dimension "Home and
258 neighborhood". The dimension "Religion/culture" stay unchanged. Finally, three items do not
259 fit any of the identified dimensions: Q8 *"I am healthy enough to get out and about"*, Q22 *"I*

260 *feel safe where I live” and Q29 “If my health limits social/leisure activities, then I will*
261 *compensate and find something else I can do”.*

262

263 **Title:** Figure 2: Factors’ structure of the OPQOL derived form PCA

264

265 Table 2 presents the scores of the different questionnaires measuring the quality of life, in
266 original scoring and in transformed values (TV) to be compared to OPQOL-35. The average
267 scores of the questionnaires, scaled to OPQOL-35, ranged from 142.2 +/- 17.2 for CASP-12 to
268 155.4 +/- 19.6 for EQ-5D-5L. The maximum score was reached in all the questionnaires except
269 in the WHOQOL-OLD (118 out of 120).

270

271 **Title:** Table 2: Scores of QoL questionnaires

272 **Legend:** n= number of participants; SD= standard deviation; TV= transformed values

273

274 Convergent validity

275 Table 3 shows that OPQOL-35-SF (test), EQ-5D-5L, WHOQOL-OLD, CASP-12, VAS QoL and VAS
276 health total score all correlated lowly to moderately with each other ($r = 0.384-0.663$; all
277 $P < .001$). (71)

278

279 **Title:** Table 3: Correlations between total scores of QoL questionnaires (Spearman’s rho)

280 **Legend:** OPQOL-35-SF: Older People’s Quality of Live Questionnaire Swiss French; VAS QoL:
281 Visual Analogue Scale for Quality of Life; WHOQOL-OLD: World Health Organization Quality of
282 Life in older people questionnaire; CASP-12: Control, Autonomy, Self-realization, Pleasure in 12

283 questions; EQ-5D-5L: EuroQol-5-dimensions-5- levels; VAS health: Visual Analogue Scale for
284 health, ** $p < .001$

285

286 Internal consistency

287 Cronbach's alpha coefficient for the total scale was 0.875 for the test and 0.902 for the retest.

288 This shows a good internal consistency (45) and could mean that the items evaluate the same
289 construct (72).

290

291 Test-retest reliability

292 262 older people completed within a time interval from 6 to 23 days the OPQOL-35-SF a
293 second time. The mean score of the total scale for the first and the second test was 147.91
294 (SD 13.43) and 146.03 (SD 14.28), respectively. $ICC_{2,1}$ for the total sample (N=262) was 0.83
295 (CI 0.78-0.87), and for the sample that didn't reported events that have strongly influenced
296 their quality of life between the first and the second meeting (N=238) was 0.83 (CI 0.77-0.87).
297 These results show a good reliability.(45, 61) The $ICC_{2,1}$ of the subscales ranged between 0.58
298 to 0.84 for the older people without life changes, and between 0.59 to 0.82 for those that
299 reported events having influenced their quality of life (Table 4).

300

301 **Title:** Table 4: OPQOL-35-SF Subscales test-retest reliability ($ICC_{2,1}$)

302 **Legend:** ICC: Intraclass Correlation Coefficient; CI: Confidence Interval

303

304 Agreement between test and retest was between 81.6% and 92.6% for the total sample and
305 between 81.6% and 93.3% for the reduced sample (sample without extra events between test
306 and retest). Weighted Cohen's kappa coefficients were between 0.25 and 0.7 in the total

307 sample and between 0.22 and 0.67 in the reduced sample. 30 items were rated as moderate
308 in the total sample and 29 items in the reduced sample. PABAK was higher in the total sample
309 than in the reduced one: between 0.63 and 0.85 and between 0.63 and 0.87, respectively
310 (Additional material IV).

311 Discussion

312 The aim of this study was to evaluate the psychometric properties of the Swiss French version
313 of OPQOL-35 in older people in the French speaking part of Switzerland. Political leaders as
314 well as social and health professionals need effective and validated tools to assess the quality
315 of life in older people.(73, 74) The results of this study demonstrate the good to very good
316 psychometric quality of the Swiss French version of the OPQOL-35 questionnaire. It also
317 showed the complexity of the repartition of the quality of life-items in pre-defined categories.

318

319 With 264 participants, the sample of this study was smaller than the sample of the studies
320 evaluating the psychometric properties in Czech (24), in Persian (23) and in Chinese (25).
321 However, this sample is sufficient to meet the requirements and recommendations to conduct
322 a factor analysis.(42)

323

324 EFA extracted and identified eight factors using a minimal eigenvalue of 1 as the factor
325 criterion and explained 58% of the variance observed. As the original version of Bowling, the
326 Persian version and the Chinese version, the Swiss French version of OPQOL-35 has eight
327 dimensions, unlike the Czech version, which has seven. Based on cross-cultural aspects that
328 are reflected with the items, some dimensions of the original version have been renamed,

329 some have fewer or more items, some dimensions have been integrated into others, and new
330 dimensions have been created in the translated versions.

331 Bowling's "Life overall" dimension is still present in the Iranian version, but it is completed by
332 two items *"I take life as it comes and make the best of things"* and *"I feel lucky compared to*
333 *most people"* from the original "Psychological and emotional well-being" dimension. In the
334 Swiss French version, the dimension "Life overall" disappears and its four items are integrated
335 into the dimension "Psychological and emotional well-being".

336 The Czechs created a new dimension entitled "Positive Approach", which includes the items
337 *"I take life as it comes and try to make the best of it"*, *"I feel happy compared to most people"*
338 and *"I tend to look on the bright side of the life"*.

339 The "Health" dimension of the original version also disappeared in the Swiss French version.

340 Three of its items integrate a new dimension "Physical condition" which also includes three
341 items from the original dimension "Social relationship/leisure and social activities": *"I have*
342 *social or leisure activities/hobbies that I enjoy doing"*, *"I try to stay involved with things"* and
343 *"I do paid or unpaid work or activities that gives me a role in life"*. Similarly, three items from
344 the original "Independence, control over life, freedom" dimension, namely *"I am healthy*
345 *enough to have my own independence"*, *"I can please myself what I do"* and *"I have a lot of*
346 *control over the important things in my life"* are incorporated into the "Physical condition"
347 dimension. In the Chinese version, Chen et al. (25) created a new dimension entitled "Health
348 and Independence". It seems that, for the Swiss French population 65 years old and over, the
349 aspects of physical condition, or health, are closely related to independence, as they are for
350 the Chinese population. This is similar to the Czech population, as, in their version, Mares et
351 al. (24) created a dimension entitled "Health, independence, active life" which groups some
352 items included in the "Physical condition" dimension of the Swiss French version.

353

354 The original version of Bowling has a dimension entitled "Social Relationships/Leisure and
355 Social Activities". This dimension has been modified in all translated versions of the OPQOL-
356 35, both in its title and in the items that are attached to it. The Czech version has divided the
357 items of this dimension into two new dimensions, a "Family and Safe Environment" dimension
358 and a "Loneliness" dimension. In the Swiss French version, the items of the original Bowling
359 dimension are divided into a dimension "Social Relations" and a new dimension entitled
360 "Family Context" which includes the three items *"My family, friends or neighbors will help me
361 if necessary"*, *"I have someone who gives me love and affection"* and *"I have my children
362 around which is important"*. The notion of "Family" appears explicitly in the Czech version
363 (Family and Safe Environment) and in the Swiss French version (Family context) while in the
364 English, Iranian and Chinese versions, the items referring to it are distributed in different
365 dimensions. In the Persian version, the item *"My family, friends or neighborhood will help me
366 if necessary"* is not included in any of the questionnaire dimensions. The fact that the Chinese
367 sample consisted exclusively of older people living alone could explain why the notion of
368 "Family" was not highlighted in the Chinese version of OPQOL.

369 The three items *"I am healthy enough to get out and about"*, *"I feel safe where I live"* and *"If
370 my health limits social/leisure activities, then I will compensate and find something else I can
371 do"*, couldn't be attributed in any identified dimensions in the Swiss French OPQOL-35.
372 Similarly, in the Persian version, Nikkhah et al. (23) were unable to include four items in the
373 identified dimensions, namely *"My family, friends or neighbors would help me if needed"*, *"I
374 can please myself what I do"*, *"The cost of things compared to my pension/income restricts my
375 life"*, and *"I cannot afford to do things I would enjoy"*.

376

377 OPQOL-35-SF correlated lowly with EQ-5D-5L ($r = 0.42$, $P < .001$) and its VAS for health (r
378 $=0.425$, $P < .001$), and moderately with VAS for QoL ($r = 0.561$, $P < .001$), WHOQOL-OLD ($r =$
379 0.656 , $P < .001$) and CASP-12 ($r = 0.663$, $P < .001$). Quality of life is a multidimensional concept,
380 so the low correlation with the EQ-5D-5L and its VAS could be explained by the fact that EQ-
381 5D-5L is health centered and do not explore any other dimensions as suggested in the
382 literature.(75) The correlation between the Swiss French version of the OPQOL and the
383 WHOQOL-OLD is relatively similar to that of the original version ($r = 0.698$) assessed in a
384 population of English origin (ONS Omnibus) from Bowling.(21) The correlation between the
385 Swiss French version of the OPQOL and the CASP-12 is slightly lower than the one
386 demonstrated by Prof. Bowling in her study with the CASP-19 ($r = 0.732$). Whatsoever, the
387 overall OPQOL score was statistically significant in correlation with validated questionnaires
388 measuring quality of life. This supports the convergent validity of the Swiss French OPQOL.

389
390 Cronbach's alpha's coefficient for the total scale was 0.875 for the test and 0.902 for the
391 retest. That shows a good internal consistency as to the original English version (0.876 in the
392 ONS Omnibus and 0.901 in the Follow-up).(21) The internationally used OPQOL questionnaire
393 has also demonstrated very good internal consistency: 0.78 in Italy(12), 0.81 in Ghana(76),
394 0.834 in Sri Lanka(77), 0.90 in China(25) and 0.92 in Iran(23). Considering the literature on the
395 internal reliability of a questionnaire, the Swiss French version has a very acceptable reliability,
396 neither too low nor too high.(45, 61, 65)

397
398 The $ICC_{2.1}$ of the Swiss French OPQOL total score indicates a good test-retest reliability for a
399 use for research purposes with values over 0.75 (total sample : 0.83, CI 0.78-0.87; reduced
400 sample : 0.83, CI 0.77-0.87) (68). Because $ICC_{2.1}$ is not over 0.9, it cannot be used

401 individually.(78) The results of the Swiss French OPQOL are slightly lower than those obtained
402 in the Chinese (ICC 0.87) and the Persian (ICC 0.92) versions. The test-retest reliability of the
403 original English version showed Spearman's rho between 0.403 and 0.782. Subscales' test-
404 retest reliability of the Swiss French OPQOL can be compared to the results of the Chinese and
405 Persian version. In the Swiss French version, two subscales show an ICC_{2,1} between 0.75 and
406 0.9 and six an ICC_{2,1} between 0.5 and 0.75; in the Chinese version, four subscales had an ICC
407 between 0.75 and 0.9 and four an ICC between 0.5 and 0.75. However, the Persian version
408 showed better results with four subscales having an ICC >0.9, and four subscales with an ICC
409 between 0.75 and 0.9. The difference in these results could be explained by the difference in
410 the length of time between filling out the questionnaires, 1 to 3 weeks in the Swiss French
411 version, 4 weeks in the English version and 2 weeks in the Chinese and Persian version. The
412 time between the administration of two questionnaires should be long enough to prevent
413 subjects from remembering what they had written, but short enough to prevent a change in
414 the situation.(45) It seems that with older people, a short duration would be more
415 appropriate.(21) The statistical methods used in these studies are also different: ICC_{2,1} for the
416 Swiss French version, Spearman's rho for the English version and ICC for the Chinese and
417 Persian versions. It is possible that ICC_{2,1} might show smaller reliability than ICC.(68) For a
418 positive rating for reliability, weighted Kappa should be at least 0.70 (45). Following the ratings
419 of Landis and Koch(79), PABAK results between 0.80 to 1.00 means a "near-perfect
420 agreement"; between 0.60 to 0.79 a "substantial agreement" and between 0.40 to 0.59 a
421 "moderate agreement". In the Swiss French version of OPQOL, 17 items reach a "near-perfect
422 agreement", and 18 items can be interpreted as "substantial agreement". Six items have a
423 PABAK <0.70: Q6 "*I look forward to things*", Q12 "*I'd like more people to enjoy life with*", Q16
424 "*I do paid or unpaid work or activities that give me a role in life*", Q19 "*The cost of the things*

425 *compared to my pension/income restricts my life”, Q21 “I have responsibilities to others that*
426 *restrict my social or leisure activities” and Q33 “I cannot afford to do things I would enjoy”.*

427 This may be explained by the reactions of the participants. Q6 was not easily understood, the
428 participants did not know if the item was for the present moment or in general. Participants
429 took long time to answer Q12 because coding is reversed. Q19 and Q21 often needed
430 clarifications. Q33, at the end of the questionnaire, follows a similar item but expressed in
431 positive terms. Participants took more time, certainly because of the loss of the concentration.
432 The original version of OPQOL contains voluntarily eight items with reversed scoring, to avoid
433 automatism.(80) The relevance of reversal coding is discussed.(81, 82) In their translation of
434 the questionnaire, the Czechs decided to invert the rating in order to respond to their local
435 and socio-cultural practice, i.e. the "best rating" is 1 and the "worst rating" is 5.(24)

436

437 For this study, SC and CM were trained to conduct “one-to-one” and “in-group” interviews.
438 This permitted to informally record the participants' experiences when filling out the
439 questionnaires. Some of them would have liked "memory" to be the subject of an item.
440 Memory loss is a concern for older adults. For many of them, religion and culture are two
441 themes to be differentiated in the items. Most participants wished they could have answered
442 "yes" or "no." The choice of 5 answers offered by the Likert scale was not easy to integrate.
443 Perhaps a 3-level scale should be considered for the elderly population. In addition, some of
444 them would have liked to complete their answers with qualitative information.

445

446 The assessment of the quality of life of our seniors could complete their evaluation during
447 physiotherapy care, either in a practice or at their home. Although the ICC test-retest
448 reliability of the Swiss French version of the OPQOL-35 is not above 0.90, this tool could inspire

449 physiotherapists to learn about the quality of life of their older patients. The bio-psycho-social
450 care would be even more complete.

451

452 It would be interesting to continue this study by recruiting 200 additional subjects to perform
453 a confirmatory factor analysis. The authors of this study translated and assessed the
454 psychometric properties of the Swiss French version of the OPQOL-35 for Switzerland, which
455 represents 25% of the Swiss population. Switzerland has four national languages and German
456 is spoken by over 64% of the population. To our knowledge, the OPQOL-35 has not been
457 translated or validated in German. This could be the subject of future research.

458

459

460 List of abbreviation:

461 CASP: Control, Autonomy, Self-realization and Pleasure

462 EFA: Explanatory Factor Analysis

463 EQ: EuroQol

464 ICC2.1: Intra-class Correlation Coefficient, two-way random effects, absolute agreement,
465 single rater

466 KMO: Kaiser-Meyer-Olkin measure of sampling adequacy

467 OPQOL: Older People's Quality Of Life questionnaire

468 PABAK: Prevalence-Adjusted Bias-Adjusted Kappa

469 PCA: Principal Component Analysis

470 QoL: Quality of Life

471 REDCap: Research Electronic Data Capture

472 VAS: Visual Analogue Scale

473 WHO: World Health Organization

474 Declarations

475 Ethics approval and consent to participate

476 This study was approved by the Swissethics committee (project 38/14). All participants
477 received an information letter and signed an informed consent.

478 Consent for publication

479 Not applicable

480 Availability of data and materials

481 The datasets used and/or analyzed during the current study are available from the
482 corresponding author on reasonable request.

483 Competing interests

484 The authors declare that they have no competing interests.

485 Funding

486 Not applicable

487 Author's contributions

488 AGMH: conception and design, interpretation, drafting the article, critical revision, and final
489 approval

490 CM: collection and interpretation of the data and final approval

491 RH: statistical analysis and final approval

492 SC: collection and interpretation of the data, statistical analysis, critical revision of the article
493 and final approval

494

495

496 Additional material

497

498 Additional material I:

499 File name: Additional material I.pdf

500 Title: Score's conversions

501 Description of data: Table displaying the equation of the conversion of the score of the

502 questionnaires to meet the range of scores of the OPQOL.

503

504

505 Additional material II:

506 File name: Additional material II.pdf

507 Title: Principal Component Analysis (test)

508 Description of data: Table displaying the detailed results of the PCA for the test

509

510

511 Additional material III:

512 File name: Additional material III.pdf

513 Title: Principal Component Analysis (retest)

514 Description of data: Table displaying the detailed results of the PCA for the retest

515

516

517 Additional material IV:

518 File name: Additional material IV.pdf

519 Title: Cohen's kappa and PABAK

520 Description of data: Table displaying the detailed results of the Cohen's kappa and PABAK

521 separated for the total sample and the reduced sample

1 References

- 2 1. Organisation WH. Decade of Helthy Ageing 2020-2030 [cited 2020. Available from:
3 <https://www.who.int/ageing/decade-of-healthy-ageing>.
- 4 2. Organisation WH. Ageing and health [cited 2020. Available from:
5 <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>.
- 6 3. Giacalone D, Wendin K, Kremer S, Frøst MB, Bredie WL, Olsson V, et al. Health and
7 quality of life in an aging population—Food and beyondq. 2014.
- 8 4. Holliday R. Aging and the decline in health. *Health*. 2010;2(6):615-9.
- 9 5. Tinetti ME, Fried TR, Boyd CM. Designing health care for the most common chronic
10 condition—multimorbidity. *Jama*. 2012;307(23):2493-4.
- 11 6. Smith SM, Soubhi H, Fortin M, Hudon C, O’Dowd T. Managing patients with
12 multimorbidity: systematic review of interventions in primary care and community settings.
13 *Bmj*. 2012;345:e5205.
- 14 7. Ilinca S, Leichsenring K, Rodrigues R. From care in homes to care at home: European
15 experiences with (de) institutionalisation in long-term care.
- 16 8. Van Leeuwen KM, Van Loon MS, Van Nes FA, Bosmans JE, De Vet HC, Ket JC, et al.
17 What does quality of life mean to older adults? A thematic synthesis. *PloS one*.
18 2019;14(3):e0213263.
- 19 9. Kröger T, Bagnato A. Care for older people in early twenty-first-century Europe:
20 dimensions and directions of change. *Social services disrupted: Edward Elgar Publishing*;
21 2017.

- 22 10. OFS. Santé des personnes âgées [cited 2020. Available from:
23 <https://www.bfs.admin.ch/bfs/fr/home/statistiques/sante/etat-sante/personnes->
24 [agees.html](https://www.bfs.admin.ch/bfs/fr/home/statistiques/sante/etat-sante/personnes-agees.html).
- 25 11. Borglin G, Edberg A-K, Hallberg IR. The experience of quality of life among older
26 people. *Journal of aging studies*. 2005;19(2):201-20.
- 27 12. Bilotta C, Bowling A, Nicolini P, Casè A, Pina G, Rossi SV, et al. Older People's Quality
28 of Life (OPQOL) scores and adverse health outcomes at a one-year follow-up. A prospective
29 cohort study on older outpatients living in the community in Italy. *Health and quality of life*
30 *outcomes*. 2011;9(1):72.
- 31 13. Lawton M, Birren J, Lubben J, Rowe J, Deutchman D. The concept and measurement
32 of quality of life in the frail elderly. *The concept of Measurement of Quality of Life in the Frail*
33 *Elderly* San Diego: Academic Press, Inc. 1991.
- 34 14. CURAVIVA.CH. Conception de la qualité de vie. suisses Adheis; 2014.
- 35 15. Halvorsrud L, Kalfoss M. The conceptualization and measurement of quality of life in
36 older adults: a review of empirical studies published during 1994–2006. *European journal of*
37 *ageing*. 2007;4(4):229-46.
- 38 16. Power M, Quinn K, Schmidt S. Development of the WHOQOL-old module. *Quality of*
39 *life research*. 2005;14(10):2197-214.
- 40 17. Hyde M, Wiggins RD, Higgs P, Blane DB. A measure of quality of life in early old age:
41 the theory, development and properties of a needs satisfaction model (CASP-19). *Aging &*
42 *mental health*. 2003;7(3):186-94.
- 43 18. Borrat-Besson C, Ryser V-A, Gonçalves J. An evaluation of the CASP-12 scale used in
44 the Survey of Health, Ageing and Retirement in Europe (SHARE) to measure Quality of Life
45 among people aged 50. Lausanne: FORS. 2015.

- 46 19. Caballero FF, Miret M, Power M, Chatterji S, Tobiasz-Adamczyk B, Koskinen S, et al.
47 Validation of an instrument to evaluate quality of life in the aging population: WHOQOL-
48 AGE. *Health and quality of life outcomes*. 2013;11(1):177.
- 49 20. Schmidt S, Mühlhan H, Power M. The EUROHIS-QOL 8-item index: psychometric results
50 of a cross-cultural field study. *The European Journal of Public Health*. 2006;16(4):420-8.
- 51 21. Bowling A. The psychometric properties of the older people's quality of life
52 questionnaire, compared with the CASP-19 and the WHOQOL-OLD. *Current gerontology and*
53 *geriatrics research*. 2009;2009.
- 54 22. Bowling A, Hankins M, Windle G, Bilotta C, Grant R. A short measure of quality of life
55 in older age: The performance of the brief Older People's Quality of Life questionnaire
56 (OPQOL-brief). *Archives of gerontology and geriatrics*. 2013;56(1):181-7.
- 57 23. Nikkhah M, Heravi-Karimooi M, Montazeri A, Rejeh N, Nia HS. Psychometric
58 properties the Iranian version of older People's quality of life questionnaire (OPQOL). *Health*
59 *and quality of life outcomes*. 2018;16(1):174.
- 60 24. Mares J, Cigler H, Vachkova E. Czech version of OPQOL-35 questionnaire: the
61 evaluation of the psychometric properties. *Health and quality of life outcomes*.
62 2016;14(1):93.
- 63 25. Chen Y, Hicks A, While AE. Validity and reliability of the modified Chinese version of
64 the Older People's Quality of Life Questionnaire (OPQOL) in older people living alone in C
65 hina. *International journal of older people nursing*. 2014;9(4):306-16.
- 66 26. GUMIKIRIZA-ONORIA MJL, FELLOW N. Cultural adaptation of the Older People's
67 Quality of life Questionnaire (OPQOL) to Uganda's elderly population.
- 68 27. Dharmo E, Koçollari N. Older people quality of life evaluation. *Mediterranean Journal*
69 *of Social Sciences*. 2014;5(13):385.

- 70 28. Rajput M, Bhatt S. Comparing the effect of two different dual task training conditions
71 on balance and gait in elderly. *J Med Sci Clin Res*. 2014;2:2510-9.
- 72 29. Siriwardhana DD, Weerasinghe MC, Rait G, Scholes S, Walters KR. The association
73 between frailty and quality of life among rural community-dwelling older adults in Kegalle
74 district of Sri Lanka: a cross-sectional study. *Quality of Life Research*. 2019;28(8):2057-68.
- 75 30. Siddiqui AT, Hasan M, Abbas K, Tariq SM, Haider SA. Health related quality of life of
76 home dwelling vs. nursing facility dwelling elderly—A cross-sectional study from Karachi,
77 Pakistan. *JPM The Journal of the Pakistan Medical Association*. 2019;69(6):892-5.
- 78 31. Johani S, Alavi K, Mohamad MS. Perbandingan Tahap Kualiti Hidup Bagi Warga Emas
79 Yang Mendapatkan Perkhidmatan Di Pusat Aktiviti Warga Emas (PAWE) Di Kawasan Bandar
80 Dan Luar Bandar (Comparison of Quality of Life Level among Elderly at Elderly Activity Center
81 in Urban and Rural Areas). *Jurnal Psikologi Malaysia*. 2018;32(3).
- 82 32. Cahyaningtias RN. Hubungan Kemungkinan Kejadian Depresi dengan Kualitas Hidup
83 Pada Lanjut Usia Dengan Pendekatan: Biopsikososispiritual di Puskesmas: Ciputat, Ciputat
84 Timur, Dan Pondok Ranji Tahun 2018. 2019: UIN Syarif Hidayatullah Jakarta-FK.
- 85 33. Caliskan H, Aycicek GS, Ozsurekci C, Dogrul RT, Balci C, Sumer F, et al. Turkish
86 validation of a new scale from older people's perspectives: Older people's quality of life-brief
87 (OPQOL-brief). *Archives of gerontology and geriatrics*. 2019;83:91-5.
- 88 34. Feizi A, Heidari Z. Persian version of the brief Older People's Quality of Life
89 questionnaire (OPQOL-brief): the evaluation of the psychometric properties. *Health and
90 Quality of Life Outcomes*. 2020;18(1):1-11.
- 91 35. Haugan G, Drageset J, André B, Kukulu K, Mugisha J, Utvær BKS. Assessing quality of
92 life in older adults: psychometric properties of the OPQoL-brief questionnaire in a nursing
93 home population. *Health and Quality of Life Outcomes*. 2020;18(1):1.

- 94 36. francophonie Oidl. La langue française dans le monde 2018. 2019 Mars 2019.
- 95 37. Bowling A, Gabriel Z. Lay theories of quality of life in older age. Ageing Soc.
96 2007;27(6):827-48.
- 97 38. Bowling A, Stenner P. Which measure of quality of life performs best in older age? A
98 comparison of the OPQOL, CASP-19 and WHOQOL-OLD. Journal of Epidemiology &
99 Community Health. 2011;65(3):273-80.
- 100 39. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-
101 cultural adaptation of self-report measures. Spine. 2000;25(24):3186-91.
- 102 40. Bütikofer A, Rausis L. Validité et fiabilité de la traduction transculturelle suisse-
103 romande du Questionnaire « Older People's Quality of Life Questionnaire »: Haute Ecole de
104 Santé HES-SO Valais-Wallis; 2017.
- 105 41. Williams B, Onsmann A, Brown T. Exploratory factor analysis: A five-step guide for
106 novices. Australasian journal of paramedicine. 2010;8(3).
- 107 42. Roussel P. Méthodes de développement d'échelles pour questionnaires d'enquête.
108 Management des Ressources Humaines: Méthodes de recherche en sciences humaines et
109 sociales. 2005:245-76.
- 110 43. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL. Multivariate data analysis:
111 Prentice hall Upper Saddle River, NJ; 1998.
- 112 44. Munro BH. Statistical methods for health care research: lippincott williams & wilkins;
113 2005.
- 114 45. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality
115 criteria were proposed for measurement properties of health status questionnaires. Journal
116 of clinical epidemiology. 2007;60(1):34-42.

- 117 46. Leplege A, Perret-Guillaume C, Ecosse E, Hervy M, Ankri J, von Steinbüchel N. A new
118 instrument to measure quality of life in older people: The French version of the WHOQOL-
119 OLD. *La Revue de Medecine Interne*. 2012;34(2):78-84.
- 120 47. Perneger TV, Combescure C, Courvoisier DS. General population reference values for
121 the French version of the EuroQol EQ-5D health utility instrument. *Value in health*.
122 2010;13(5):631-5.
- 123 48. Hawker GA, Mian S, Kendzerska T, French M. Measures of Adult Pain: Visual Analog
124 Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain
125 Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade
126 Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and
127 Constant Osteoarthritis Pain (ICOAP). *Arthritis care & research*. 2011;63:S240-S52.
- 128 49. Brokelman RB, Haverkamp D, van Loon C, Hol A, van Kampen A, Veth R. The
129 validation of the visual analogue scale for patient satisfaction after total hip arthroplasty.
130 *European Orthopaedics and Traumatology*. 2012;3(2):101.
- 131 50. Williams VS, Morlock RJ, Feltner D. Psychometric evaluation of a visual analog scale
132 for the assessment of anxiety. *Health and quality of life outcomes*. 2010;8(1):1-8.
- 133 51. Gudex C, Dolan P, Kind P, Williams A. Health state valuations from the general public
134 using the visual analogue scale. *Quality of Life Research*. 1996;5(6):521-31.
- 135 52. Eboli G. Le Guichet du Savoir 2008 [Available from:
136 <https://www.guichetdusavoir.org/viewtopic.php?t=30050>.
- 137 53. de Boer A, van Lanschot J, Stalmeier P, van Sandick J, Hulscher J, de Haes J, et al. Is a
138 Single-Item Visual Analogue Scale as Valid, Reliable and Responsive as Multi-Item Scales in
139 Measuring Quality of Life? *Quality of life research: an international journal of quality of life*
140 *aspects of treatment, care and rehabilitation*. 2004;13(2):311-20.

- 141 54. Buber I, Prskawetz A, Engelhardt H, Schwarz F, Winter-Ebmer R. Survey of Health,
142 Ageing and Retirement in Europe. SHARE First Results for Austria Forschungsbericht.
143 2006;31.
- 144 55. Wiggins RD, Netuveli G, Hyde M, Higgs P, Blane D. The evaluation of a self-
145 enumerated scale of quality of life (CASP-19) in the context of research on ageing: A
146 combination of exploratory and confirmatory approaches. Social Indicators Research.
147 2008;89(1):61-77.
- 148 56. Group E. EQ-5D 2017 [Available from: <https://euroqol.org/eq-5d-instruments/eq-5d-5l-about/>].
- 150 57. Marx RG, Menezes A, Horovitz L, Jones EC, Warren RF. A comparison of two time
151 intervals for test-retest reliability of health status instruments. Journal of clinical
152 epidemiology. 2003;56(8):730-5.
- 153 58. Patridge EF, Bardyn TP. Research electronic data capture (REDCap). Journal of the
154 Medical Library Association: JMLA. 2018;106(1):142.
- 155 59. Baumgartner H, Homburg C. Applications of structural equation modeling in
156 marketing and consumer research: A review. International journal of Research in Marketing.
157 1996;13(2):139-61.
- 158 60. DeVon HA, Block ME, Moyle-Wright P, Ernst DM, Hayden SJ, Lazzara DJ, et al. A
159 psychometric toolbox for testing validity and reliability. Journal of Nursing scholarship.
160 2007;39(2):155-64.
- 161 61. De Vet HC, Terwee CB, Mokkink LB, Knol DL. Measurement in medicine: a practical
162 guide: Cambridge University Press; 2011.
- 163 62. Kaiser HF. A second generation little jiffy. Psychometrika. 1970;35(4):401-15.

- 164 63. Glen S. Statistics How To 2020 [Available from:
165 <https://www.statisticshowto.com/kaiser-meyer-olkin>.
- 166 64. Hair J, Black W, Babin B, Anderson R. Multivariate data analysis (Pearson new
167 internat. ed). Harlow: Pearson. 2014.
- 168 65. Touzani M, Salaani T. Le processus de validation des échelles de mesure: fiabilité et
169 validité. *Marketing*. 2000;11(3):73.
- 170 66. Bowling A. Measuring the quality of later life. *The New Dynamics of Ageing Volume 1*.
171 2018;1:81.
- 172 67. McDowell I. *Measuring health: a guide to rating scales and questionnaires*: Oxford
173 University Press, USA; 2006.
- 174 68. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation
175 Coefficients for Reliability Research. *J Chiropr Med*. 2016;15(2):155-63.
- 176 69. Sim J, Wright CC. The kappa statistic in reliability studies: use, interpretation, and
177 sample size requirements. *Physical therapy*. 2005;85(3):257-68.
- 178 70. Byrt T, Bishop J, Carlin JB. Bias, prevalence and kappa. *Journal of clinical*
179 *epidemiology*. 1993;46(5):423-9.
- 180 71. Mukaka MM. A guide to appropriate use of correlation coefficient in medical
181 research. *Malawi medical journal*. 2012;24(3):69-71.
- 182 72. Henson RK. Understanding internal consistency reliability estimates: A conceptual
183 primer on coefficient alpha. *Measurement and evaluation in counseling and development*.
184 2001;34(3):177-89.
- 185 73. Zimmermann-Sloutskis D, Gruet F, Zimmermann E. Comparaison de la qualité de vie
186 des personnes âgées vivant à domicile ou en institution: Observatoire suisse de la santé
187 (Obsan); 2012.

- 188 74. Weber D. Santé et qualité de vie des personnes âgées. Bases pour les programmes
189 d'action cantonaux. Promotion Santé Suisse; 2016 mars 2016. Contract No.: 5.
- 190 75. Netuveli G, Blane D. Quality of life in older ages. British medical bulletin.
191 2008;85(1):113-26.
- 192 76. Bazaadut D. Assessment of the Relationship Between Caregiver Psychosocial Factors
193 and the Quality of Life of the Elderly at Home in the Tamale Township: University of Ghana;
194 2014.
- 195 77. Rathnayake S, Siop S. Quality of Life and Its Determinants among Older People Living
196 in the Rural Community in Sri Lanka. Indian Journal of Gerontology. 2015;29(2).
- 197 78. Nunnally J, Bernstein I. Psychometric theory. New York. 1994.
- 198 79. Landis JR, Koch GG. The measurement of observer agreement for categorical data.
199 biometrics. 1977:159-74.
- 200 80. Ashton MMC. Psychologie de la personnalité et des différences individuelles: De
201 Boeck Supérieur; 2014.
- 202 81. Suárez Álvarez J, Pedrosa I, Lozano LM, García Cueto E, Cuesta Izquierdo M, Muñiz
203 Fernández J. Using reversed items in Likert scales: A questionable practice. Psicothema, 30.
204 2018.
- 205 82. Sonderen Ev, Sanderman R, Coyne JC. Ineffectiveness of reverse wording of
206 questionnaire items: Let's learn from cows in the rain. PloS one. 2013;8(7):e68967.
- 207

Figures

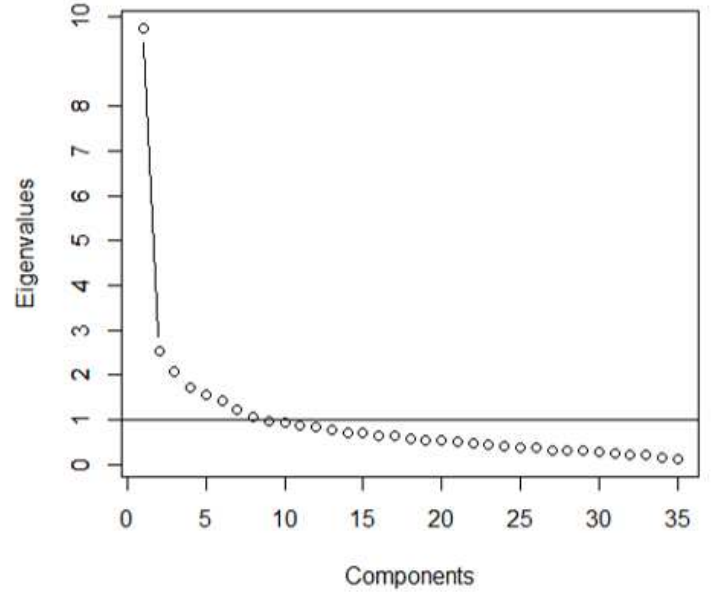
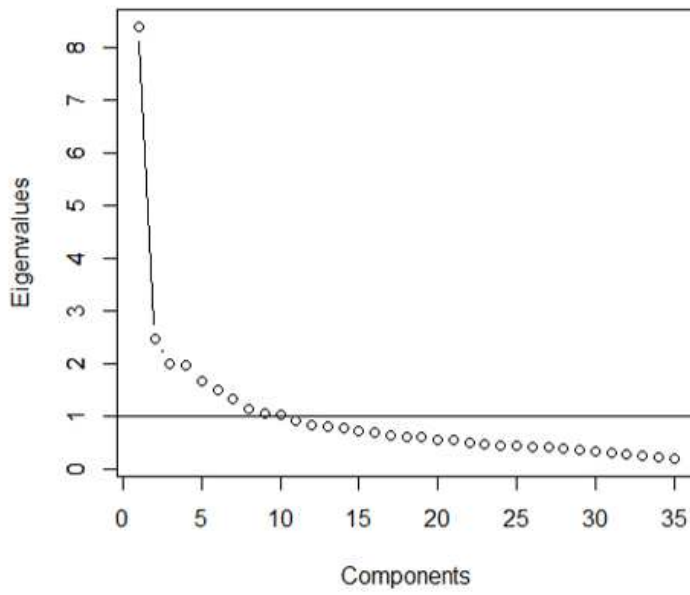


Figure 1

Scree plot of eigenvalues from the exploratory factor analysis. 1a: OPQOL-35-SF test; 1b: OPQOL-35-SF retest

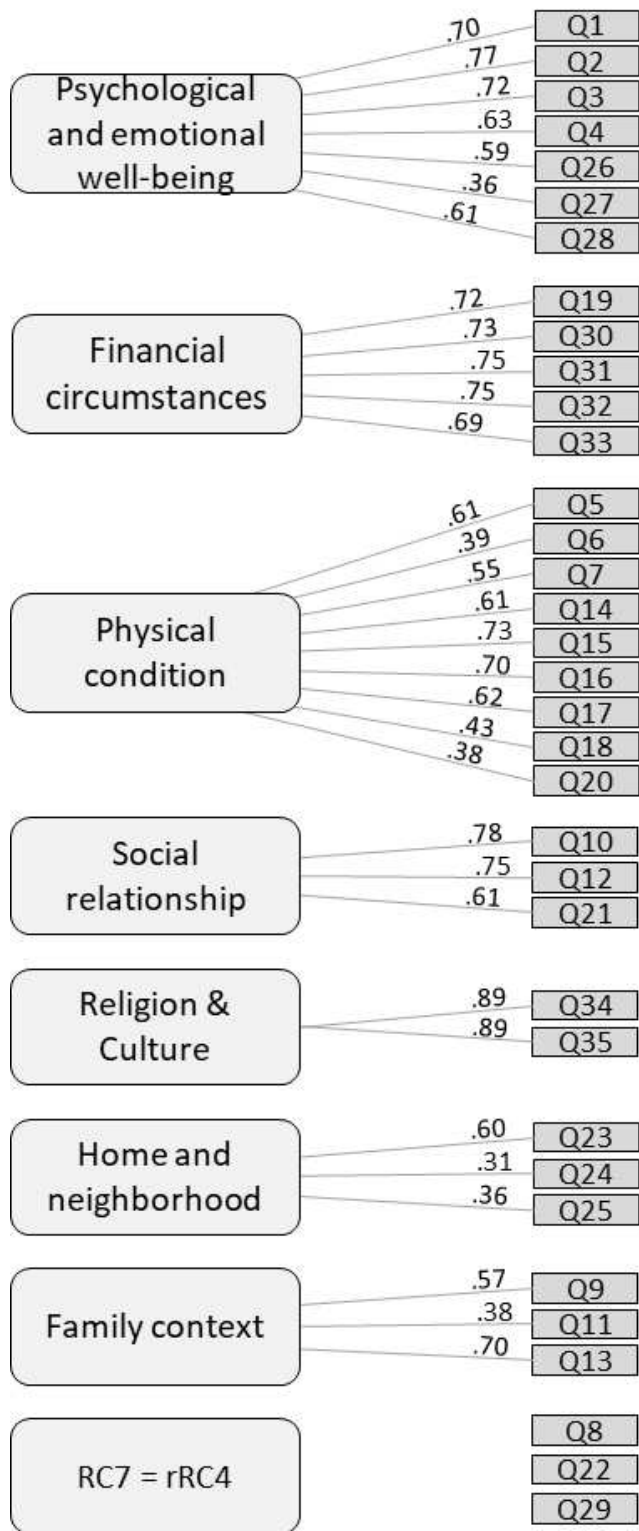


Figure 2

Factors' structure of the OPQOL derived from PCA

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [AdditionalmaterialI.pdf](#)
- [AdditionalmaterialII.pdf](#)
- [AdditionalmaterialIII.pdf](#)
- [AdditionalmaterialIV.pdf](#)