

Italian Validation of the Chiba Interprofessional Competency Scale (CICS29)

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Abstract. *Background and aim of the work:* The Chiba Inter-professional Competency Scale (CICS29) validated in several languages, it is a self-report instrument that investigates the degree of interprofessional collaboration in six areas: attitudes and beliefs of the professional; ability to manage a work group; actions to achieve goals; providing assistance that respects the patient; attitudes and behaviours that improve the cohesion of the working group; fulfilling or performing the own professional role. In addition to being recent, the scale investigates collaboration among all health professionals, and is not limited to specific professionals. The aim of the study was to validate the Italian version of CICS29. *Method:* A questionnaire-based study was conducted with an Italian sample consisting of 530 health professionals (419 women, mean age = 40 years, SD = 10.7; range 23- 58 years). The internal validity was measured using factor analysis. To verify the convergent validity, the Italian Version of Interprofessional Collaborative Competency Attainment Survey (ICCAS) was correlated with the CICS29; *Results:* The reliability and the internal validity of the CICS29 revealed 6 factors corresponding to the original subscales. The analysis presents an excellent sample adequacy measure (KMO = .933) with the scores ranging from 0.62 to 0.78 for the interclass correlation coefficients of the 6 domains. A significant level of correlation was found between the subscales of the CICS29 and the ICCAS. *Conclusions:* In conclusion, the Italian version of CICS29 has a satisfactory level of reliability and validity and it is recommended for measuring interprofessional collaboration of the health professionals. (www.actabiomedica.it)

Key words: interprofessional collaboration, interprofessional competence, health professions, Italian validation, Chiba Inter-professional Competency Scale

Background

A relevant component of a well-functioning healthcare system is Inter-professional Collaboration (1). Integrative and synergistic interventions among professionals with different knowledge and skills are mandatory for needs of patients (2). Care management often not respect an integrative way Health care teams

should improve their members' skills and share case management to provide better health services to patients and better health outcomes (3-5).

Relational skills as ability to collaborate became important to produce a better quality of care (6). Collaborative practice can be defined as a process by which the parties involved identify different aspects of a problem, constructively explore their differences and

seek solutions that go beyond personal visions of what is possible (7).

Although the literature amply highlights positive effects of inter-professional collaboration on the patient's care, professionals involved and on the expected health outcomes few studies have investigated the degree of collaborative competence among health professionals (5, 8, 9, 10). Although many tools are available (9, 11) the validated scales in the Italian context are often limited to measuring the collaborative practice between doctors and nurses and no scale measuring attitudes towards collaboration has been validated in Italian until now.

Several authors (12, 13) have analysed the instruments for measuring professional collaboration, indicating the presence of different scales that measure collaborative perception, including the Collaborative Practice Scale (14) and the Collaboration and Satisfaction with Care Decision (15). However those instruments can be applicable only for specific cases, such as, for example, the intensive care units (ICUs).

There are only two instruments devoted to evaluate inter-professional skills towards collaboration. The first one is the Inter-professional Collaborative Competency Attainment Survey [ICCAS] (16). It is a self-assessment scale that investigates six subscales related to inter-professional collaborative competence: communication; collaboration; roles and responsibilities; collaboration with the patient or a family-centred approach; conflict management and resolution; team functioning. This tool has been validated in English and French and was recently translated and adapted to the Italian context (17).

The second one is the Chiba Inter-professional Competency Scale [CICS29] (18). It is a multi-dimensional self-report instrument, which specifically investigates the degree of collaborative competence among different health professionals. It consists of six specific areas: attitudes and beliefs of the professional; ability to manage a work group; actions to achieve goals; providing assistance that respects the patient; attitudes and behaviours that improve the cohesion of the working group; fulfilling or performing the own professional role. In addition to being recent, the scale has the precious advantage of investigating collaboration among all health professionals, and is not lim-

ited to the relationship between specific professional categories. This instrument is not validated in Italian language.

In light of this gap in the Italian measurement of inter-professional skills towards collaboration, the objective of this study was to validate the Italian version of the CICS29 (18), considering the factorial validity, the convergent validity and reliability (internal consistency).

As far as factorial validity is concerned, we expected that the Italian version of the scale would reflect the same structure as the original instrument. We also expected the scale to show adequate reliability (internal consistency), similar to that of the original scale.

Concerning the convergent validity, we expected a correlation among the CICS29 subscales and the measurements of a contiguous construct, already validated in Italian: the Inter-professional Collaborative Competency Attainment Survey (ICCAS; 16).

Methods

Participant Recruitment

At first we have obtained authorization for the validation by the main authors of the original study (18). Then the CICS29 scale was translated from English into Italian by a professional native-English-speaking translator and subsequently translated into Italian by a professional native-Italian-speaking translator. The translation was made by bilingual authors according to existing guidelines and back-translations were made to guarantee the maximum adherence to the original version.

The participants were contacted in the territorial and hospital contexts of Emilia Romagna region (Central-Northern Italy). The questionnaires were administered directly to each participant and, once completed, were collected by researchers. The CICS29 is meant to be a questionnaire useful on a health care population and, for this reason, no particular exclusion criteria were applied.

All participants were able to perfectly read and understand Italian and to fill out the questionnaires by themselves.

Measurements

CICS29 (18) is a self-assessment scale that investigates collaborative awareness through 29 items, measured with a 5-point Likert scale (1 = disagree; 5 = agree). The scale has six main sections (subscales): attitudes and beliefs of the professional (6 items); ability to manage a work group (5 items); actions to achieve objectives (5 items); providing assistance that respects the patient (5 items); attitudes and behaviours that improve the cohesion of the working group (4 items); fulfilling own professional role (4 items).

ICCAS (19) already validated in Italian (17) is a self-assessment instrument that investigates the interprofessional collaboration skills through 20 items, measured with a 5-point Likert scale (1 = low, 5 excellent). It has 6 dimensions: communication (5 items); collaboration (3 item); roles and responsibilities (4 items); collaboration with the patient - family-centred approach (3 items); conflict management / resolution (3 items); team operation (2 items).

In addition to The CICS29 and the ICCAS, demographic information, were collected (gender, job, type of employment, education, Operative Unit).

Data analysis

The structure of the scale was investigated through a factor analysis (principal axis; varimax rotation) using the Kaiser-Meyer-Olin (KMO) score.

The Internal consistency (reliability) of the scale was evaluated using the Cronbach's alpha coefficient and, to confirm the coherence of the scale, the inter-item correlations were evaluated. The convergent validity was evaluated by The Pearson r coefficient to highlight all the possible correlations among the CICS29 and the ICCAS subscales.

All statistical analyses were performed with the software IBM SPSS Statistics 23 for Windows.

Ethical considerations

The study has been conducted in agreement with the Ethical Principles for Medical Research Involving Human Subjects-the Declaration of Helsinki and it has been approved by the International Research

Board of the University of Parma. All the Hospitals where the study took place were contacted and were asked for their availability to participate in the research. An explanatory document of the study was sent to the coordinators of the operating units in order to inform them, and to agree on the access times in the structures. All eligible participants were informed of the purpose and characteristics of the study and received a clear informative written document, explaining the design, aims, procedure and ethical considerations of the research. Informed consent was obtained before the professionals' participation. Those who signed the consent have been informed that participation in the study was voluntary and that they could have withdrawn their consent to participate at any time.

Results

530 health professionals (mean age = 40 years, DS= 10.7; range 23- 58 years), participated in the study (Table 1). Most of them were nurses (63%) working in Primary Care Unit (18.7), with a full time job (87.9%). The sample respected the gender proportion proposed in Sakai et al. (18): 16.8% of male and 83.2% of female. In our sample the proportion consisted of 111 men (20.9%) and 419 female (79.1%).

The Table 2 shows the Italian Version of CICS29, the Factor Analysis of the principal axis, the Cronbach's alpha and inter-item correlation.

The Italian version of the CICS29 showed the same structure of the original version.

The factor analysis performed on the 29 items presented an excellent sample adequacy measure (KMO=0.933). Factor analysis yielded six factors, whose real eigenvalues exceeded 0.95% of the simulated ones with respect to parallel analysis. They explain a total of 53.0% of the variance Details for each of the six factors are included below.

The attitudes and beliefs of the professional (Factor 1) was saturated by six items that affected the attitude and beliefs related to commitment and effort as a professional, compared to the ability to improve their work. The average inter-item correlation had a factor score of .48 and the internal consistency is acceptable ($\alpha = .62$).

Table 1. Demographic characteristics of respondents (n = 530)

Variable	Category	N	%
<i>Gender</i>	Famale	419	79.1
	Male	111	20.9
<i>Job</i>	Nurses	334	63
	Medical Doctors	63	11.9
	Physiotherapists	22	4.2
	Psychiatric Rehabilitation Technicians	11	2.1
	Radiology Technicians	11	2.1
	Psychologists	8	1.5
	Social Workers	8	1.5
	Biomedical Laboratory Technicians	3	0.6
	Educator	1	0.2
<i>Operative Unit</i>	Patient Recovery	99	18.7
	Mental Health	74	14
	Oncology	68	12.8
	Primary Care	41	7.7
	Cardiology	33	6.2
	Long-Term Care	32	6
	Obstetrics	26	9
	Medicine	25	4.7
	Surgery	24	4.5
	Nephrology,	19	3.6
	Operating Room	15	2.8
	Diagnostic Imaging	10	1.9
	Diabetology	9	1.7
	Emergency Room	9	1.7
	Physiotherapy	9	1.7
	Childhood Neuropsychiatry	7	1.3
	Radiotherapy,	6	1.1
	The Laboratory	6	1.1
	Day Hospital	6	1.1
	Health Care	5	0.9
	Resuscitation,	3	0.6
Social Services	2	0.4	
Ophthalmology	1	0.2	
Pharmaceutical Service.	1	0.2	
<i>Type of employment</i>	Full Time	466	87.9
	Part Time	64	12.1
<i>Education</i>	Graduates	204	38.5
	Bachelor's Degree	198	37.4
	Master's Degree Or Post-Graduate Specialization.	93	17.5

Table 2. Original and Italian Version of CICS29; Factorial Analysis of the principal axis, Cronbach's alpha and inter-item correlation (N= 530)

Original Version	Italian Version	Factor loading					
		1	2	3	4	5	6
I strive to be a professional (question 3)	Mi sforzo di fare del mio meglio come professionista (domanda 3)	.66					
I am able to apply updated expert knowledge to actual practice (question 6)	Sono in grado di applicare le conoscenze specialistiche aggiornate alla mia pratica attuale (domanda 6)	.58					
I am able to explain the basis for care to anyone (question 5)	Sono in grado di spiegare a chiunque le informazioni basilari dell'assistenza (domanda 5)	.55					
I practice evidence-based care (question 4)	Pratico un'assistenza basata sulle evidenze scientifiche (domanda 4)	.53					
I constantly strive to improve my performance (question 1)	Mi sforzo costantemente per migliorare il mio lavoro (domanda 1)	.51					
I always reflect on the care that I have provided (question 2)	Rifletto sempre sull'assistenza che ho fornito (domanda 2)	.47					
I understand the scope and limits of my team members' work (question 7)	Mi rendo conto delle capacità e dei limiti dei membri del mio gruppo di lavoro (domanda 7)		.59				
I cooperate with my team members to try to solve the problem when the team is not functioning well (question 9)	Quando il mio gruppo di lavoro non funziona bene, collaboro con i membri del gruppo per cercare di risolvere il problema (domanda 9)		.58				
I respect my team members' busy schedules and work pace (question 8)	Rispetto gli orari impegnativi e il ritmo lavorativo dei membri del mio gruppo di lavoro (domanda 8)		.52				
I know when problems within the team are likely to arise (question 11)	Mi rendo conto quando all'interno del gruppo di lavoro stanno per emergere dei problemi (domanda 11)		.51				
I reconcile conflicts among team members (question 10)	Concilio i conflitti tra i membri del gruppo di lavoro (domanda 10)		.51				
I provide necessary support to my team members depending on their professional competency (question 15)	Fornisco il supporto necessario ai membri del mio gruppo di lavoro in base alla loro competenza professionale (domanda 15)			.66			
I am able to evaluate whether the team is operating well objectively (question 16)	Sono in grado di valutare in modo obiettivo se il gruppo di lavoro sta funzionando bene (domanda 16)			.64			
I am able to explain the results of my team's initiatives (question 12)	Sono in grado di spiegare i risultati delle iniziative del mio gruppo di lavoro (domanda 12)			.61			
I am able to adjust my practices to achieve the team's objectives (question 13)	Sono in grado di adattare le mie consuetudini per raggiungere gli obiettivi del gruppo di lavoro (domanda 13)			.60			
I am able to coordinate the opinions of myself and my team members in light of the team's objective (question 14)	Sono in grado di coordinare le mie opinioni e quelle degli altri membri in base agli obiettivi del gruppo di lavoro (domanda 14)			.59			
I seek the best way to care for patients (question 21)	Cerco il miglior modo per assistere i pazienti (domanda 21)				.59		

(continued on next page)

Table 2 (continued). Original and Italian Version of CICS29; Factorial Analysis of the principal axis, Cronbach's alpha and inter-item correlation (N= 530)

Original Version	Italian Version	Factor loading					
		1	2	3	4	5	6
I respect not only the wishes of the patient but also those of their family (question 17)	Rispetto non solo le esigenze del paziente, ma anche quelle della sua famiglia (domanda 17)				.55		
I keep patient independence in mind when providing care (question 18)	Quando lavoro tengo presente l'autonomia del paziente (domanda 18)				.53		
I interact with patients to help them make their own decisions (question 19)	Interagisco con i pazienti per aiutarli a prendere decisioni in modo autonomo (domanda 19)				.52		
I change my manner of interacting with patients on the basis of their characteristics and situations (question 20)	Modifico il mio modo di interagire con i pazienti basandomi sulle loro caratteristiche e sulla situazione in cui si trovano (domanda 20)				.52		
I strive daily to create good interpersonal relations between professionals (question 25)	Mi sforzo quotidianamente di creare buone relazioni interpersonali fra i professionisti (domanda 25)					.60	
I try to create a suitable atmosphere during meetings wherein it is easy for other professionals to speak (question 24)	Durante le riunioni cerco di creare un'atmosfera adatta a favorire la comunicazione fra i vari professionisti (domanda 24)					.60	
I consciously create opportunities for communication with other professionals (question 22)	Creo attivamente opportunità di comunicazione con gli altri professionisti (domanda 22)					.57	
I discuss ideal patient care daily with other professionals (question 23)	Mi confronto quotidianamente con altri professionisti sull'assistenza ideale per i pazienti (domanda 23)					.57	
I fulfil my professional role as required by my team (question 27)	Adempio al mio ruolo professionale come richiesto dal mio gruppo di lavoro (domanda 27)						.67
I understand the scope of what can be accomplished by professional expertise and skills (question 28)	Capisco quanto possiamo raggiungere attraverso le nostre abilità e competenze (domanda 28)						.65
I am able to express opinions in front of other professionals on the basis of my expert knowledge (question 26)	Sono in grado di esprimere opinioni davanti ad altri professionisti sulla base della mie competenze avanzate (domanda 26)						.65
I am able to state my opinions when necessary from the viewpoint of my professional expertise, even if doing so creates friction with other professionals (question 29)	Quando necessario sono in grado di manifestare la mia opinione dal punto di vista della mia competenza professionale, anche se questo crea contrasto con altri professionisti (domanda 29)						.55
Alpha di Cronbach (Original Study)		.75	.71	.65	.73	.72	.77
Alpha di Cronbach (Italian Version)		.62	.70	.78	.77	.74	.76
Inter-item correlation		.48	.46	.48	.35	.50	.44

Factor 1: Attitudes and beliefs as a professional (*Attitudini e credenze del professionista*); **Factor 2:** Team management skills (*Abilità di gestire un gruppo di lavoro*); **Factor 3:** Attitudes and behaviours that improve team cohesion (*Attitudini e comportamenti che migliorano la coesione del gruppo di lavoro*); **Factor 4:** Actions for accomplishing team goals (*Azioni per raggiungere gli obiettivi del gruppo di lavoro*); **Factor 5:** Providing care that respects patients (*Fornire un'assistenza che rispetta il paziente*); **Factor 6:** Fulfilling one's role as a professional (*Adempiere al proprio ruolo professionale*).

The team management skills (Factor 2) were saturated by five items concerning the skills of the professional about collaboration and understanding the members of the working group with respect. The inter-item average correlation was .46 and has an acceptable internal consistency ($\alpha = .70$).

Actions for accomplishing team goals (Factor 3) was saturated by five items that represented how much the professional was able to explain, modify, mediate both communicative and relational behaviours to achieve common objectives within the group. The factor had an acceptable internal consistency ($\alpha = .78$) and inter-item consistency of .48.

Providing care that respects patients (Factor 4) was saturated with five items and concerned the ability to respect the patient's needs and improve the patient's personal autonomy. The average inter-item correlation was .35 and the internal consistency was acceptable ($\alpha = .77$).

The fifth factor, attitudes and behaviours that improve team cohesion (Factor 5), was saturated by five items and concerned the belief of how much the proactive professional was committed to favouring the climate of the working group. The inter-item average correlation was .50 and it had acceptable internal consistency ($\alpha = .74$).

The last factor, fulfilling one's role as a professional (F6), was saturated by four items and represented the professional's perception of the performance of his or her work. The inter-item average correlation was .44 and the internal consistency was acceptable ($\alpha = .76$).

About the convergent validity (table 3), the Pearson's correlation coefficients highlighted that t on the ICCAS in almost all subscales.

For example, providing care that respects patients (CICS29) correlated in a high significant way with collaborative-patient or family-centred approach (ICCAS; $r = .28$).

In particular, the team management skills (CICS29) correlated in a highly significant way with communication (ICCAS; $r = .27^{**}$), roles and responsibilities (ICCAS; $r = .29^{**}$) and conflict management or resolution (ICCAS; $r = .28^{**}$).

About the actions for accomplishing team goals (CICS29) correlated in a highly significant way with communication (ICCAS; $r = .26^{**}$), collaboration (ICCAS; $r = .26^{**}$), roles and responsibilities (ICCAS; $r = .33^{**}$) and conflict management or resolution (ICCAS; $r = .27^{**}$).

Attitudes and behaviours that improve team cohesion (CICS29) correlated in a highly significant way with communication (ICCAS; $r = .25^{**}$), roles and re-

Table 3. Person correlation coefficient among the CICS29 (in column) and the ICCAS (in row) subscales

Scale	Attitudes and beliefs as a professional	Team management skills	Actions for accomplishing team goals	Providing care that respects patients	Attitudes and behaviours that improve team cohesion	Fulfilling one's role as a professional
Communication	R=.11*	R=.27**	R=.26**	R=.19**	R=.25**	R=.29**
Collaboration	R = .08	R=.21**	R=.26**	R=.22**	R=.21**	R=.27**
Roles and responsibility	R=.14**	R=.29**	R=.33**	R=.24**	R=.25**	R=.33**
Collaborative patient/family centred approach	R=.14*	R=.22**	R=.26**	R=.28**	R=.23**	R=.27**
Conflict management/resolution	R= .09	R=.28**	R=.27**	R=.26*	R=.27**	R=.22**
Team functioning	R=.15*	R=.24**	R=.25**	R=.18**	R=.23**	R=.25**

* $p < .05$, ** $p < .001$

sponsibilities (ICCAS; $r = .25^{**}$), conflict management or resolution (ICCAS; $r = .27; **$) and team functioning (ICCAS; $r = .23^{**}$).

Finally, fulfilling one's role as a professional (CICS29) correlated in a highly significant way with communication (ICCAS; $r = .29^{**}$), collaboration (ICCAS; $r = .27^{**}$), roles and responsibilities (ICCAS; $r = .33^{**}$), collaborative-patient or family-centred approach (ICCAS; $r = .27^{**}$), and team functioning (ICCAS; $r = .25^{**}$).

The scale that measures the Attitudes and beliefs as a professional (CICS29) correlates less significantly with the ICCAS subscales. In particular the subscale it is not correlates with Collaboration and Conflict management/resolution of ICCAS scale and the other correlations even if significant are not so high like the other subscales.

Discussion

A good instrument to measure inter-professional collaboration should have these features: reliable, easy to understand and full, short enough to be used in a multidisciplinary context, that take into consideration not only some professional categories (e.g nurses and doctors). The CICS29 (18), since its first formulation in Japanese, has shown these characteristics and for the reason it has been translated and validated other languages. The aim of the present work was to validate the Italian version of the CICS29 (18).

Factor analysis confirmed that the Italian version of the scale has the same 6 factors as observed in the Japanese version with the same items that load on the factors of the original scale (e.g. Team management skills and Actions for accomplishing team goals).

The Internal consistency was explored by Cronbach's alpha coefficient. As Sakai et al. (18) has found the subscales of CICS29 and the total CICS29 scores showed a good reliability. In the Japanese study, the reliability of the sub-constructs varied from .66 and .77. The results achieved in our sample are very similar, with a Cronbach's alpha that varies between .62 and .78. So, in both studies, the CICS29 appears an effective instrument for assessing the degree of inter-professional competence.

The correlation between the subscales of CICS29 and the ICCAS (16) ones, that investigated the inter-professional collaborative competence, is high. These findings seem to be relevant to sustain the validity Italian version of CICS29. In fact the psychometric properties and the factorial structure are strongly supported by the statistical analysis

Two important limitations must be acknowledged. The first represented by the difficulty to find scales to test the discriminating validity. The second are the participants of the study. Although it is a polycentric study, it was carried out in a single Italian region of Central-Northern Italy. It would therefore be useful to extend the studies to other regions to ensure that the results are generalizable.

Although limitations exist, we want to underline some strengths of the study. The scale could easily be used within different wards and could provide valid assistance to knowledge development and possible interventions since the inter-professional collaboration is the best strategy for the management of complex health problems. Working together means sharing responsibilities in care, information, coordination and decisions made about the care and assistance of the patient (6). The foundation of inter-professional collaboration is first and foremost the training, which should represent a pivotal point in the study paths of health professionals, as well as in daily practice. It would also be useful to apply the scale in different departments, because in addition to the welfare aspects, a good collaboration influences various outcomes such as patient safety, access, coordination of services and the appropriate use of health resources (1-5).

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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- Received: 9 November 2019
Accepted: 6 January 2020
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