Clinical Research

Translation, adaptation, and validation of western ontario and mcmaster universities osteoarthritis index (WOMAC) for indonesian

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ABSTRACT

Introduction: Osteoarthritis (OA) of the knee remains a major health problem in Indonesia. WOMAC is a disease specific questionnaire for knee and hip osteoarthritis patients. It consists of 3 subscales, which are pain, stiffness and physical function. It is one of the commonly used functional score for research or medical evaluation. Even though functional score should be accepted internationally, translation to native language and local custom is needed. WOMAC has been translated into 72 languages. In South East Asia, validated languages for WOMAC are Thailand, Cantonese (Malaysia), English (Malaysia, Singapore), Malay (Malaysia, Singapore), Tamil (Malaysia) and Mandarin (Singapura). Indonesia has no functional score for OA that has already validated into Indonesian. The aim of this study is to translate and validate the WOMAC into Indonesian.

Methods: A cross-sectional study was conducted at Siloam General Hospital, Lippo Village, with one hundred samples. All data were obtained by interview and questionnaire, then analyzed using Crohnbach's Alpha coefficient for reliability test dan face validity for validity test.

Results: There were 12 males and 88 females with a mean age of 63.67±9.223 years, who 36% of the patients had Kellgren-Lawrence grade III. Crohnbach's alpha coefficient was 0.966, suggesting that the items had relatively high internal consistency and highly correlated.

Conclusion: Based on this study, the Indonesian WOMAC questionnaire is validated dan reliable to be used among Indonesian population.

ABSTRAK

Pendahuluan: *Osteoartritis (OA) lutut masih menjadi masalah kesehatan yang penting di Indonesia. WOMAC adalah kuesioner yang spesifik untuk pasien dengan OA lutut dan pinggul. WOMAC terdiri dari 3 bagian penilaian, yaitu nyeri, kekakuan, dan fungsi fisik. Ini merupakan salah satu sistem skor fungsional yang paling sering digunakan baik untuk keperlukan penelitian maupun evaluasi medis. Walaupun sistem skor fungsional harus dapat diterima secara internasional, terjemahan dalam bahasa asli dan yang disesuaikan dengan kebudayaan serta kebiasaan daerah juga diperlukan. WOMAC sudah diterjemahkan dalam 72 bahasa. Di Asia Tenggara, bahasa yang sudah tervalidasi adalah bahasa Thailand, Kanton (Malaysia), Inggris (Malaysia, Singapura), Melayu (Malaysia, Singapura), Tamil (Malaysia), dan Mandarin (Singapura). Indonesia masih belum memiliki sistem skor fungsional untuk OA yang sudah tervalidasi dalam bahasa Indonesia. Tujuan studi ini adalah untuk menerjemahkan dan memvalidasi WOMAC dalam bahasa Indonesia.*

Metode: *Studi potong lintang dilakukan pada Rumah Sakit Umum Siloam, Lippo Village, dengan 100 sampel. Seluruh data diperoleh melalui wawancara dan pengisian kuesioner, dilanjutkan dengan analisa dengan koefisien Crohnbach's Alpha untuk tes reliabilitas dan* face validity *untuk tes validitas*.

Hasil: *Didapatkan 12 sampel laki-laki dan 88 perempuan dengan rata-rata usia 63.67±9.223 tahun, yang 36% diantaranya memiliki OA dengan Kellgren Lawrence derajat III. Koefisien Crohnbach's Alpha 0.966, menunjukkan bahwa terdapat konsistensi internal yang relatif tinggi dan sangat berkorelasi.*

Kesimpulan: *Berdasarkan studi ini, kuesioner WOMAC dalam Bahasa Indonesia sudah tervalidasi dan dapat digunakan untuk masyarakat Indonesia.*

Keywords: knee osteoarthritis, WOMAC, functional scoring system, Indonesian
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INTRODUCTION

Osteoarthritis (OA) is a joint degenerative disease that related to cartilage damage. OA of the knee remains a major health problem with a high incidence in Indonesia affecting 15.5% men and 12.7% women. In recent days, there are some functional scoring systems to help assess the patients' quality of life. These scoring systems were made based on the Caucasian race dan other Western countries. Either for research or medical evaluation purposes, these scoring systems need to have been validated and internationally recognized as functional scores in respective native language. In Southeast Asia, only few countries have OA functional score validated to their native languages. Indonesia has no OA functional score validated yet into Indonesian. WOMAC is one of the commonly used functional score in Indonesia which consists of 3 subscales, *i.e.* pain, stiffness, and physical functions. The aim of this study is to translate and validate the Indonesian WOMAC for Indonesian.

METHODS

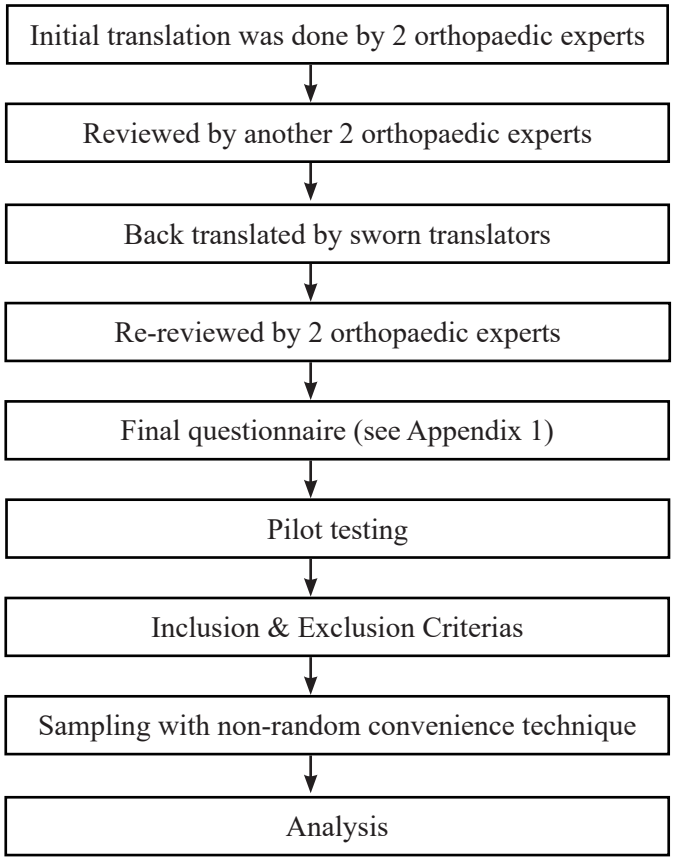

Figure 1. Research Plot

This research was completed in 4 months. Forward translation was done by 2 orthopedic experts and reviewed by another 2 orthopedic experts. Backward translation was done by sworn translators and reviewed by another 2 orthopedic experts. Final questionnaire was obtained, and a cross-sectional study was conducted at Siloam General Hospital, Lippo Village, with one hundred samples included.

The samples were obtained by non-random convenience sampling according to the inclusion and exclusion criteria set previously. The inclusion criteria are Indonesia citizens, patients with primary knee osteoarthritis (regardless degrees and sides), willing to have their data taken, and willing to sign the consent. While the exclusion criteria are patients with history of musculoskeletal injury on lower leg or other arthritis diseases, have mental disease, and didn't complete the questionnaire. Ethics was done by Faculty of Medicine, Universitas Pelita Harapan ethical committee.

All data were obtained by interview and questionnaire, then analyzed using SPSS with the Crohnbach's Alpha coefficient as the reliability test. Validity test was done through face validity. The tests were done with the back translated questionnaire and re-reviewed by the orthopaedic experts. Pre-testing was done with the final questionnaire and tested on 10 subjects according to the inclusion and exclusion criteria.

RESULTS

Table 1. Research Subjects Description for Numeric Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Age	100	38	88	63.67	9.223
Body Weight	100	38	98	64.38	11.427
Body Height	100	140	173	154.63	7.129
BMI	100	17	39	26.93	4.541
WOMAC Right Knee	100	0	316	64.52	58.803
WOMAC Left Knee	100	0	316	62.04	53.550

The mean age of the samples was 63.67$\pm$9.223 years with range from 38 to 88 years. While the mean BMI was 26.93$\pm$4.541.

Table 2. Research Subjects Description for Categorical Variables

No	Variable	n	%
1	Gender		
	Men	12	12
	Women	88	88
2	KL grading Right Knee		
	Missing	12	12
	1	1	1
	2	23	23
	3	41	41
	4	23	23
3	KL grading Left Knee		
	Missing	14	14
	1	0	0
	2	26	26
	3	41	41
	4	19	19

From the 100 patients, 88 were women and 12 were man. Majority of the samples (41%) had grade III osteoarthritis based on Kellgren-Lawrence grading.

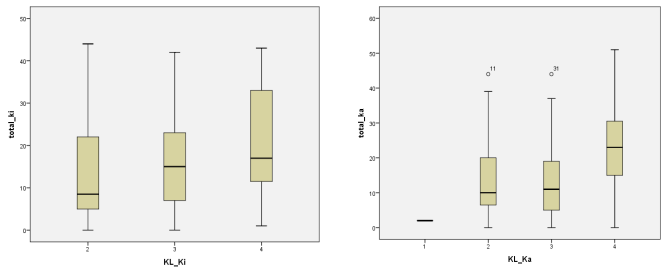

Figure 2. Total WOMAC score compared to Kellgren-Lawrence grading of the knee osteoarthritis (From Left-to-Right: Left Knee, Right Knee)

From the reliability test with Crohnbach's Alpha coefficient (*see Appendix 2*), the score was 0.966. From the item statistics (*Table 3*), Q19 (Physical Function (PF) no. 12) and Q21 (PF14) of both knees gave much lower scores on mean and standard deviation. From the inter-item correlation matrix (*see Appendix 3*), Q17-Q20 (PF10-13) for both knees did not give good score compared to the other items, especially Q19 (PF12). Based on the item total statistics (*see Appendix 4*), there would not be any change in Crohnbach's Alpha coefficient if any one of the items was deleted.

Table 3. Item Statistics

	Mean	Std. Deviation		Mean	Std. Deviation
Left 1	1.07	1.027	Right 1	1.13	1.160
Left 2	1.37	1.220	Right 2	1.42	1.319
Left 3	.49	.893	Right 3	.44	.857
Left 4	.31	.706	Right 4	.32	.750
Left 5	.69	.918	Right 5	.72	.986
Left 6	.98	1.180	Right 6	.92	1.134
Left 7	.59	.877	Right 7	.55	.857
Left 8	1.00	.943	Right 8	1.03	.969
Left 9	1.04	.963	Right 9	1.05	.989
Left 10	.74	.895	Right 10	.78	.960
Left 11	.45	.757	Right 11	.47	.810
Left 12	.52	.822	Right 12	.59	.877
Left 13	.49	.759	Right 13	.57	.844
Left 14	.84	.813	Right 14	.88	.844
Left 15	.70	.882	Right 15	.75	.925
Left 16	.54	.869	Right 16	.61	.952
Left 17	.52	.703	Right 17	.56	.783
Left 18	.39	.790	Right 18	.41	.805
Left 19	.14	.403	Right 19	.12	.383
Left 20	.72	.996	Right 20	.74	1.070
Left 21	.11	.424	Right 21	.12	.456
Left 22	.32	.649	Right 22	.39	.723
Left 23	.98	1.128	Right 23	1.00	1.163
Left 24	.51	.904	Right 24	.56	.925

DISCUSSION

Validation was done at the beginning of the study by doing the forward and backward translations and then had them reviewed by the orthopaedic experts. Pilot study with the final questionnaire was done with 10 samples and all gave good remarks, thus it is concluded as valid questionnaire.

The questions were well accepted by the patients and it took approximately 8 minutes to complete the questionnaire. All patients were literate and fill the questionnaire themselves.

Based on the research, the alpha coefficient was found

to be 0.966, suggesting that the items have relatively high internal consistency, highly correlated, and reliable. From the item statistics and inter-item correlation matrix it was suggested to remove some of the questions, but based on the item total statistics, there would not be any change in the alpha coefficient if any one question was removed. Therefore, it was decided not to remove any question from the questionnaire.

The pain and stiffness subscales were very well accepted, but there were some problems with the physical function subscales. The term "toilet" is ambiguous for some patients due to the Indonesian habit for squatting rather than sitting on the toilet. As for Q17/PF10 (*Bangun dari tempat tidur* or Rising from bed), Indonesian has the perception of waking up instead of getting out of the bed. Q18/PF11 (*Melepaskan kaus kaki*/stocking or Taking off socks/stockings). Q19/PF12 (*Berbaring di tempat tidur* or lying in bed) doesn't have good correlation with other questions because for Indonesian there is a slight bias between sleeping and lying in bed. Sleeping and lying in bed carried almost the same meaning for Indonesian. Q20/PF13 (*Keluar/masuk bak mandi (melangkah setinggi±50cm)* or Getting in/off bath) is the most subjective question to ask in this questionnaire. It is hard to find bathtub in Indonesians' houses, so it is hard to picture how to get in/off the bathtub. We added additional information to help Indonesian in comprehending the question, but it was still hard to make them get the real meaning of this question. Q21/PF14 (*Duduk* or sitting) has lower scores in mean and standard deviation because when we say "sit" or "*duduk*" to Indonesian, some of the Indonesian will think of sitting on the floor rather than sitting on a chair. WOMAC for Arab population was also confronted with the same problems regarding the socks and stockings, getting in/off bath, and sitting. Though Singapore has similar background with Indonesia, WOMAC for Singapore population is quite different, where the pain and physical function subscales have better correlations.

This study still has some limitations. First, the study was limited to knee osteoarthritis, where it should be generalized with hip osteoarthritis. Second, the sampling was done with non-random convenience sampling. Third, the sample was limited from 1 health center in a short time period. We expected that there will be better study in near future with random sampling and greater samples that can represent the population better. For the validation, it was done by face validity and for the reliability, the test was done with Crohnbach's Alpha coefficient. These methods are quite simple and we hope future studies will use more complex methods.

CONCLUSION

Based on this research, the Indonesian WOMAC questionnaire is validated dan reliable to be used in the Indonesian population.

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Appendix 1. Indonesian WOMAC Questionnaire

Original WOMAC

0: None
1: Mild
2: Moderate
3: Severe
4: Extreme

PAIN

How much pain do you have:
1. Walking on flat surface
2. Going up or down stairs
3. At night while in bed
4. Sitting or lying
5. Standing upright

STIFFNESS

How severe is your stiffness:
1. After first awakening in the morning
2. After sitting or resting later in the day

PHYSICAL FUNCTION

What degree of difficulty do you have:
1. Descending stairs
2. Ascending stairs
3. Rising from seating
4. Standing
5. Bending to floor
6. Walking on flat
7. Getting in/out of car
8. Going shopping
9. Putting on socks/stockings
10. Rising from bed
11. Taking off socks/stockings
12. Lying in bed
13. Getting in/off bath
14. Sitting
15. Getting on/off toilet
16. Heavy domestic duties
17. Light domestic duties

Indonesian WOMAC

Skor	Nyeri	Kaku	Fungsi Fisik
0	Tidak nyeri	Tidak kaku	Tidak sulit
1	Nyeri ringan	Kaku ringan	Agak sulit
2	Nyeri sedang	Kaku sedang	Cukup sulit
3	Nyeri hebat	Kaku hebat	Sangat sulit
4	Nyeri sangat hebat	Kaku sampai terkunci	Sangat sulit sekali

NYERI:

Seberapa nyeri lutut yang anda rasakan saat:
1. Berjalan di tempat yang rata
2. Naik atau turun tangga
3. Tidur malam hari
4. Duduk atau berbaring
5. Berdiri tegak

KAKU:

Seberapa berat kaku lutut yang anda rasakan saat:
1. Awal bangun tidur di pagi hari
2. Setelah duduk atau beristirahat di siang hari

FUNGSI FISIK:

Seberapa parah kesulitan yang anda alami saat:
1. Turun tangga
2. Naik tangga
3. Bangun dari duduk
4. Berdiri
5. Membungkuk menyentuh lantai
6. Berjalan di permukaan yang rata
7. Keluar/masuk mobil
8. Pergi berbelanja
9. Memakai kaus kaki/*stocking*
10. Bangun dari tempat tidur
11. Melepaskan kaus kaki/*stocking*
12. Berbaring di tempat tidur
13. Keluar/masuk bak mandi (melangkah setinggi±50cm)
14. Duduk
15. Duduk atau bangun dari toilet duduk
16. Melakukan pekerjaan rumah yang berat
17. Melakukan pekerjaan rumah yang ringan

Appendix 2. Reliability Statistics

Crohnbach's Alpha	Crohnbach's Alpha Based on Standardized Items	N of Items
.966	.967	48

Appendix 3. Inter-Item Correlation Matrix

Inter-Item Correlation Matrix – Left Knee

	Ki_1	Ki_2	Ki_3	Ki_4	Ki_5	Ki_6	Ki_7	Ki_8	Ki_9	Ki_10	Ki_11	Ki_12	Ki_13	Ki_14	Ki_15	Ki_16	Ki_17	Ki_18	Ki_19	Ki_20	Ki_21	Ki_22	Ki_23	Ki_24
Ki_1	1.000	.640	.358	.373	.634	.468	.368	.469	.446	.438	.478	.399	.578	.497	.547	.489	.299	.426	.196	.365	.237	.450	.463	.418
Ki_2	.640	1.000	.314	.241	.491	.384	.341	.527	.520	.367	.419	.330	.446	.427	.433	.314	.244	.237	.449	.336	.135	.397	.314	.331
Ki_3	.358	.314	1.000	.445	.372	.326	.233	.372	.376	.199	.313	.200	.209	.234	.304	.150	.233	.227	.285	.088	.310	.145	.100	.225
Ki_4	.373	.241	.445	1.000	.461	.274	.207	.364	.308	.289	.549	.294	.392	.193	.329	.251	.364	.306	.237	.153	.627	.222	.261	.351
Ki_5	.634	.491	.372	.461	1.000	.535	.443	.490	.437	.491	.726	.350	.510	.380	.458	.414	.487	.363	.201	.291	.322	.338	.433	.326
Ki_6	.468	.384	.326	.274	.535	1.000	.538	.290	.347	.301	.519	.385	.406	.397	.353	.326	.475	.312	.219	.296	.146	.061	.349	.265
Ki_7	.368	.341	.233	.207	.443	.538	1.000	.403	.438	.442	.600	.410	.426	.374	.270	.267	.496	.218	.164	.145	.177	.179	.349	.292
Ki_8	.469	.527	.372	.364	.490	.290	.403	1.000	.890	.623	.481	.469	.537	.514	.644	.468	.381	.488	.373	.323	.354	.462	.465	.438
Ki_9	.446	.520	.376	.308	.437	.347	.438	.890	1.000	.633	.432	.471	.540	.511	.585	.420	.357	.457	.376	.307	.311	.399	.419	.347
Ki_10	.438	.367	.199	.289	.491	.301	.442	.623	.633	1.000	.547	.529	.591	.428	.553	.455	.554	.445	.270	.280	.316	.492	.465	.453
Ki_11	.478	.419	.313	.549	.726	.519	.600	.481	.432	.547	1.000	.513	.667	.381	.461	.425	.599	.379	.322	.276	.411	.423	.472	.458
Ki_12	.399	.330	.200	.294	.350	.385	.410	.469	.471	.529	.513	1.000	.624	.534	.579	.394	.401	.384	.358	.352	.327	.498	.425	.400
Ki_13	.578	.446	.209	.392	.510	.406	.426	.537	.540	.591	.667	.624	1.000	.554	.629	.483	.407	.453	.368	.411	.270	.560	.413	.442
Ki_14	.497	.427	.234	.193	.380	.397	.374	.514	.511	.428	.381	.534	.554	1.000	.665	.538	.288	.428	.316	.343	.227	.461	.316	.332
Ki_15	.547	.433	.304	.329	.458	.353	.270	.644	.585	.553	.461	.579	.629	.665	1.000	.648	.254	.634	.347	.513	.413	.557	.552	.637
Ki_16	.489	.314	.150	.251	.414	.326	.267	.468	.420	.455	.425	.394	.483	.538	.648	1.000	.280	.867	.186	.515	.221	.478	.536	.533
Ki_17	.299	.244	.233	.364	.487	.475	.496	.381	.357	.554	.599	.401	.407	.288	.254	.280	1.000	.213	.275	.066	.348	.251	.357	.309
Ki_18	.426	.237	.227	.306	.363	.312	.218	.488	.457	.445	.379	.384	.453	.428	.634	.867	.213	1.000	.208	.410	.202	.345	.462	.496
Ki_19	.196	.449	.285	.237	.201	.219	.164	.373	.376	.270	.322	.358	.368	.316	.347	.186	.275	.208	1.000	.200	.205	.329	.140	.274
Ki_20	.365	.336	.088	.153	.291	.296	.145	.323	.307	.280	.276	.352	.411	.343	.513	.515	.066	.410	.200	1.000	.241	.249	.508	.452
Ki_21	.237	.135	.310	.627	.322	.146	.177	.354	.311	.316	.411	.327	.270	.227	.413	.221	.348	.202	.205	.241	1.000	.348	.279	.326
Ki_22	.450	.397	.145	.222	.338	.061	.179	.462	.399	.492	.423	.498	.560	.461	.557	.478	.251	.345	.329	.249	.348	1.000	.285	.356
Ki_23	.463	.314	.100	.261	.433	.349	.349	.465	.419	.465	.472	.425	.413	.316	.552	.536	.357	.462	.140	.508	.279	.285	1.000	.772
Ki_24	.418	.331	.225	.351	.326	.265	.292	.438	.347	.453	.458	.400	.442	.332	.637	.533	.309	.496	.274	.452	.326	.356	.772	1.000

Inter-Item Correlation Matrix – Right Knee

	Ka_1	Ka_2	Ka_3	Ka_4	Ka_5	Ka_6	Ka_7	Ka_8	Ka_9	Ka_10	Ka_11	Ka_12	Ka_13	Ka_14	Ka_15	Ka_16	Ka_17	Ka_18	Ka_19	Ka_20	Ka_21	Ka_22	Ka_23	Ka_24
Ka_1	1.000	.795	.348	.450	.650	.530	.425	.581	.567	.461	.536	.470	.677	.604	.623	.540	.375	.472	.055	.402	.429	.541	.546	.459
Ka_2	.795	1.000	.371	.383	.620	.509	.356	.583	.572	.401	.504	.412	.617	.553	.583	.469	.327	.359	.159	.379	.318	.546	.447	.385
Ka_3	.348	.371	1.000	.549	.399	.276	.135	.446	.463	.205	.340	.216	.236	.311	.357	.237	.246	.204	.207	.159	.355	.128	.243	.311
Ka_4	.450	.383	.549	1.000	.518	.339	.179	.417	.359	.365	.548	.339	.379	.284	.378	.247	.397	.249	.216	.218	.595	.233	.312	.394
Ka_5	.650	.620	.399	.518	1.000	.558	.447	.474	.440	.532	.724	.427	.522	.408	.510	.442	.441	.363	.170	.400	.435	.466	.493	.407
Ka_6	.530	.509	.276	.339	.558	1.000	.513	.361	.355	.336	.514	.373	.502	.443	.404	.438	.495	.401	.185	.382	.214	.162	.521	.400
Ka_7	.425	.356	.135	.179	.447	.513	1.000	.430	.396	.394	.584	.330	.470	.343	.302	.340	.440	.314	.166	.235	.295	.221	.476	.398
Ka_8	.581	.583	.446	.417	.474	.361	.430	1.000	.874	.627	.548	.526	.584	.548	.662	.451	.444	.476	.344	.368	.358	.459	.565	.511
Ka_9	.567	.572	.463	.359	.440	.355	.396	.874	1.000	.629	.500	.548	.631	.564	.632	.418	.420	.469	.330	.318	.300	.453	.474	.433
Ka_10	.461	.401	.205	.365	.532	.336	.394	.627	.629	1.000	.576	.492	.605	.478	.586	.414	.529	.406	.237	.357	.315	.503	.470	.482
Ka_11	.536	.504	.340	.548	.724	.514	.584	.548	.500	.576	1.000	.502	.653	.482	.482	.437	.601	.368	.272	.341	.420	.391	.493	.481
Ka_12	.470	.412	.216	.339	.427	.373	.330	.526	.548	.492	.502	1.000	.660	.533	.632	.375	.411	.412	.298	.316	.352	.493	.485	.423
Ka_13	.677	.617	.236	.379	.522	.502	.470	.584	.631	.605	.653	.660	1.000	.636	.663	.443	.445	.440	.317	.390	.293	.575	.442	.441
Ka_14	.604	.553	.311	.284	.408	.443	.343	.548	.564	.478	.482	.533	.636	1.000	.685	.519	.408	.400	.295	.368	.248	.441	.432	.410
Ka_15	.623	.583	.357	.378	.510	.404	.302	.662	.632	.586	.482	.632	.663	.685	1.000	.599	.279	.641	.342	.526	.455	.600	.601	.649
Ka_16	.540	.469	.237	.247	.442	.438	.340	.451	.418	.414	.437	.375	.443	.519	.599	1.000	.242	.777	.157	.604	.225	.428	.602	.595
Ka_17	.375	.327	.246	.397	.441	.495	.440	.444	.420	.529	.601	.411	.445	.408	.279	.242	1.000	.225	.211	.079	.348	.199	.344	.372
Ka_18	.472	.359	.204	.249	.363	.401	.314	.476	.469	.406	.368	.412	.440	.400	.641	.777	.225	1.000	.199	.383	.277	.347	.474	.516
Ka_19	.055	.159	.207	.216	.170	.185	.166	.344	.330	.237	.272	.298	.317	.295	.342	.157	.211	.199	1.000	.175	.206	.267	.158	.264
Ka_20	.402	.379	.159	.218	.400	.382	.235	.368	.318	.357	.341	.316	.390	.368	.526	.604	.079	.383	.175	1.000	.210	.237	.544	.476
Ka_21	.429	.318	.355	.595	.435	.214	.295	.358	.300	.315	.420	.352	.293	.248	.455	.225	.348	.277	.206	.210	1.000	.378	.286	.366
Ka_22	.541	.546	.128	.233	.466	.162	.221	.459	.453	.503	.391	.493	.575	.441	.600	.428	.199	.347	.267	.237	.378	1.000	.336	.320
Ka_23	.546	.447	.243	.312	.493	.521	.476	.565	.474	.470	.493	.485	.442	.432	.601	.602	.344	.474	.158	.544	.286	.336	1.000	.789
Ka_24	.459	.385	.311	.394	.407	.400	.398	.511	.433	.482	.481	.423	.441	.410	.649	.595	.372	.516	.264	.476	.366	.320	.789	1.000

Appendix 4. Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Ka_1	30.51	670.818	.710	.965
Ki_1	30.57	680.167	.627	.965
Ka_2	30.22	668.779	.649	.965
Ki_2	30.27	679.351	.534	.966
Ka_3	31.20	693.616	.454	.966
Ki_3	31.15	696.290	.376	.966
Ka_4	31.32	692.583	.549	.965
Ki_4	31.33	695.698	.500	.966
Ka_5	30.92	677.731	.704	.965
Ki_5	30.95	682.513	.656	.965
Ka_6	30.72	679.012	.584	.965
Ki_6	30.66	681.641	.516	.966
Ka_7	31.09	689.861	.538	.965
Ki_7	31.05	690.533	.510	.966
Ka_8	30.61	675.836	.755	.965
Ki_8	30.64	679.425	.702	.965
Ka_9	30.59	677.174	.713	.965
Ki_9	30.60	680.545	.664	.965
Ka_10	30.86	680.182	.674	.965
Ki_10	30.90	683.465	.653	.965
Ka_11	31.17	683.577	.722	.965
Ki_11	31.19	685.388	.728	.965
Ka_12	31.05	685.381	.624	.965
Ki_12	31.12	686.491	.642	.965
Ka_13	31.07	682.389	.719	.965
Ki_13	31.15	684.836	.741	.965
Ka_14	30.76	686.002	.635	.965
Ki_14	30.80	688.384	.604	.965
Ka_15	30.89	675.796	.793	.964
Ki_15	30.94	679.067	.761	.965
Ka_16	31.03	681.242	.657	.965
Ki_16	31.10	684.273	.655	.965
Ka_17	31.08	694.418	.480	.966
Ki_17	31.12	695.359	.511	.966
Ka_18	31.23	687.997	.620	.965
Ki_18	31.25	689.119	.605	.965
Ka_19	31.52	706.575	.397	.966
Ki_19	31.50	706.859	.364	.966
Ka_20	30.90	683.626	.537	.966
Ki_20	30.92	688.539	.484	.966
Ka_21	31.52	703.767	.448	.966
Ki_21	31.53	704.373	.456	.966

Ka_22	31.25	693.907	.535	.965
Ki_22	31.32	695.291	.558	.965
Ka_23	30.64	672.576	.678	.965
Ki_23	30.66	675.398	.651	.965
Ka_24	31.08	681.408	.674	.965
Ki_24	31.13	683.165	.652	.965