

**Table 1** Correlation coefficients *r* among items and domains of QLICD-PU (n=153)

| Code | Items brief description in English            | Physical    | Psychological | Social      | Specific    |
|------|-----------------------------------------------|-------------|---------------|-------------|-------------|
| PH1  | Take care of daily life (e.g. eating)?        | <b>0.70</b> | 0.14          | 0.34        | 0.06        |
| PH2  | Felt easily fatigued?                         | <b>0.65</b> | 0.33          | 0.21        | 0.19        |
| PH3  | Have trouble walking 800m or more?            | <b>0.76</b> | 0.12          | 0.24        | 0.04        |
| PH4  | Have trouble going up and down stairs?        | <b>0.71</b> | 0.32          | 0.20        | 0.04        |
| PH5  | Need to take medication?                      | <b>0.65</b> | 0.33          | 0.23        | 0.19        |
| PH6  | A good appetite?                              | <b>0.49</b> | 0.10          | 0.17        | 0.09        |
| PH7  | Satisfied with your sleep?                    | <b>0.55</b> | 0.20          | 0.14        | 0.15        |
| PH8  | Felt pain or uncomfortable?                   | <b>0.52</b> | 0.26          | 0.24        | 0.43        |
| PS1  | Memory and concentration affected?            | 0.39        | <b>0.46</b>   | 0.40        | 0.16        |
| PS2  | Felt mentally miserable?                      | 0.35        | <b>0.59</b>   | 0.32        | 0.28        |
| PS3  | Felt lonely and helpless?                     | 0.14        | <b>0.69</b>   | 0.42        | 0.19        |
| PS4  | Felt pessimism and despair?                   | 0.18        | <b>0.72</b>   | 0.37        | 0.26        |
| PS5  | Worried about disease?                        | 0.31        | <b>0.72</b>   | 0.27        | 0.39        |
| PS6  | Felt fretful or irritable?                    | 0.16        | <b>0.56</b>   | 0.24        | 0.31        |
| PS7  | Felt nervous and anxious?                     | 0.26        | <b>0.68</b>   | 0.20        | 0.31        |
| PS8  | Stop medication because of side effects?      | 0.10        | <b>0.44</b>   | 0.05        | 0.14        |
| PS9  | To be a burden to the family?                 | 0.36        | <b>0.55</b>   | 0.37        | 0.23        |
| PS10 | Felt self-abasement because of disease?       | 0.03        | <b>0.69</b>   | 0.20        | 0.23        |
| PS11 | Hidden emotions but could not forget?         | 0.11        | <b>0.68</b>   | 0.29        | 0.27        |
| SO1  | Interfered with work/housework?               | 0.29        | 0.35          | <b>0.53</b> | 0.18        |
| SO2  | Family roles?                                 | 0.16        | 0.03          | <b>0.38</b> | 0.10        |
| SO3  | Decreased caring and attention to family?     | 0.28        | 0.36          | <b>0.34</b> | 0.20        |
| SO4  | Good relations with family?                   | 0.01        | 0.09          | <b>0.56</b> | 0.04        |
| SO5  | Help and support from family?                 | 0.06        | 0.03          | <b>0.52</b> | 0.08        |
| SO6  | Affected participating in leisure activities? | 0.18        | 0.35          | <b>0.41</b> | 0.07        |
| SO7  | Treat illness positively and optimistically?  | 0.23        | 0.30          | <b>0.63</b> | 0.23        |
| SO8  | Treatments received good for curing?          | 0.12        | 0.22          | <b>0.35</b> | 0.16        |
| SO9  | Economic problems caused by illness?          | 0.11        | 0.35          | <b>0.48</b> | 0.27        |
| SO10 | Support from friends and relatives?           | 0.13        | 0.01          | <b>0.51</b> | 0.06        |
| SO11 | Affected sexual activities?                   | 0.27        | 0.27          | <b>0.35</b> | 0.16        |
| PU1  | Have pain (sore) in epigastria?               | 0.28        | 0.11          | 0.11        | <b>0.53</b> |
| PU2  | Have heartburn in epigastria?                 | 0.08        | 0.17          | 0.14        | <b>0.49</b> |
| PU3  | Have pain/discomfort at night or hungry?      | 0.17        | 0.08          | 0.05        | <b>0.51</b> |
| PU4  | Pain/uncomfortable relieved after dinner?     | 0.13        | 0.00          | 0.07        | <b>0.33</b> |
| PU5  | Have acid regurgitation?                      | 0.06        | 0.17          | 0.05        | <b>0.48</b> |
| PU6  | Have any belch (burps)?                       | 0.19        | 0.12          | 0.08        | <b>0.49</b> |
| PU7  | Abdominal distension?                         | 0.03        | 0.07          | 0.15        | <b>0.53</b> |
| PU8  | Salivate (flow saliva)?                       | 0.06        | 0.26          | 0.00        | <b>0.38</b> |
| PU9  | Move bowels normal?                           | 0.27        | 0.10          | 0.19        | <b>0.34</b> |
| PU10 | Upset/distress for gastroscopy inspection?    | 0.13        | 0.21          | 0.05        | <b>0.36</b> |
| PU11 | Vexed for food limit?                         | 0.05        | 0.30          | 0.12        | <b>0.43</b> |
| PU12 | Troubled/limit by dine at fix time?           | 0.14        | 0.18          | 0.14        | <b>0.35</b> |
| PU13 | Worried about causing severe disease?         | 0.04        | 0.36          | 0.22        | <b>0.51</b> |
| PU14 | Vexed for often taking stomach medications?   | 0.01        | 0.31          | 0.17        | <b>0.55</b> |

\*Correlations between each item and its designated scale are in bold type.

**Table 2** Correlation Coefficients among domain scores of QLICD-PU and SF-36 (n=153)\*

| QLICD-PU   | SF-36       |      |             |      |      |             |      |             |             |             |
|------------|-------------|------|-------------|------|------|-------------|------|-------------|-------------|-------------|
|            | PF          | RP   | BP          | GH   | VT   | SF          | RE   | MH          | PCS         | MCS         |
| <b>PHD</b> | <b>0.67</b> | 0.26 | 0.26        | 0.37 | 0.31 | 0.18        | 0.16 | 0.19        | 0.61        | 0.30        |
| <b>PSD</b> | 0.23        | 0.21 | 0.21        | 0.40 | 0.30 | 0.38        | 0.27 | <b>0.51</b> | 0.38        | 0.51        |
| <b>SOD</b> | 0.37        | 0.20 | 0.31        | 0.47 | 0.33 | <b>0.54</b> | 0.23 | 0.31        | 0.53        | 0.47        |
| <b>SPD</b> | 0.14        | 0.18 | <b>0.33</b> | 0.29 | 0.12 | 0.24        | 0.20 | 0.23        | 0.31        | 0.25        |
| <b>TOT</b> | 0.49        | 0.30 | 0.39        | 0.56 | 0.37 | 0.39        | 0.31 | 0.49        | <b>0.64</b> | <b>0.54</b> |

PHD: physical domain, PSD: psychological domain, SOD: social domain, SPD: specific domain, TOT: total score

PF: physical function, RP: role-physical, BP: bodily pain, GH: general health, VT: vitality, SF: social function, RE: role-emotional, MH: mental-health, PCS: Physical Component Summary, MCS: Mental Component Summary.

**Table 3** Reliability of the quality of life instrument QLICD-PU (n=153 for  $\alpha$ , n=63 for  $r$  and ICC)

| Domains/facets<br>(number of items)   | Internal consistency<br>coefficient $\alpha$ | Test-retest<br>coefficient $r$ | Test-retest ICC<br>(95% CI) |
|---------------------------------------|----------------------------------------------|--------------------------------|-----------------------------|
| <b>Physical Function PHD (8)</b>      | <b>0.79</b>                                  | <b>0.89</b>                    | <b>0.89 (0.83-0.93)</b>     |
| Independence (3)                      | 0.81                                         | 0.88                           | 0.88 (0.82-0.93)            |
| Appetite and Sleep (2)                | 0.49                                         | 0.74                           | 0.74 (0.60-0.83)            |
| Physical Symptoms (3)                 | 0.60                                         | 0.80                           | 0.80 (0.69-0.87)            |
| <b>Psychological Function PSD(11)</b> | <b>0.83</b>                                  | <b>0.91</b>                    | <b>0.91 (0.86-0.95)</b>     |
| Cognition (2)                         | 0.53                                         | 0.83                           | 0.82 (0.72-0.89)            |
| Anxiety (3)                           | 0.69                                         | 0.83                           | 0.83 (0.74-0.89)            |
| Depression (3)                        | 0.79                                         | 0.90                           | 0.90 (0.83-0.94)            |
| Self-Consciousness (3)                | 0.70                                         | 0.94                           | 0.94 (0.90-0.96)            |
| <b>Social Function SOD(11)</b>        | <b>0.62</b>                                  | <b>0.77</b>                    | <b>0.77 (0.65-0.86)</b>     |
| Social Support/Security (6)           | 0.73                                         | 0.84                           | 0.84 (0.75-0.90)            |
| Social Effects (4)                    | 0.63                                         | 0.74                           | 0.73 (0.59-0.83)            |
| Sexual Function (1)                   | -                                            | 0.84                           | 0.84 (0.74-0.90)            |
| <b>Specific domain SPD (14)</b>       | <b>0.73</b>                                  | <b>0.80</b>                    | <b>0.80 (0.69-0.87)</b>     |
| Upper abdomen pain(4)                 | 0.44                                         | 0.72                           | 0.72 (0.57-0.82)            |
| Acid regurgitation/salivation(2)      | 0.35                                         | 0.86                           | 0.86 (0.77-0.91)            |
| Hiccup (1)                            | -                                            | 0.84                           | 0.84 (0.75-0.90)            |
| Flatulent (1)                         | -                                            | 0.83                           | 0.83 (0.73-0.89)            |
| Changing in stool habit (1)           | -                                            | 0.77                           | 0.77 0.64-0.85              |
| Effects of mental and life(5)         | 0.63                                         | 0.73                           | 0.72 (0.58-0.82)            |
| <b>Total TOT(44)</b>                  | -                                            | <b>0.89</b>                    | <b>0.89 (0.82-0.93)</b>     |

- not acceptable/suitable, ICC: Intra-Class Correlation

Table 4 The estimated variance components and percentage of variance accounted for by effects (percent) for p×i design in G-study for four domains of quality of life instrument QLICD-PU ( $n'_p = 153$ )

| Domain             | $p$ (person)       |             | $i$ (item)         |             | $p \times i$ (person*item) |             |
|--------------------|--------------------|-------------|--------------------|-------------|----------------------------|-------------|
|                    | Variance component | Percent (%) | Variance component | Percent (%) | Variance component         | Percent (%) |
| PHD( $n'_i = 8$ )  | 0.517              | 27.80       | 0.224              | 12.04       | 1.119                      | 60.16       |
| PSD( $n'_i = 11$ ) | 0.547              | 35.92       | 0.128              | 8.40        | 0.848                      | 55.68       |
| SOD( $n'_i = 11$ ) | 0.190              | 12.20       | 0.092              | 5.91        | 1.275                      | 81.89       |
| SPD( $n'_i = 14$ ) | 0.143              | 8.99        | 0.257              | 16.15       | 1.191                      | 74.86       |

PHD: physical domain, PSD: psychological domain, SOD: social domain, SPD: specific domain ,  
 $p$ : person effect,  $i$ : item effect,  $p \times i$ : person-by-item interaction effect

Table 5 G-coefficients and  $\Phi$ -coefficients for different numbers of items for  $p \times I$  design in D-study for four domains of quality of life instrument QLICD-PU

| Domain               | Number of items | $\sigma^2(P)$ | $\sigma^2(I)$ | $\sigma^2(PI)$ | $\sigma^2(\delta)$ | $\sigma^2(\Delta)$ | $\sigma^2(X_{PI})$ | $E\rho^2$    | $\Phi$       |
|----------------------|-----------------|---------------|---------------|----------------|--------------------|--------------------|--------------------|--------------|--------------|
| Physical domain      | 6               | 0.517         | 0.037         | 0.186          | 0.186              | 0.224              | 0.042              | 0.735        | 0.698        |
|                      | <b>8</b>        | <b>0.517</b>  | <b>0.028</b>  | <b>0.140</b>   | <b>0.140</b>       | <b>0.168</b>       | <b>0.032</b>       | <b>0.787</b> | <b>0.755</b> |
|                      | 9               | 0.517         | 0.025         | 0.124          | 0.124              | 0.149              | 0.029              | 0.806        | 0.776        |
|                      | 11              | 0.517         | 0.020         | 0.102          | 0.102              | 0.122              | 0.024              | 0.836        | 0.809        |
| Psychological domain | 9               | 0.338         | 0.010         | 0.095          | 0.095              | 0.105              | 0.013              | 0.780        | 0.763        |
|                      | <b>11</b>       | <b>0.338</b>  | <b>0.007</b>  | <b>0.069</b>   | <b>0.069</b>       | <b>0.076</b>       | <b>0.010</b>       | <b>0.830</b> | <b>0.815</b> |
|                      | 13              | 0.338         | 0.006         | 0.059          | 0.059              | 0.065              | 0.009              | 0.852        | 0.839        |
|                      | 15              | 0.338         | 0.005         | 0.051          | 0.051              | 0.056              | 0.008              | 0.869        | 0.858        |
| Social domain        | 9               | 0.190         | 0.010         | 0.142          | 0.142              | 0.152              | 0.012              | 0.573        | 0.556        |
|                      | <b>11</b>       | <b>0.190</b>  | <b>0.008</b>  | <b>0.116</b>   | <b>0.116</b>       | <b>0.124</b>       | <b>0.010</b>       | <b>0.622</b> | <b>0.605</b> |
|                      | 13              | 0.190         | 0.007         | 0.098          | 0.098              | 0.105              | 0.009              | 0.660        | 0.644        |
|                      | 16              | 0.190         | 0.006         | 0.080          | 0.080              | 0.085              | 0.008              | 0.705        | 0.690        |
|                      | 17              | 0.190         | 0.005         | 0.075          | 0.075              | 0.080              | 0.007              | 0.717        | 0.703        |
|                      | 27              | 0.190         | 0.003         | 0.047          | 0.047              | 0.051              | 0.005              | 0.801        | 0.790        |
| Specific domain      | 29              | 0.190         | 0.003         | 0.044          | 0.044              | 0.047              | 0.005              | 0.812        | 0.801        |
|                      | 11              | 0.143         | 0.023         | 0.108          | 0.108              | 0.132              | 0.025              | 0.568        | 0.520        |
|                      | <b>14</b>       | <b>0.143</b>  | <b>0.018</b>  | <b>0.085</b>   | <b>0.085</b>       | <b>0.103</b>       | <b>0.020</b>       | <b>0.626</b> | <b>0.580</b> |
|                      | 17              | 0.143         | 0.015         | 0.070          | 0.070              | 0.085              | 0.016              | 0.671        | 0.626        |
|                      | 20              | 0.143         | 0.013         | 0.060          | 0.060              | 0.072              | 0.014              | 0.705        | 0.663        |
|                      | 24              | 0.143         | 0.011         | 0.050          | 0.050              | 0.060              | 0.012              | 0.742        | 0.703        |
|                      | 34              | 0.143         | 0.008         | 0.035          | 0.035              | 0.043              | 0.009              | 0.803        | 0.770        |
| 41                   | 0.143           | 0.006         | 0.029         | 0.029          | 0.035              | 0.007              | 0.831              | 0.802        |              |

$\sigma^2(\delta)$  is the variance components of relative error

$\sigma^2(\Delta)$  is the variance components of absolute error

$\sigma^2(X_{PI})$  is the variance components of error when estimating the universe score by using sample mean

$E\rho^2$  is the Generalizability coefficient

$\Phi$  is the index of dependability

**Table 6** Responsiveness of the quality of life instrument QLICD-PU (n=135)

| Domains/facets<br>(number of items) | Before treatment |              | After treatment |              | Differences   |              | <i>t</i>      | <i>p</i>         | SRM         |
|-------------------------------------|------------------|--------------|-----------------|--------------|---------------|--------------|---------------|------------------|-------------|
|                                     | Mean             | SD           | Mean            | SD           | Mean          | SD           |               |                  |             |
| <b>Physical Function (8)</b>        | <b>58.70</b>     | <b>19.53</b> | <b>71.57</b>    | <b>13.06</b> | <b>-12.87</b> | <b>17.37</b> | <b>-8.61</b>  | <b>&lt;0.001</b> | <b>0.74</b> |
| Independence (3)                    | 71.23            | 27.41        | 82.35           | 16.48        | -11.11        | 23.39        | -5.52         | <0.001           | 0.47        |
| Appetite and Sleep (2)              | 43.24            | 25.59        | 58.33           | 21.87        | -15.09        | 24.39        | -7.19         | <0.001           | 0.62        |
| Physical Symptoms (3)               | 56.48            | 22.11        | 69.63           | 15.75        | -13.15        | 21.07        | -7.25         | <0.001           | 0.62        |
| <b>Psychological Function(11)</b>   | <b>75.35</b>     | <b>16.15</b> | <b>83.84</b>    | <b>13.85</b> | <b>-8.48</b>  | <b>11.78</b> | <b>-8.37</b>  | <b>&lt;0.001</b> | <b>0.72</b> |
| Cognition (2)                       | 68.61            | 22.85        | 81.11           | 17.80        | -12.50        | 23.76        | -6.11         | <0.001           | 0.53        |
| Anxiety (3)                         | 69.57            | 22.24        | 84.81           | 17.57        | -15.25        | 20.09        | -8.82         | <0.001           | 0.76        |
| Depression (3)                      | 82.47            | 20.70        | 87.35           | 14.71        | -4.88         | 14.27        | -3.97         | <0.001           | 0.34        |
| Self-Consciousness (3)              | 78.52            | 19.09        | 81.17           | 16.51        | -2.65         | 10.95        | -2.82         | 0.006            | 0.24        |
| <b>Social Function (11 )</b>        | <b>67.41</b>     | <b>14.21</b> | <b>71.16</b>    | <b>12.92</b> | <b>-3.75</b>  | <b>10.99</b> | <b>-3.97</b>  | <b>&lt;0.001</b> | <b>0.34</b> |
| Social Support/Security (6)         | 69.69            | 19.73        | 76.60           | 15.04        | -6.91         | 13.64        | -5.89         | <0.001           | 0.51        |
| Social Effects (4)                  | 64.44            | 22.08        | 63.75           | 21.27        | 0.69          | 18.00        | 0.45          | 0.655            | 0.04        |
| Sexual Function (1)                 | 65.56            | 30.67        | 68.15           | 27.90        | -2.59         | 21.22        | -1.42         | 0.158            | 0.12        |
| <b>Sub-Total (QLICD-GM) (30)</b>    | <b>68.00</b>     | <b>12.56</b> | <b>75.92</b>    | <b>10.90</b> | <b>-7.92</b>  | <b>10.02</b> | <b>-9.19</b>  | <b>&lt;0.001</b> | <b>0.79</b> |
| <b>Specific domain(14)</b>          | <b>62.72</b>     | <b>11.86</b> | <b>74.44</b>    | <b>12.14</b> | <b>-11.72</b> | <b>11.43</b> | <b>-11.91</b> | <b>&lt;0.001</b> | <b>1.03</b> |
| Upper abdomen pain(4)               | 53.47            | 17.90        | 68.43           | 11.66        | -14.95        | 19.60        | -8.86         | <0.001           | 0.76        |
| Acid regurgitation/salivation(2)    | 75.83            | 21.28        | 86.94           | 18.19        | -11.11        | 19.77        | -6.53         | <0.001           | 0.56        |
| Hiccup (1)                          | 70.00            | 28.78        | 85.56           | 19.19        | -15.56        | 26.43        | -6.84         | <0.001           | 0.59        |
| Flatulent (1)                       | 60.19            | 29.97        | 80.00           | 23.22        | -19.81        | 27.67        | -8.32         | <0.001           | 0.72        |
| Changing in stool habit (1)         | 48.89            | 28.95        | 54.63           | 24.66        | -5.74         | 27.14        | -2.46         | 0.014            | 0.21        |
| Effects of mental and life(5)       | 66.70            | 18.66        | 74.89           | 19.24        | -8.19         | 13.90        | -6.84         | <0.001           | 0.59        |
| <b>Total (44)</b>                   | <b>66.32</b>     | <b>10.73</b> | <b>75.45</b>    | <b>10.36</b> | <b>-9.13</b>  | <b>9.38</b>  | <b>-11.31</b> | <b>&lt;0.001</b> | <b>0.97</b> |

SRM: Standardized Response Mean