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The Barthel Index: Italian Translation, Adaptation and Validation

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Abstract

The Barthel Index (BI) is widely used to measure disability also in Italy, although a validated and culturally adapted Italian version of BI has not been produced yet. This article describes the translation and cultural adaptation into Italian of the original 10-item version of BI, and reports the procedures for testing its validity and reliability.

The cultural adaptation and validation process was based on data from a cohort of disabled patients from two different Rehabilitation Centers in Rome, Italy.

Forward and backward translation method was adopted by qualified linguist and independent native English official translators. The scale obtained was reviewed by 20 experts in psychometric sciences. The Italian adapted version of the BI was then produced and validated. A total number of 180 patients were submitted to the adapted scale for testing its acceptability and internal consistency. The total time of compilation was 5 ± 2,6 minutes (range 3-10). Validation of the scale was performed by 7 trained professional therapists that submitted both the translated and the adapted versions to a group of 62 clinically stable patients (T-test=-2.051 p=0.05). The internal consistency by Cronbach's alpha resulted equal to 0.96. Test – retest intra – rater reliability was evaluated on 35 cases; at test-retest was ICC=0.983 (95%IC: 0.967-0.992).

This is the first study that reports translation, adaptation and validation of the BI in Italian language. It provides a new tool for professionals to measure functional disability when appraising Italian speaking disable patients in health and social care settings along the continuum of care.

Keywords

Barthel index, Functional disability, Validation, Cultural adaptation, Italian

Introduction

Independence in self–care activities is a common outcome measure to assess disability. Among all other instruments Barthel Index (BI) has been regarded as the best in terms of sensitivity, simplicity, communicability and ease of scoring [1-5].

The BI was first developed by Mahoney and Barthel in 1965 [6], and later modified by Collin et al. [7] and Shah et al. (1989) [8]. The original 10-item form consists of 10 activities of daily living (ADL) including feeding, bathing, grooming, dressing, bowel and bladder control, toilet use, transfers (bad to chair and back), mobility, and stairs climbing. Items are rated in terms of whether patients can perform the task independently, with assistance or are totally dependent (scored as 0, 5 or 10; 15 points per item for transfers and mobility). The total score is calculated by adding up the individual scores, and ranges from 0 (total dependence) to 100 (total independence). There is little consensus over which of the versions should be considered as definitive, but the original and the 10-item versions are the most commonly used [9].

As rehabilitation was integrated in the processes of care to disabling people in Italy, the need of objective measures of both disability and recovery was satisfied by developing "in house" versions of the BI. Some of them can be downloaded from the link in citing [10-15]. Even though none of the versions translated have been culturally adapted and validated, the BI is widely used in Italy to determine whether the disability criteria for access of patients to rehabilitation services are fulfilled, as well as to monitor patients' recovery [16,17].

Simple translation misses cultural peculiarities with consequent distortions of items' meaning. Cross-cultural validation and adaptation is necessary [18].

This article describes the translation and cultural adaptation into Italian of the original BI (Italian culturally adapted Barthel Index-IcaBI), and reports the procedures for testing its cross – cultural validity, test – retest reliability, internal consistency, validity and reliability. The structural validity, inter – rater reliability, sensitivity to disability changes, as well as items' quality, will be reported in a subsequent paper.

Methods

The study was divided into two stages. Firstly, the English version of the 10-item BI was translated into Italian and culturally adapted according to a team – approach procedure as described by the Census Bureau Guideline for the Translation of Data Collection Instrument [18]. The translated BI was then tested for its validity and reliability properties in a prospective study.

Translation process

The 10-item version of BI was adopted [19]. Permission for

translation, adaptation, and validation was received from The Maryland State Medical Society. The procedure of translation included three steps. Firstly two native English official translators independently translated into Italian both the original BI and definitions of the performance criteria (forward translation). One translator had a technical background and the other had a medical background and he was the judge of translation. Secondly, 2 bilingual persons, blind to the original English version and independently one the other, back – translated the scales into English. These two new English versions were translated into Italian by two independent health–care professionals with a certificated knowledge of English language, and blind to the original version (backward translation). Scoring of questions were the same as for the original BI. All translators had a consensus meeting to consolidate the final translated BI.

Cultural adaptation

In order to adapt the translated index to Italian culture, it was reviewed by a panel of 20 experts in psychometric sciences, pertaining to different medical disciplines. The experts could comment on items' translation by writing observations on a form. The judge of translation reviewed and approved this final culturally adapted version that was then tested for validity and reliability (Appendix 1).

Patients and validation procedures

The validation process was based on data from a cohort of 180 patients hospitalized in two different Rehabilitation Centers providing care for internal medicine, neurological and orthopedic disorders in Rome, Italy. The cross–cultural validity of the scale was performed on 62 and test-retest reliability on 35 out of the 180 patients enrolled in the study.

All cases admitted to the outpatient Rehabilitation Centers of Israelite Hospital and San Giovanni Battista Hospital- Order of Malta between May 2014 and November 2014 were screened for inclusion in the study, irrespective of the illness they were affected. The study was approved by the Ethics Committee of participating hospitals.

All patients were informed about the study and their interest in taking part in it was recorded; those who entered the study gave their consent before inclusion. Post-comatose patients were excluded, as well as cases aged<18 years old, affected by spinal cord injuries, cognitive impairment or psychiatric illnesses [20], and if they did not consent to enter the study.

The scale was administered voluntarily by 6 physical therapists (PT) and 1 occupational therapist (OT). Assessments were made by observing patients' performance directly at bedside. Before starting evaluations, all therapists were trained on the administration of the scale.

All statistical analyses were performed with Statistical Package of Social Sciences (SPSS) version 18.0 for Windows. The description of the variables was carried out using frequency tables, means and standard deviations (SD). Data were analyzed with IBM-SPSS statistical software version 20.0.

Pre– test (cross-cultural validity)

According to Perneger et al. Small samples (5–15 participants) that are common in pre-tests of questionnaires may fail to uncover even common problems. A default sample size of 30 participants is recommended [21]. To evaluate the cross–cultural validity of the scale, alternatively the translated and the culturally adapted scale were administered to 62 out of the 180 patients enrolled. In order to avoid bias, the same patient was tested two times by the same professional. A time interval between the repeated administrations should be short enough to ensure that clinical change had not occurred. A time period of 4-6 has been considered appropriated [17]. The time interval of 4 days between the two administrations was considered to be appropriate for the current population. T Paired two – sample T – test was performed to reveal possible mistakes, mis-understandings or changes as respect to the original meanings of each item of the scale. The significance was set for p<0.05.

Reliability

Test–retest intra–rater reliability: For assessment of test-retest reliability, each patient was evaluated twice by the same professional (Table 3). The sample size was calculated according to McMillan et al. [22] and to Lam et al. [23]. A cut-off value of 60, and a sensitivity of 97.2% was established. Basing on a disability prevalence rate of 28% and a 2.8% False Negative Rate, a sample of 35 subjects was calculated. The time interval for test-retest studies needs to be sufficiently short to support the assumption that the patients remain stable, and sufficiently long to prevent recall. A time interval of 6 days was considered to be appropriate for the current population. In order to measure test-retest reliability, Intraclass Correlation Coefficient (ICC) was calculated. From the 2 assessments to each patient, one of them was chosen randomly and those answers were used for calculation of validity and internal consistency. The scale was considered as stable at the test-retest for ICC >0.70. Two–way random ICC for absolute agreement was adopted to evaluate intra–rater reliability [24,25].

Internal Consistency: The sample size for internal consistency was calculated by considering 10 patients for each item [17]. The Italian culturally adapted BI was administered to the 180 patients that consent to enter the study, by the same 7 therapists that performed the cross-cultural validation and the test-retest reliability.

Chronbach's alpha was used for Internal Consistency. In order to assess the interrelatedness among the items and the homogeneity of the scale, Pearson's correlation coefficient and Chronbach's α were calculated with a value of >0.70 being considered acceptable for both tests [26].

Acceptability

Acceptability of the scale has been evaluated by clocking time of administrations on the same sample of 180 patients included in the Internal Consistency evaluation.

Results

Translation

After forward and backward translation and after a consensus meeting, the translated scale was formed (Appendix 2).

Cultural adaptation

The experts agreed on that the sentence *"categorie intermedie implicano che il paziente fornisce più del 50% dello sforzo"* was misleading, and asked for its deleting from definitions of the performance criteria; the phrasing of some of the items were also re-formulated. Furthermore, modifications were made to individual items with reference to the experts' opinions (Appendix 3).
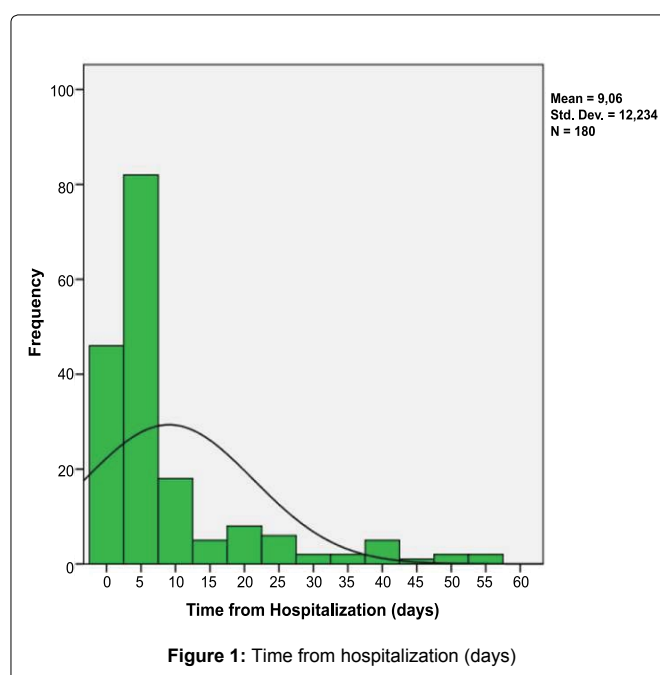

Mean = 9,06
Std. Dev. = 12,234
N = 180

Figure 1: Time from hospitalization (days)

Patients

A total of 210 patients were initially assessed for their inclusion in the study. Of these, 18 (8.6%) patients did not fulfill the inclusion criteria, and 12 (5.7%) did not consent to enter the study. A total number of 180 patients were administered the Italian culturally adapted BI. Their mean age was73.6 ± 14 years (range: 21-101). 91 patients were females (51%), aged 73.9 ± 14.2 years (range 21-101); 89 were males (49%), aged 70.9 ± 13.8 years (range 22-93). At the time of evaluation, patients were hospitalized meanly since 9.1 ± 12.2 days before (Figure 1).

Pre–test (cross-cultural validity)

Cross–cultural validity was evaluated on 62 patients out of the 180 that entered the study (mean age 75.8 ± 12.9 years, 32 males, 30 females, mean time of hospitalization before administration 3.4 ± 3.7 days) (Table 1). The mean total score of first translation was 74.11; the mean total score of adapted version was 74.44. The total scores were not influenced by age ($\chi2$=241.2 p=0.6), gender ($\chi2$=19.0 p=0.4) and pathology ($\chi2$=95.4 p=0.8). Paired two – sample T – test revealed no significant differences between the results of the two administrations (t=2.05; mean difference=0.3; p=0.05).

Reliability

Test–retest and intra–rater reliability: Thirty-five out of the 180 included patients were submitted to test–retest and intra–rater reliability procedures (mean age 75.6 ± 12.0 years, 20 males, 15 females, mean time of hospitalization before administration 3.5 ± 3.7 days) (Table 1). The test-retest reliability of each item is reported in Table 2. As to the intra-rater reliability, ICC between the different administrations over time was 0.983 (95%IC: 0.967 – 0.992). The total scores were not influenced by age ($\chi2$=311.5 p=0.4), gender ($\chi2$=16.3 p=0.3) and pathology ($\chi2$=27.8 p=0.48).

Internal consistency: The internal consistency was calculated on all the 180 included cases. Both Pearson and Spearman Tests (Appendix 4) revealed a strong correlation between each item and the whole scale (ρ>0.7 p<0.01). Crombach's α was 0.94 (p<0.001). Demographic data and clinical characteristics of included cases are reported in Table 2.The distribution of cases among operators is reported in Table 3. The total scores were not influenced by age ($\chi2$=893.9 p=0.1), gender ($\chi2$=16.39p=0.3) and pathology ($\chi2$=2110.7 p=0.9).

Acceptability

The total time of compilation was 5 ± 2.58 minutes (range 3-10). No multiple answers and no mis-understandings were found.

Discussion

The aim of this study was to translate the original 10 items BI into Italian, to culturally adapt it for Italian disabled people, and to validate it. Translation and linguistic adaptation was performed applying internationally recognized methods [18], and under the supervision of a panel of experts that ensured the maintenance of the original meaning of the items.

In order to describe the differences between the translated and the

culturally adapted version, comparison were made by a t-test analysis. The differences in total scores were not significant, indicating that the two scale might be indifferently adopted. In accordance with ISPOR Task Force for Translation and Cultural Adaptation we propose the adoption of the version culturally adapted [27].

Test-retest intra-rater reliability has been calculated for IcaBI, and resulted equal to 0.983; ICC's value ≥0,70 is considered optimal to establish the degree to which repeated measurements are free from measurement error. The most important index of test reliability is the alpha coefficient [28]. Nunnally [29] has implicated that if a new questionnaire is going to be used, its alpha coefficient should be at least 0.7. The IcaBI internal consistency was equal to 0.94. The high IcaBI reliability indicates that scores of patients remain stable after repeated measurement, as in the original version. The high level of interrelatedness among the items represents the cross - cultural validity of the adapted scale that reflects adequately the performances of the original English version [30].

The BI was translated and validated in many languages, such as Turkish, German, Persian, Chinese, Brazilian, Dutch and Japanese [18,31-36].

The BI was firstly developed as a simple index of independence, useful to evaluate functional disability in any disabled patient and in scoring improvement in rehabilitation [9]. Examples of BI validity as ADL indicator are available in literature [37,38]. The original BI has been shown to have a Chronbach's alpha of 0.87 [39]. The Dutch translated version of the BI has been reported to have a Chronbach's alpha of 0.87 [35]. The Turkish have validated BI for rehabilitation patients, reporting an internal consistency of 0.88 [31],whereas the Japanese validated the scale for older people living at home, and reported a Chronbach's alpha equal to 0.93 [34]. Most of those studies have been performed on stroke cases. They reported an Internal consistency nearly at 0.93, the Chinese at 0.92 [33], the Brazilian at 0.967 [40].

As shown in Appendix, all items of the BI have a corrected item-item correlation coefficient of more than 0.5. So all items have acceptable item total correlation and, hence, the IcaBI fulfills the first criterion of item analysis. Based on the literature review which was done for this project, item analysis has not been determined for the Barthel Index yet. Item analysis of IcaBI should be addressed in future research.

Disability at the time of admission to a rehabilitation hospital is a major predictor both of discharge disability [41-43] and of return home [41,42,44]. It has been estimated that more than 3 million

Table 2: Demographic characteristics and hospitalization ward of patients submitted to each test

	Pre-test (n=62)**	Test-retest (n=35)***	Internal consistency (n=180)*
Demographics			
Age(mean ± SD)	76 ± 14	76 ± 12	73 ± 14
Female n (%)	15(42.9%)	84(46.7%)	30(48.4%)
Time from hospitalization (days)	7.14 ± 4.6	4 ± 4.4	9.06 ± 12.2
Ward			
Internal Medicine	**62 (34.4)**	**35(19.4)**	**142 (78.9)**
Neurorheabilitation n (%)	0	0	32 (17.7)
Orthopedic n (%)	0	0	6 (3.3)

*patients submitted to the evaluation of acceptability of the adapted version of the scale; **Sample of patients submitted to both the translated and the adapted version of the scale; ***Sample of patients submitted to the adapted version of the scale after 6 days of the first submission (test-retest)

Table 3: Distribution of subjects among evaluators

	(n°)	(%)	Cumulative percentage (%)
Operator1	11	6,1	6,1
Operator2	38	21,1	27,2
Operator3	36	20,0	47,2
Operator4	37	20,6	67,8
Operator5	37	20,6	88,3
Operator6	11	6,1	94,4
Operator7	10	5,6	100,0
Total	**180**	**100,0**	

Table 1: Test-retest reliability of the single items

N.	Item	ICC (95%IC)
1	"alimentazione"	0.904(0.810-0.952);
2	"capacità di farsi il bagno o la doccia e cura dell'aspetto esteriore"	1
3	"cura dell'aspetto esteriore"	1
4	"capacità di vestirsi"	0.984 (0.969-0.992),
5	"transito intestinale"	0.966 (0.932-0.983),
6	"vescica"	0.940 (0.882-0.970),
7	"utilizzo del WC (sedersi ed alzarsi, pulirsi, rivestirsi)"	0.939 (0.879-0.969),
8	"trasferimento (dalla posizione seduta sul letto alla sedia e viceversa)"	0.974 (0.949-0.987)
9	"mobilità (su superfici piane)"	0.951 (0.903-0.975)
10	"scale"	0.980 (0.961-0.990)
Total scale		0,983 (0.967-0.992)

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people suffered functional impairment in Italy in 2013 [13]. With such a burden, it is of great importance to apply evidence-based, validated and comprehensive instruments able to quantify disability and document whether patients fulfill the criteria of access to rehabilitation centers. The BI is used in most of the Italian Regional Health Systems to determine discharge placement of patients, the burden of care, the efficiency and effectiveness of rehabilitation intervention. Unfortunately, only one Italian study that evaluated the validity and reliability of the BI administered by telephone compared with face-to-face was recently published, and no data on translation of the scale and adaptation processes to Italian culturally are available in literature [45].

This study has some limits. The reliability of ADL assessment may not be generalizable to assessments by other care staff or to self-rated interviews because only OTs and PTs were involved in this study. Furthermore, the IcaBI is not applicable to post-comatose patients and to cases affected by spinal cord injuries, cognitive impairment or psychiatric illnesses, cause those cases were excluded from our series.

Among several ways to confirm the cross – cultural validity of IcaBI, only test – retest, intra – rater reliability, and internal consistency were compared to the original version of the BI. Factorial analysis, inter-rater reliability and responsiveness will be verified in following research.

The FIM is the only scale that that is applicable to disable patients regardless the illness they are affected. Unfortunately, although usually administered in Italian language, psychometric properties of the Italian version have not been verified yet. Future studies are needed to evaluate the concurrent validity of IcaBI as respect to FIM.

Conclusions

The Italian culturally adapted BI as a whole has demonstrated to be valid, reliable, acceptable, easy to understand and rapidly administrable.

This work provides a new tool for professionals to measure functional impairment when appraising Italian speaking disable patients in health and social care settings along the continuum of care. Further studies involving other healthcare workers are needed to evaluate generalizability of our data.

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Appendix 1: Gentile Collega,

al fine di arrivare ad una stesura finale della scala di Barthel il più possibile chiara e di facile compilazione per gli operatori, ti preghiamo, per ogni item, di segnalare e commentare eventuali punti non chiari (di dubbia o non univoca interpretazione), difficoltà che potrebbero emergere in fase di compilazione (es. difficoltà nell'inquadrare la condizione di un paziente tra le opzioni presenti), frasi che potrebbero necessitare di un chiarimento o di eventuali modifiche, o altre osservazioni o suggerimenti che ritieni necessari.

Item 1: ALIMENTAZIONE
Osservazioni:_____
Item 2: CAPACITA' DI FARSI IL BAGNO
Osservazioni:_____
Item 3: CURA DELL'ASPETTO ESTERIORE
Osservazioni:_____
Item 4: CAPACITA' DI VESTIRSI
Osservazioni:_____
Item 5: TRANSITO INTESTINALE
Osservazioni:_____
Item 6:VESCICA
Osservazioni:_____
Item 7: UTILIZZO DEL WC
Osservazioni:_____
Item 8: TRASFERIMENTI (LETTO / SEDIA E VICEVERSA)
Osservazioni:_____
Item 9: MOBILITA' (SU SUPERFICI PIANE)
Osservazioni:_____
Item 10: SCALE
Osservazioni:_____
Altre osservazioni o suggerimenti: _____

Appendix 2a: Italian culturally adapted BI

Indice di Barthel	
Paziente	
Cognome e Nome	
Sesso **Età** **Tempo ricovero**	
Diagnosi:	
Reparto di appartenenza:	
Nome e cognome del valutatore	
	Punteggio
ALIMENTAZIONE 0 = non in grado di alimentarsi 5 = ha bisogno di assistenza (tagliare la carne, ecc.) oppure necessita di una dieta modificata (dieta semisolida – liquida) o alimentazione artificiale (PEG, ecc.) 10 = in grado di alimentarsi	
CAPACITA' DI FARSI IL BAGNO O LA DOCCIA 0 = non in grado di lavarsi autonomamente 5 = in grado di lavarsi autonomamente	
CURA DELL'ASPETTO ESTERIORE 0 = ha bisogno di assistenza nella cura personale 5 = in grado di lavarsi la faccia, pettinarsi, lavarsi i denti, radersi	
CAPACITA' DI VESTIRSI 0 = non in grado di vestirsi autonomamente 5 = ha bisogno di assistenza, ma è in grado di vestirsi parzialmente in autonomia 10 = in grado di vestirsi autonomamente (bottoni, cerniere lampo, lacci, ecc.)	
TRANSITO INTESTINALE 0 = non in grado di controllare l'alvo 5 = occasionalmente non in grado di controllare l'alvo 10 = in grado di controllare l'alvo	
VESCICA 0 = non in grado di controllare la minzione 5 = occasionalmente non in grado di controllare la minzione 10 = in grado di controllare la minzione	
UTILIZZO DEL WC (SEDERSI E ALZARSI, PULIRSI, RIVESTIRSI) 0 = non in grado di utilizzare il wc 5 = in grado di utilizzare il wc con assistenza 10 = in grado di utilizzare il wc autonomamente	
TRASFERIMENTI (DALLA POSIZIONE SEDUTA SUL LETTO ALLA SEDIA E VICEVERSA) 0 = non in grado di effettuare i trasferimenti 5 = è in grado di stare seduto, ma necessita di massima assistenza nei trasferimenti 10 = è in grado di stare seduto, ma necessita di minima assistenza (verbale o fisico) 15 = è in grado di effettuare trasferimenti	
MOBILITA' (SU SUPERFICI PIANE) 0 = non in grado di spostarsi per più di 50 metri 5 = in grado di spostarsi su sedia a rotelle, anche su percorsi non rettilinei, per più di 50 metri 10 = in grado di deambulare per più di 50 metri con l'assistenza (verbale o fisica) di una persona 15 = in grado di deambulare (anche con ausili) per più di 50 metri	
SCALE 0 = non in grado di salire e scendere le scale 5 = in grado di salire e scendere le scale con assistenza 10 = in grado di salire e scendere le scale autonomamente	
Total	

Appendix 2b: Performance criteria of Italian culturally adapted BI

Indice Barthel ADL: linee guida per la compilazione

1. L'indice dovrebbe essere utilizzato come misura di ciò che il paziente effettivamente fa, non di ciò che potrebbe fare;

2. Lo scopo principale è di stabilire il grado di indipendenza da aiuto, fisico o verbale, indipendentemente da quanto possa essere limitato e dalla ragione per cui viene erogato;

3. La richiesta di supervisione rende il paziente non indipendente;

4. La performance del paziente dovrebbe essere valutata utilizzando la migliore evidenza disponibile. Le fonti abituali sono domande al paziente, ad amici e a parenti e agli infermieri, ma sono importanti anche osservazione diretta e senso comune. In ogni caso, non è necessario testare direttamente;

5. Di solito è importante la performance del paziente nel corso delle precedenti 24 – 48 ore, ma in alcuni casi sono rilevanti periodi più lunghi;

6. E' consentito l'impiego di ausili per essere considerato indipendente.

Appendix 3: Translated and adapted version of Italian BI at comparison

Translated Items	Adapted Items
ITEM 1 "alimentazione"	
0 = "incapace	"non in grado di alimentarsi";
5= "ha bisogno di aiuto nel tagliare la carne, nello spalmare il burro, etc, oppure necessita di una dieta modificata	" ha bisogno di assistenza (tagliare la carne, etc…) oppure necessita di una dieta modificata (dieta semisolida- liquida) o alimentazione artificiale (PEG, etc…);
10= "indipendente"	"in grado di alimentarsi".
ITEM 2 "capacità di farsi il bagno"	**"capacità di farsi il bagno o la doccia"**
0= "dipendente"	"non in grado di lavarsi autonomamente";
10= "indipendente (o doccia)	"in grado di lavarsi autonomamente";
ITEM 3 "cura dell'aspetto esteriore"	
0= "ha bisogno di aiuto nella cura personale"	"ha bisogno di assistenza nella cura personale";
5= in grado di lavarsi la faccia, pettinarsi, lavarsi i denti, radersi	
ITEM 4 "capacità di vestirsi"	
0= "dipendente"	" non in grado di vestirsi autonomamente";
5="ha bisogno di aiuto ma è in grado di vestirsi, per circa la metà, in autonomia"	"ha bisogno di assistenza, ma è in grado di vestirsi parzialmente in autonomia"
10= "indipendente (inclusi bottoni, cerniere lampo, lacci, etc...)"	"in grado di vestirsi autonomamente (bottoni, cerniere lampo, lacci, etc…)"
ITEM 5 "transito intestinale"	
0= "incontinente (o necessita di clistere)"	"non in grado di controllare l'alvo";
5= "incidente occasionale"	"occasionalmente non in grado di controllare l'alvo";
10= "continente"	"in grado di controllare l'alvo"
ITEM 6 "Vescica"	
0= "incontinente, oppure utilizza catetere in modo non indipendente"	"non in grado di controllare la minzione";
5="incidente occasionale"	"occasionalmente non in grado di controllare la minzione";
10="continente"	"in grado di controllare la minzione";
ITEM 7 "utilizzo del wc"	
0="dipendente"	"non in grado di utilizzare il wc";
5="ha necessità di aiuto, ma può fare qualcosa da solo"	"in grado di utilizzare il wc con assistenza";
10="indipendente (si siede e si rialza, si riveste, si pulisce)"	"in grado di utilizzare il wc autonomamente";
ITEM 8 "trasferimenti (letto/sedia e viceversa)"	**"trasferimenti (dalla posizione seduta sul letto alla sedia e viceversa")**
0="incapace (non ha equilibrio da seduto)"	"non in grado di effettuare i trasferimenti";
5="ha necessità di un aiuto considerevole (uno o due persone, forza fisica), è capace di sedersi"	" è in grado di stare seduto, ma necessita di massima assistenza nei trasferimenti";
10="ha necessità di un aiuto limitato (verbale o fisico)"	"è in grado di stare seduto, ma necessita di minima assistenza (verbale o fisico)";
15="indipendente"	"è in grado di effettuare trasferimenti"
ITEM 9"mobilità (su superfici piane)"	
0="immobile, o mobile per meno di 50 metri"	"non è in grado di spostarsi per più di 50 metri";
5="indipendente su sedie a rotelle, inclusi gli angoli, per più di 50 metri"	into "in grado di spostarsi su sedia a rotelle, anche su percorsi non rettilinei, per più di 50 metri)";
10="cammina per più di 50 metri con l'aiuto (verbale o fisico) di una persona"	"in grado di deambulare per più di 50 metri con l'assistenza (verbale o fisica) di una persona)";
15="indipendente (ma può fruire di ausili, ad esempio un bastone), per più di 50 metri"	in grado di deambulare (anche con ausili) per più di 50 metri
ITEM 10 "scale"	
0="incapace"	"non in grado si salire e scendere le scale";
5="ha necessità di aiuto (verbale, fisico, essere preso in braccio)"	"in grado di salire e di scendere le scale con assistenza";
10="indipendente"	"in grado di salire e scendere le scale autonomamente";

Appendix 4: Item X item Pearson correlation

	Item 1 - Alimentazione	Item2 - Capacità di farsi il bagno o la doccia	Item 3- Cura dell'aspetto esteriore	Item 4 - Capacità di vestirsi	Item 5 - Transito intestinale	Item 6 - Vescica	Item 7 - Utilizzo del wc (sedersi e alzarsi, pulirsi, rivestirsi)	Item 8 – Trasferimenti (dalla posizione seduta sul letto alla sedia e viceversa)	Item 9 - Mobilità (su superfici piane)	Item10 - Scale
Item 1 - Alimentazione	1,000	,577**	,612**	,703**	,736**	,643**	,671**	,648**	,651**	,530**
Item 2 -Capacità di farsi il bagno o la doccia	,577**	1,000	,746**	,781**	,704**	,651**	,762**	,721**	,725**	,766**
Item 3 - Cura dell'aspetto esteriore	,612**	,746**	1,000	,785**	,712**	,762**	,759**	,803**	,759**	,734**
Item 4 - Capacità di vestirsi	,703**	,781**	,785**	1,000	,792**	,753**	,865**	,833**	,810**	,830**
Item 5 - Transito intestinale	,736**	,704**	,712**	,792**	1,000	,759**	,758**	,755**	,717**	,666**
Item 6 - Vescica	,643**	,651**	,762**	,753**	,759**	1,000	,768**	,795**	,770**	,699**
Item 7 - Utilizzo del wc (sedersi e alzarsi, pulirsi, rivestirsi)	,671**	,762**	,759**	,865**	,758**	,768**	1,000	,871**	,880**	,814**
Item 8 - Trasferimenti (dalla posizione seduta sul letto alla sedia e viceversa)	,648**	,721**	,803**	,833**	,755**	,795**	,871**	1,000	,904**	,767**
Item 9 - Mobilità (su superfici piane)	,651**	,725**	,759**	,810**	,717**	,770**	,880**	,904**	1,000	,799**
Item 10 - Scale	,530**	,766**	,734**	,830**	,666**	,699**	,814**	,767**	,799**	1,000

** Correlation is significant at the 0.05 level (2-tailed).