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# Patients' Assessment of Chronic Illness Care (PACIC): Validation and Evaluation of PACIC Scale among Patients with Type 2 Diabetes in Hungary

RESEARCH AND THEORY

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## ABSTRACT

**Introduction:** The aims of this study were to evaluate the psychometric properties of the Hungarian translation of the PACIC in a sample of patients with type 2 diabetes and to reveal the associations between the mean PACIC scores and the number of chronic diseases, or visits to GPs, and specialist. An exploratory factor analysis (EFA) has also been performed to test the structural validity of the PACIC scale.

**Methods:** The Hungarian version of PACIC was validated using randomly selected patients with type 2 diabetes (N = 684) from licensed GP practices.

**Results:** Floor (1.6%–30.2%) and ceiling effects (11.3–33.6%) were similar of the PACIC scale. The internal consistency of the total scale (Cronbach's alpha 0.93) was excellent and subscales were good (between 0.73–0.9). The mean scores of each PACIC subscale group were between 2.99–3.53. There was a weak significant correlation between the mean PACIC scores of subscales and the number of GP visits ($p < 0.001$), and specialist visits ($p < 0.001$). The EFA identified four factors on the sample (KMO = 0.931). Gender and education showed correlation with some new factors.

**Conclusion:** The psychometric properties of the Hungarian version of PACIC questionnaire showed a reasonable level of validity among patients with type 2 diabetes. Now, this instrument is ready to assess the chronic care of diabetic patients in Hungary.

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The Hungarian translation of the self-completing PACIC questionnaire used in this survey was developed in 2013, based on the guidelines of the WHO [23, 24].

### VALIDATION OF THE QUESTIONNAIRE

The validity of the Hungarian PACIC questionnaire was tested for the following psychometric properties: content validity, internal consistency reliability, convergent and construct validity. Descriptive data on predetermined subscale and total scale levels were also presented.

### ACCEPTABILITY

The acceptability of the translated items were assessed by exploring rates of missing data on item level. The researchers also calculated the proportion of the respondents with the lowest (floor effect) and the highest (ceiling effect) possible scores on PACIC scale at item level and original predetermined subscales in order to prove the acceptability of the instrument. The floor and ceiling effects were measured as the percent of patients who reported a minimum (i.e., 1) or maximum (i.e., 5) scores. If a substantial proportion of the respondents score at either extreme of range, suggesting that the scale is not sensitive to measure the real differences [25]. Frequency less than 30% was accepted [26]. A stricter criterion was used on the total PACIC scale (<1.5 or >4.5).

### RELIABILITY

The internal consistency of the questionnaire was assessed by calculating the Cronbach's α value both subscales and total scale levels. Good internal consistency is needed to justify summarizing of items at both levels [27]. Cronbach's alpha value between 0.70 and 0.80 can be considered acceptable and scores over 0.80 as excellent [25], however, alphas should not exceed 0.95 [27]. The inter-correlations between the predetermined subscales were assessed with Spearman's rho.

Association analyses (related to demographic characteristics and number of chronic conditions and number of visits) were performed by independent sample of t-test, ANOVA, Kruskal-Wallis or Mann-Whitney U tests, Sperman's rho – rank correlation coefficient, as appropriate.

Exploratory factor analysis was performed on the PACIC instrument to explore the latent feature of structure of 20 item scale. Tests of sampling adequacy (Kaiser–Meyer–Olkin-criterion ≥0.50) and multicollinearity (Bartlett test of sphericity with a P-value < 0.05) were undertaken prior to factor extraction to ensure that the scale items were appropriate for principle component analysis. The EFA produced solutions from one to six factors. Calculation results were measured using multiple fit indices. The degree of fit was evaluated using $\chi^2$ test (degree of freedom df, associated p value); comparative fit index (CFI, Hull method); Tucker-Lewis index (TLI; >0.95 very good, >0.90 good). It was even used root-mean-square error of approximation (RMSEA; 0.06> very good; >0.08 good).

SPSS and R statistical programmes (version 22.0 and version 4.02) were used for data recording and analysis.

### ETHICAL APPROVAL

The study was approved by the Hungarian Medical Research Council.

## RESULTS

A total of 684 questionnaires were returned from the 800 questionnaires (response rate: 85.5%) distributed among diabetic patients, all of them were evaluable.

The mean age of the respondents was 63.19 (SD = 12.79), 51.6% of them were female. The main sociodemographic characteristics have been shown in Table 1.

Most patients who filled in the questionnaire suffered from other chronic diseases besides diabetes. Hypertension had the highest prevalence (74.7%), but the prevalence of arthritis (36.1%) and chronic pain (22.8%) were also high among others. The prevalence of depression (13.9%) and ischaemic heart diseases (13.5%) was similar among respondents.

12.5% of the respondents did not have any other diagnosed chronic diseases besides diabetes, 28.2% had one and 13.4% suffered from four or more chronic diseases (2 chronic diseases 28.7%; 3 chronic diseases 18.9%). During the last six months, 10.5% of the patients visited their GP once, 39.0% of them 2–3 times, and 50.4% 4 or

| CHARACTERISCTICS | N (%) (N = 684) |
|---|---|
| **Gender** | |
| male | 331 (48.4) |
| female | 353 (51.6) |
| **Age** (min 19, max 96) | |
| ≤54 | 138 (20.2) |
| 55–64 | 206 (30.1) |
| 65+ | 340 (49.7) |
| **Marital status** | |
| married | 401 (58.6) |
| widow | 151 (22.1) |
| single | 53 (7.8) |
| divorced | 70 (10.2) |
| other | 9 (1.3) |
| **Education** | |
| primary school or less | 169 (24.7) |
| secondary school/secondary grammar school | 395 (57.8) |
| higher education | 120 (17.5) |

**Table 1** Patients' main characteristics.

more than 4 times. Regarding the number of specialists visits, they are much less. 48.6% of the patients attended a specialist appointment once and 36.0% 2–3 times in the last six months (4–5 × 10.4%; ≥6 × 5.1%).

The response rate was high with only two missing items in 2 respondents' questionnaire. The 20 questions on assessment of the quality of care can be subscaled into 5 topics (Patient activation; Delivery system design/decision support; Goal setting; Problem-solving/contextual counseling; Follow-up/coordination).

Regarding the results of quality-of-care responses, 41.5% of the respondents (rated 4 or 5 of the first item) cooperated with their GPs to develop a treatment plan for their chronic disease, according to 40.4% of them doctors and nurses always considered their values, belief and traditions respectively when they proposed treatment. More than sixty percent (62.0%) of respondents were asked about their problems related to taking medicine at every attended appointment. 65.5% of the patients were satisfied completely with the care of their GPs, these patients' opinion was that the whole procedure of care was almost always well organized.

Patients' opinion was examined about the extent of personalization of their care. Forty percent of respondents (40.1%) reported they had never been asked about their health behavior in any way, 43.4% had never been recommended for group work that could help them to deal with their chronic disease, to get well, or to change their lifestyle. 56.1% of patients were referred to a dietitian, patient education and counseling specialist in almost all cases.

Floor and ceiling effects showed a wide variation at single items level, but it was low both on the subscales and on the total PACIC scale. Similar floor and ceiling effects were found in our study. The floor effects ranged between 1.6% and 30.2% (>30% for one item), while the ceiling effects ranged between 11.3% and 33.6% (>30% for two items). Item 9 ("Given a copy of my treatment plan.") showed the highest floor effect, while the ceiling effect was more than 30% for item 5 ("Satisfied that my care was well organized.") and item 20 ("Asked how my visits with other doctors were going."). On subscales the highest value (ceiling effect) was 10.1% for *Follow-up/coordination*, however there was no floor/ceiling value, which exceeded the 20% limit on subscale level (Table 2). Based on the responses of the quality survey of care, the mean total PACIC score was 3.24 (SD 0.85). The total PACIC scale approched the normal distribution; however, it was moderately skewed (skewness 0.530, kurtosis − 0.248). The five subscales means moved in a narrow range, ranged from 2.99 (1.02) for *Goal setting/tailoring* to 3.53 (0.93) for *Delivery system design/decision support*.

In terms of reliability the Cronbach's αvalue for the whole scale was 0.936, while the Cronbach's αvalue for the subgroup was as follows: patient activation 0.818 (3 items), delivery system design/decision support 0.730 (3 items), goal setting/tailoring 0.823 (5 items), problem solving/contextual 0.830 (4 items) and follow-up/coordination 0.815 (5 items).

The inter-correlation (Spearman's rho) between the subscales was moderate to high, being the highest between the Problem-solving and Goal-setting scales (0.752; $p < 0.001$) and Goal-setting and Decision-support scales (0.660; $p < 0.001$), whereas the Follow-up scale was the least correlated with the other scales, and the lowest with the Patient-activation scale (0.489; $p < 0.001$). The Goal-setting (0.881; $p < 0.001$) and Problem-solving (0.892; $p < 0.001$) scales correlated the highest with the total PACIC scale and the Follow-up scale the least (0.725; $p < 0.001$).

The number of diseases and the age showed a moderately weak relationship (Pearson's $r = 0.314$, $p < 0.001$). Examining the relationship between the number of diseases and PACIC mean score, significant relationship was not found. However, as the number of diseases increased, the number of attended appointments at GPs and specialists increased paralelly (Pearson's $r = 0.208$ and $r = 0.170$, $p < 0.001$ in both cases).

There was a weak significant association between the mean PACIC scores of subscales and the number of visits to GPs (the value of Spearman's rhos respectively were 0.044 ($p = 0.25$); 0.157 ($p < 0.001$); 0.127 ($p < 0.001$); 0.122 ($p < 0.001$); 0.128 ($p < 0.001$)). There was a weak significant association between the mean PACIC scores subscales and visits to specialists (the value of Spearman's rhos respectively were 0.168 ($p < 0.001$); 0.127 ($p = 0.001$); 0.151 ($p < 0.001$); 0.178 ($p < 0.001$); 0.121 ($p = 0.002$)).

The means of the subscales for the numbers of the visits of GPs and specialist are shown in Table 3. In all cases, there was a significantly higher PACIC subscale mean in the group with more than 6 visits.

The analysis of the different demographic groups has not shown significant difference between mean PACIC scores (gender, age, education, marital status) (Table 4).

## EXPLORATORY FACTOR ANALYSIS

The associations between the 20 questions of quality of care were analyzed by exploratory factor analysis (EFAPromax rotation).

The EFA produced solutions from one to six factors. The results are shown in Table 5. All goodness-of-fit incidices show correct results model (KMO = 0.931; Bartlett test $p = 0.000$). These results and the Hull method (based on comparative fit index CFI, Velicer analysis) proposed a four-factor.

The factor loading values of the four-factor model are shown in Table 6. The grouping of items is shown in Figure 1.

The given names of these generated groups reflect the local Hungarian circumstances.

| | MEAN (SD) | FLOOR EFFECT[a] | CEILING EFFECT[a] |
|---|---|---|---|
| | | N (%) | |
| Patient activation (1–3 items; no missing data) | 3.32 (0.99) | 9 (1.3) | 50 (7.3) |
| Q1 | 3.17 (1.18) | 64 (9.4) | 98 (14.3) |
| Q2 | 3.08 (1.19) | 75 (11.0) | 87 (12.7) |
| Q3 | 3.71 (1.08) | 21 (3.1) | 185 (27.1) |
| Delivery system design/decision support (4–6 items; no missing data) | 3.53 (0.93) | 2 (0.3) | 65 (9.5) |
| Q4 | 3.05 (1.34) | 118 (17.3) | 116 (17.0) |
| Q5 | 3.85 (1.04) | 11 (1.6) | 225 (32.9) |
| Q6 | 3.68 (1.07) | 21 (3.1) | 169 (24.7) |
| Goal setting/tailoring (7–11 items; 1 missing item in 1 respondent's questionnaire) | 2.99 (1.02) | 7 (1.02) | 35 (5.12) |
| Q7 | 3.24 (1.22) | 80 (11.7) | 107 (15.6) |
| Q8 | 3.23 (1.19) | 62 (9.06) | 114 (16.67) |
| Q9 | 2.81 (1.53) | 206 (30.2) | 143 (20.9) |
| Q10 | 2.77 (1.37) | 184 (26.9) | 77 (11.3) |
| Q11 | 2.91 (1.29) | 128 (18.7) | 77 (11.3) |
| Problem-solving/contextual counselling (12–15 items; 1 missing item in 1 respondent's questionnaire) | 3.23 (1.02) | 8 (1.2) | 48 (7.0) |
| Q12 | 3.00 (1.38) | 144 (21.1) | 115 (16.8) |
| Q13 | 3.13 (1.25) | 86 (12.6) | 109 (15.9) |
| Q14 | 3.40 (1.20) | 56 (8.2) | 136 (19.9) |
| Q15 | 3.40 (1.20) | 56 (8.2) | 134 (19.6) |
| Follow-up/coordination (16–20 items; no missing data occured) | 3.29 (1.01) | 5 (0.7) | 69 (10.1) |
| Q16 | 2.94 (1.48) | 180 (26.4) | 136 (19.9) |
| Q17 | 2.82 (1.40) | 183 (26.8) | 92 (13.5) |
| Q18 | 3.48 (1.27) | 72 (10.5) | 169 (24.7) |
| Q19 | 3.52 (1.29) | 63 (9.2) | 199 (29.1) |
| Q20 | 3.70 (1.23) | 48 (7.0) | 230 (33.6) |
| **PACIC total score (20 items; 2 missing items alowed)** | 3.24 (0.85) | 0 (0) | 5 (0.73) |

**Table 2** Descriptive data on PACIC scale (N = 684).
[a] Floor and ceiling effects = percent of respondents attaining minimum or maximum scores (1/5).

Factor 1 (MR4) was called 'Self-management'. There were 7 items of the original 20 questions in this group (1; 2; 3; 5; 6; 7; 8) coming from different subscale topic groups: all the questions of *Patient activation* (1; 2; 3) and 2–2 questions from *Delivery system design* and *Goal setting* groups (5; 6; 7; 8).

Factor 2 (MR1) was named 'Involvement of Specialists'. This referred to question informing the researchers about what specialists the patients were referred to by primary care, and – after consultation with specialists – the GP could provide assistance in how the patient could or could not adapt this information to his or her own life.

Factor 3 (MR2) was named 'Encouraging Patient Activity'. This includes questions (10; 11; 17) that provides information about patient satisfaction with community programs and group activities recommended by the GP.

Factor 4 (MR4) was named 'Personalization'. These questions examine the personalization of the treatment plan based on cooperation between the GP and the patient. The answers informed the researchers whether the treatment plan was prepared considering the patient's belief and values. Moreover, the extent of help in adapting the treatment plan to patient's everyday life can also be estimated. Thus, a clearer view can be obtained about care and patient follow-up in primary care.

| NUMBER OF GP VISITS IN THE LAST 6 MONTHS | PATIENT ACTIVATION (MEAN (SD)) | DELIVERY SYSTEM DESIGN/DECISION SUPPORT (MEAN (SD)) | GOAL SETTING (MEAN (SD)) | PROBLEM-SOLVING/ CONTEXTUAL COUNSELLING (MEAN (SD)) | PROBLEM-SOLVING/ CONTEXTUAL COUNSELLING (MEAN (SD)) |
|---|---|---|---|---|---|
| **1x** | 3.31 (1.04) | 3.38 (0.99) | 2.80 (1.11) | 3.06 (1.17) | 3.15 (1.03) |
| **2–3x** | 3.33 (0.99) | 3.46 (0.89) | 2.92 (0.93) | 3.18 (0.98) | 3.24 (0.92) |
| **4–5x** | 3.16 (0.92) | 3.39 (0.94) | 2.92 (0.96) | 3.14 (1.00) | 3.19 (1.00) |
| **≥6** | **3.50 (1.01)** | **3.86 (0.90)** | **3.28 (1.12)** | **3.51 (1.01)** | **3.57 (1.11)** |
| ***p** | 0.017 | 0.000 | 0.000 | 0.001 | 0.001 |
| **NUMBER OF SPECIALIST VISITS IN THE LAST 6 MONTHS** | **PATIENT ACTIVATION (MEAN (SD))** | **DELIVERY SYSTEM DESIGN/DECISION SUPPORT (MEAN (SD))** | **GOAL SETTING (MEAN (SD))** | **PROBLEM-SOLVING/ CONTEXTUAL COUNSELLING (MEAN (SD))** | **PROBLEM-SOLVING/ CONTEXTUAL COUNSELLING (MEAN (SD))** |
| **1x** | 3.15 (1.03) | 3.43 (0.95) | 2.85 (0.98) | 3.09 (1.00) | 3.19 (0.98) |
| **2–3x** | 3.43 (0.94) | 3.51 (0.89) | 3.00 (1.01) | 3.28 (1.00) | 3.26 (1.00) |
| **4–5x** | 3.41 (0.92) | 3.69 (1.02) | 3.21 (1.06) | 3.44 (1.07) | 3.35 (1.09) |
| **≥6** | **3.84 (0.72)** | **4.02 (0.73)** | **3.73 (1.02)** | **3.93 (0.91)** | **4.00 (1.06)** |
| ***p** | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 |

**Table 3** The numbers of visits of GPs and specialist and mean PACIC scores.
*ANOVA test.
The highest mean PACIC scores are shown in bold. These mean values are significantly higher than the other group means.

| CHARACTERISTIC | PACIC MEAN (SD) | P-VALUE |
|---|---|---|
| **Gender** | | |
| male | 3.24 (0.82) | 0.983[a] |
| female | 3.24 (0.88) | |
| **Age** | | |
| ≤54 | 3.27 (0.87) | 0.597[b] |
| 55–64 | 3.28 (0.88) | |
| 65+ | 3.21 (0.83) | |
| **Professional education** | | |
| upper secondary education or less | 3.24 (0.85) | 0.616[a] |
| higher education | 3.28 (0.88) | |
| **Marital status** | | |
| married | 3.23 (0.86) | 0.805[b] |
| widow | 3.25 (0.87) | |
| single | 3.32 (0.77) | |
| divorced | 3.30 (0.84) | |

**Table 4** Equality between mean PACIC scores and patients' demographic characteristics (N = 684).
[a] Independent samples t-test.
[b] ANOVA.

The new variables formed by factor analysis were further examined. The new factors showed no significant correlation with age and disease number (correlation analysis). Based on independent samples t-test Factors 1, 2, 3 did not differ by gender (p = 0.977; p = 0.175; p = 0.99), only factor 4 differed by gender (p = 0.003). The mean for the female group was significantly higher.

Factor 1 showed a significant difference between the different educational groups (ANOVA, p = 0.029). Lower educational attainment showed lower goal setting. A high level of education means more conscious treatment of the disease.

Factor 2 also showed a significant difference between the different educational groups (ANOVA, p = 0.048). Those with lowest and highest qualifications involve specialists in treatment the least. The most acceptance of the help is in high school graduates. For factors 3 and 4, there was no significant difference by educational attainment.

| FACTORS | $\chi^2$ | DF | P | CFI | TLI | RMSEA |
|---|---|---|---|---|---|---|
| 1 | 1798.8 | 170 | <1.1e–26 | 0.9714 | 0.718 | 0.132 |
| 2 | 922.53 | 151 | <5.7e–11 | 0.9879 | 0.794 | 0.113 |
| 3 | 508.7 | 133 | 2.5e–45 | 0.9952 | 0.832 | 0.102 |
| **4** | **277.82** | **116** | **2.7e–15** | **0.9991** | **0.878** | **0.087** |
| 5 | 176.94 | 100 | 3.3e–06 | – | 0.901 | 0.078 |
| 6 | 98.66 | 85 | <0.15 | – | 0.923 | 0.069 |

**Table 5** Exploratory factor analysis goodness-of-fit results (1–6 factors; N = 684).
Tucker-Lewis index (TLI; >0.95 very good, >0.90 good). Root-Mean-Square Error of Approximation (RMSEA; 0.06> very good; >0.08 good).

| PREDETERMINED SUBSCALES AND ITEMS | F1 DETERMINE PURPOSES MR4 | F2 INVOLVEMENT OF SPECIALISTS MR1 | F3 ENCOURAGING PATIENT ACTIVITY MR2 | F4 PERSONALI-ZATION MR3 |
|---|---|---|---|---|
| Patient activation | | | | |
| 1. Asked for my ideas when we made a treatment plan | **0.94** | –0.16 | 0.00 | –0.09 |
| 2. Give choices about treatment to think about. | **0.90** | –0.16 | 0.04 | –0.10 |
| 3. Asked to talk about any problems with my medicines or their effects. | **0.71** | 0.20 | –0.02 | –0.11 |
| 4. Given a written list of things I should do to improve my health. | 0.15 | –0.06 | –0.09 | **0.68** |
| 5. Satisfied that my care was well organized. | **0.54** | 0.36 | –0.23 | 0.03 |
| 6. Shown how what I did to take care of myself influenced my condition. | **0.41** | 0.22 | –0.05 | 0.23 |
| 7. Asked to talk about my goals in caring for my condition. | **0.31** | 0.11 | 0.25 | 0.21 |
| 8. Helped to set specific goals to improve my eating or exercise. | **0.31** | 0.11 | 0.14 | 0.30 |
| 9. Given a copy of my treatment plan. | 0–0.17 | 0.24 | –0.03 | **1.07** |
| 10. Encouraged to go to a specific group or class to help me cope with my chronic condition. | –0.02 | –0.12 | **1.02** | –0.05 |
| 11. Asked questions, either directly or on a survey, about my health habits. | 0.15 | –0.12 | **0.62** | 0.21 |
| 12. Sure that my doctor or nurse thought about my values, beliefs, and traditions when they recommended treatments to me. | –0.02 | –0.03 | 0.22 | **0.49** |
| 13. Helped to make a treatment plan that I could carry out in my daily life. | 0.04 | 0.26 | 0.13 | **0.44** |
| 14. Helped to plan ahead so I could take care of my condition even in hard times. | 0.11 | **0.50** | 0.12 | 0.14 |
| 15. Asked how my chronic condition affects my life. | 0.16 | **0.51** | 0.17 | 0.03 |
| 16. Contacted after a visit to see how things were going. | 0.15 | 0.36 | –0.15 | **0.62** |
| 17. Encouraged to attend program sin the community that could help me. | –0.16 | 0.31 | **0.81** | –0.16 |
| 18. Reffered to a dietitian, health educator, or counselor. | –0.06 | **0.49** | 0.30 | –0.05 |
| 19. Told how my visits with other types of doctors, like an eye doctor or other specialist, helped my treatment. | –0.07 | **0.95** | 0.06 | –0.17 |
| 20. Asked how my visits with other doctors were going. | –0.03 | **0.87** | –0.09 | –0.07 |

**Table 6** Factor Analysis: using method = minres; rotation "promax". Standardized loadings (pattern matrix) based upon correlation matrix.

## DISCUSSION

The main aim of this study was to validate the Hungarian version of the PACIC scale and evaluate the chronic care management of patients with type 2 diabetes at primary care level. The response rate was high in this study and the unrespondent rate to the items was minimal. The validation analysis showed a good acceptability and internal consistency reliability (the Cronbach's α value for the subscales were more than 0.800, except the subscale 2) of the original instrument in our sample. The total PACIC scale approched the normal distribution. Regarding the acceptability we found only three items where the floor or ceiling effects exceded the 30% limit and there was no subscale where the floor or ceiling effects exceded the more stricter 20% limit. The results (similar floor and ceiling effect) are in line with the previous findings of Kim et al (2021), while others found a more notably floor effects [17, 28, 29, 30]. It is important to note, that in our study the exploratory factor analysis identified four-factor structure as best fitting model, while the five-factor model also showed a good goodness of fit results.

The background data of patients showed that the most prevalent chronic diseases and conditions among patients were hypertension, arthritis and chronic pain. Results showed that about 40% of the respondents

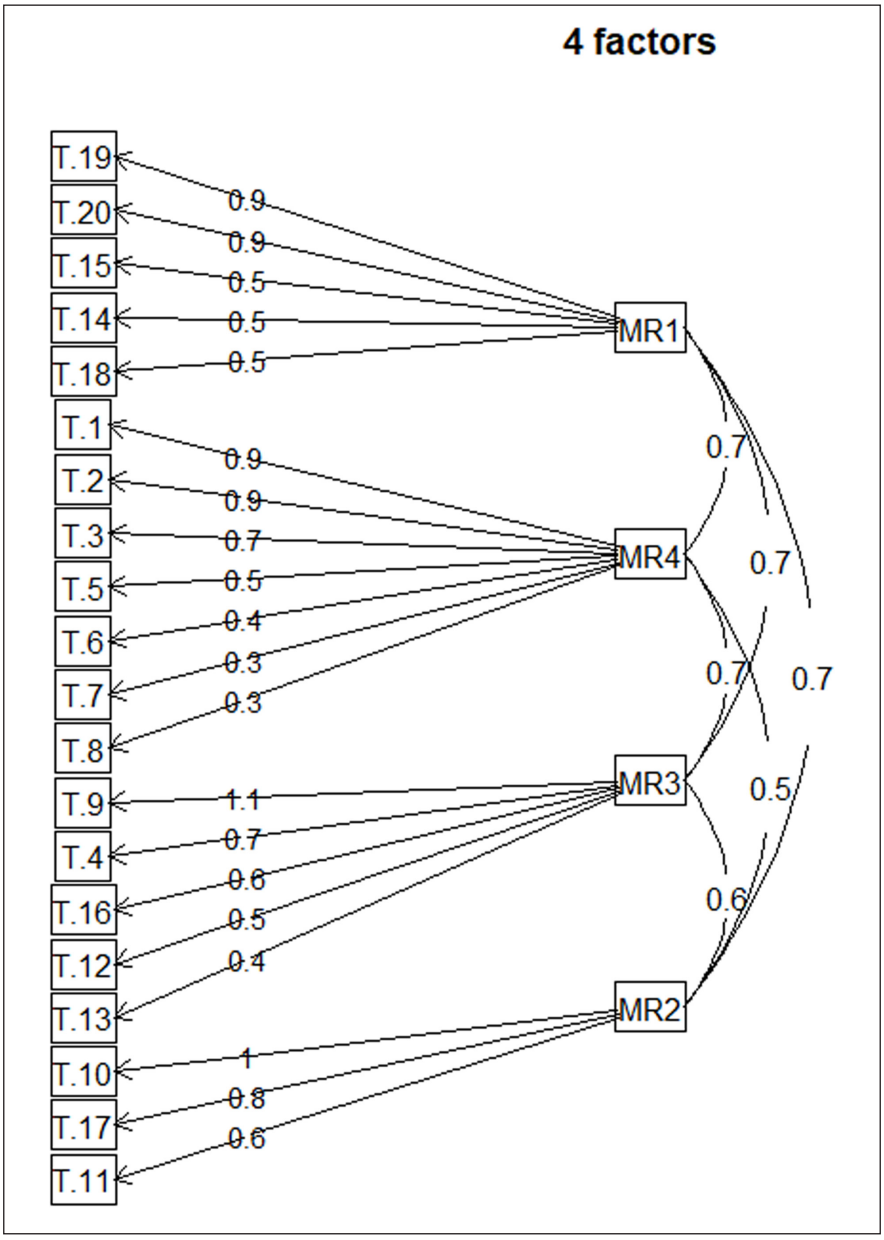


**Figure 1** Factor Analysis – four-factor model. Standardized loadings (pattern matrix) based upon correlation matrix. The figure also indicates interactions.

cooperated with their GPs to develop a treatment plan for their chronic disease and reported that doctors and nurses always considered their values, belief and traditions respectively when they proposed a treatment. More than sixty percent of respondents were asked about their problems related to taking medicine and the majority of the patients were completely satisfied with the care provided by their GPs.

Taking the PACIC subscale scores the mean scores were around 3.2, the *Delivery system design/decision support* subgroup was rated highest, while the *Goal setting* received the lowest mean score. Some studies showed lower total and subscale scores [17, 30], while others found similar scores [9, 28, 31]. Comparing our results with the findings of the latest study carried out among patients with type 2 diabetes in Finland published in 2018 [17] our PACIC scores were higher in each subgroup. In both studies the *Delivery system design/decision support* received the greatest score. However, in the Finnish study the respondents rated the *Follow up/coordination* subgroup with the lowest score. The reasons of the difference among studies can be explained by the different health care systems operating in the countries, the different characteristics (age, gender ethnic groups, diseases conditions) and expectations toward the health care system of patients.

Similarly to the previous studies the association between the PACIC scores and the sociodemographic characteristics of respondents were investigated. Drewes and colleagues found negative association between PACIC scores and age and education levels [20]. However, they did not find association with gender, duration of diabetes and comorbidity [20]. Simonsen and colleagues revealed negative association between