



Development and content validation of a comprehensive tool for assessing risk and protective factors in children and adolescents: The ACRAM

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ABSTRACT

Child maltreatment is a complex reality that has become a worldwide social and public health problem; therefore, its early detection is crucial. At present there are no scientifically rigorous instruments that cover all areas of child maltreatment. The aim of this study is to report on the development and content validation of the ACRAM (Adolescents and Children Risk of Abuse and Maltreatment) tool. This process consisted of various stages and followed a mixed methodology. Sample was composed by 144 and 80 professionals from Spain on each stage. The results are very promising and support the content validity of this tool, as we virtually all of our indicators have a good CVI and have been approved and reviewed by several groups of experts. The creation of a valid, reliable and global instrument will have significant benefits for the quality of life of children, adolescents, their families, and for professionals.

1. Introduction

Child maltreatment is considered to be a complex, heterogeneous reality that has become a social and public health problem worldwide (Guastaferro & Lutzker, 2021). According to the World Health Organization (WHO, 2021), it includes any form of violence (physical, emotional or sexual abuse, neglect, negligence or exploitation) that poses a risk to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power. Generally, this would happen in a family context. It is calculated that over 25 % of children and adolescents today have been victims of maltreatment (WHO, 2021). Child maltreatment is believed to be determined by various factors and can have serious consequences in adulthood (Newins et al., 2021; Zhang et al., 2022).

Building on Bronfenbrenner's (1979) ecological systems model, the WHO (2021) has established different types of risk factors related to child maltreatment, including the characteristics of the child or adolescent, parental and family relationships and behaviors, plus other factors that exist in the community and the social system. The literature has generally focused on parenting styles and parent and caregiver behaviors as factors that define the etiology of child maltreatment (Assink

et al., 2018; Lo et al., 2019; McMillin et al., 2016). However, authors such as Euser et al. (2011) and Skeen and Tomlinson (2013) point out that the composition of the family network, the characteristics of the child or adolescent and socioeconomic and contextual factors are also relevant predictors of maltreatment. In addition, Counts et al. (2010) and Ridings et al. (2017) stress the need to take into account the protective factors of the child or adolescent and their family, such as social support and family resources.

Preventing child maltreatment and neglect is a priority on the political agenda of most countries in the world and strategies have been developed to tackle the problem (Ajilian et al., 2015). In Spain, the passing of Organic Law 8/2021, of 4 June, on the comprehensive protection of children and adolescents against violence, lays down a comprehensive set of measures for prevention, sensitization and protection in matters involving children and adolescents who suffer violence. In particular, this law underlines the need for violence in childhood and adolescence to be detected early through the introductory and continuous interdisciplinary training of all professional workers who assess and have regular contact with children and adolescents. The efficient detection and assessment of child maltreatment is considered essential to facilitate the professional decision-making

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process (Tufford et al., 2021; Van der Put et al., 2017). Misdiagnosing the risk of child maltreatment can have serious implications for children and adolescents and their families, leading to situations of institutional negligence or loss of family autonomy (Topple & Ellett, 2019).

Calheiros et al. (2016) and Day et al. (2021) report a lack of consensus when it comes to determining situations of risk in childhood and adolescence. The review carried out by Fallon et al. (2010) suggests that incomplete definitions, the devaluation of certain forms of maltreatment and the omission of certain risk factors hinder the rigorous assessment of child maltreatment and the development of specific tools to guide interventions. Similarly, research by Stanley (2013) and Munro (2019) concludes that professionals may often, by acting intuitively or subjectively, skew the child welfare decision-making process, for example by omitting information they see as irrelevant or by focusing only on those factors that confirm their preconceptions.

Over the years a number of tools have been developed to detect and assess maltreatment, neglect or sexual abuse in children and adolescents (Arruabarrena & De Paúl, 2011; Bernstein & Fink, 1998; Schouten et al., 2017). Nevertheless, the instruments currently in use do not deal with the full complexity of those areas in which child maltreatment occurs and present methodological and psychometric shortcomings in connection with the comprehensive and rigorous assessment of maltreatment (Georgieva et al., 2021). The systematic review carried out by Saini et al. (2019) evaluated the psychometric properties of 52 instruments for assessing child maltreatment and concluded that there is only limited scientific evidence to support the risk assessments carried out using these tools. Cuccaro-Alamin et al. (2017) report that the instruments used to improve the accuracy of decision making in cases of child maltreatment have numerous operational and statistical limitations when it comes to assessing risk. These include the lack of validation of the instruments administered and the stratification of risk based on arbitrary and questionable thresholds. Indeed, in the study by Saini et al. (2019), 63 % of the instruments did not check the content validity.

International child protection organizations stress how important it is to have objective assessment tools (Meinck et al., 2016; Unicef, 1989). Nevertheless, there is no evidence that such tools exist, i.e., validated instruments for detecting and objectively assessing child maltreatment in all its various dimensions (personal, parental, background, etc.) that also include protective factors to counterbalance the risks. Investigations by Bartelink et al. (2015), Gillingham (2011), Russell (2015) and Zeijlmans et al. (2017) indicate that the value of such tools derives not only from their ability to optimize those decisions and actions aimed at improving the quality of life and welfare of children and adolescents and their families, but also from the way they can enhance the performance of the professionals and protection agencies themselves, making them potential beneficiaries too.

Finally, Keddell (2014) points out that the lack of objective diagnostic tools to support professional decisions represents a lack of ethical commitment on the part of the politicians responsible. The general aim of this study is therefore to describe the development process and verify the content validity of an objective, comprehensive tool – the ACRAM (Adolescents and Children Risk of Abuse and Maltreatment) – to aid professional decision making when carrying out risk assessments of child maltreatment. This tool is based on Bronfenbrenner's (1979) ecological model, considering both risk and protective factors in order to obtain a comprehensive assessment of each case.

2. Method

This instrument is embedded into the project DAP 360° (Determinants d'Atenció Primerenca), whose objective is the development of an assessment tool to support professionals' assessment processes in the welfare system (Georgieva et al., 2021). Given the complexity of creating a comprehensive risk detection and assessment tool, we divided the process into four stages. We used a mixed-methodology design, combining qualitative and quantitative methodologies to guarantee the

reliability, validity and scientific rigour of the research. In this study we describe only those stages associated with the tool's content validation (stages 1–3). Content validity is the extent to which the content of an instrument is a true reflection of the construct to be measured (Mokkink et al., 2018). This property refers to how relevant and comprehensible the tool is to its target population and context. It is generally considered to be the most important psychometric property, given that its absence affects all others (Terwee et al., 2018).

2.1. Procedure

- Stage 1. Preliminary investigation. The aim of this was to evaluate and determine the state of the art as regards the detection and assessment of child maltreatment. To this end, we carried out an exhaustive search for risk assessment instruments, both nationally and internationally, and consulted world experts in the field of risk assessment in children and adolescents.
- Stage 2. Pre-diagnosis study. In this stage we performed a pre-diagnosis study to enable us to carry out a preliminary content validation of all the indicators. This involved mixed research techniques: on the one hand, interviews and focus groups, and on the other, the quantitative analysis of data relating to the tool's relevance and the understanding of its content obtained from questionnaires in order to guarantee inter-rater agreement. The focus groups met in the workplaces of professionals employed in primary healthcare social services.
- Stage 3. Assessing and perfecting: producing the pilot version. Fifteen focus groups were formed, comprising professionals from different areas of child and adolescent care and intervention from specialized programs other than primary healthcare social services. Individual questionnaires related to aspects involving the relevance of the indicators were administered. Two other focus groups also met, the members of which belonged to an *ad hoc* committee of experts with considerable experience in child and adolescent care and intervention. The purpose of these was to obtain a global assessment of the instrument, including its approach, structure and response format. This procedure was designed so we could obtain a second specialized expert review of the entire set of indicators, once reformulated and reduced. Because of the COVID-19 health crisis, this stage was carried out online using the Blackboard Collaborate™ platform.
- Stage 4. Once the professionals and experts from the child protection system had carried out a final content verification, the pilot version of the instrument was tested through analysis and psychometric validation on real cases involving children and adolescents.

2.2. Samples

- Stage 2. A total of 144 professionals participated – mainly educators and social workers – from 20 primary healthcare social services teams from the child and adolescent programs in different towns and cities. They were selected by proportional stratified random sampling, from several municipalities in the Valencian Community in order to ensure maximum representativity of all geographical areas.
- Stage 3. A total of 80 professionals participated in the focus groups, selected by convenience sampling in order to guarantee heterogeneity and diversity in the profiles of each group. They came from a wide range of sources: day-care centers, residential care centers taking into account the various different types that exist, fostering services, child care specialists from teams in the autonomous regional government's territorial assessment centers, or from activities in connection with promoting children's rights, or because they belonged to other welfare systems such as education (especially the school psycho-pedagogical services or Singular Education Action Centers, known as CAES in Spanish), health (pediatricians, pediatric neurologists and child psychiatrists) or justice (specialist teams from

the youth justice system, judicial measures or institutes of forensic medicine). The committee of experts, on the other hand, was made up of 13 professionals, each with over 20 years' experience in child and adolescent intervention and care programs. They were selected by convenience sampling according to position, experience and gender, thereby ensuring heterogeneity and gender parity in both groups of experts.

2.3. Analysis

The descriptive analyses (ranges, means, standard deviations, percentages, quartiles and correlations) were calculated using SPSS v.26. To calculate the content validity indexes we used a macro in Excel that we developed *ad hoc* ourselves.

2.4. Ethical considerations

The investigation complied with ethical research standards both national (Law 14/2007 of 3 July on Biomedical Research) and international (Declaration of Helsinki, VMA, 2013). All participants gave their written informed consent for the study and were given a copy of the reports produced at every stage of the investigation. The study protocols met all the ethical standards laid down by Organic Law 3/2018 on Personal Data Protection and Guarantee of Digital Rights.

3. Results

3.1. Stage 1. Preliminary investigation

The aim of this stage was to evaluate the current state of the art regarding the assessment of child maltreatment and neglect. As indicated in the Method section above, it consisted of an exhaustive search for instruments designed to assess risk and protection factors for child maltreatment, plus consultations with pioneering experts on the subject. It was divided into two substages:

- *Search for instruments:* A systematic search of the national and international scientific literature was carried out in order to find instruments for detecting and assessing factors of risk and protection. The most important databases in the areas of social sciences, behavioral sciences and health (Web of Science, Scopus, Medline, PubMed and Cochrane) were searched, as well as the legislative documents of each of Spain's autonomous regions. The search strategy covered all publications in either English or Spanish and was performed using three semantic groups of keywords. The first of these focused on the ages represented in the samples: the unborn, babies, children and adolescents. The second focused on the concept to be assessed: child maltreatment, risk factors, community factors and protective factors. Finally, the third group focused on how the concept was actually measured. The search terms are shown in Table 1. The inclusion criteria for the search were as follows: 1)

Table 1
Search terms used.

Children and adolescents		Risk		Assessment
unborn OR	AND	*risk* OR	AND	*assessment* OR
newborn OR		*adversity* OR		*tool* OR
baby OR		*maltreatment* OR		*instrument* OR
children OR		*trauma* OR		*scale* OR
adolescents		*victimization* OR		*questionnaire* OR
OR		*neglect* OR		*set* OR
teenagers		*abuse* OR		*inventory* OR
		protective OR		*detection* OR
		protection		*recognition*

Note: The terms were used in both languages, English and Spanish.

written in English or Spanish, 2) published between 2010 and 2019, and 3) published in journals indexed in SCOPUS or JCR to guarantee their scientific rigor. The exclusion factors were: 1) grey literature (doctoral theses, conference presentations, etc.), 2) substantive articles that provide no psychometric results for the instruments, and 3) systematic reviews. The search was carried out during September and October 2019. Two research specialists performed independent searches, selecting those articles that met the above criteria. Disagreements were resolved in consultation with a third researcher until reaching an agreement, as recommended by Bekhet and Zauszniewski (2012).

The search of the scientific databases identified 63,335 articles involving instruments for assessing maltreatment, neglect and/or protective factors. After the purging of duplicates and an initial review of titles and abstracts, a total of 149 articles remained, identifying a total of 85 different instruments. The selection sequence can be seen in the PRISMA flowchart (Page et al., 2021) shown in Fig. 1. In addition to these we also obtained five instruments from legislative documents, one from each of the autonomous communities of Valencia, Catalonia, Navarre, the Basque Country and Andalusia.

A study of the 106 instruments identified in the scientific search – plus the 5 instruments found in the legislative documents of the Spanish autonomous communities – produced a huge set of indicators that was purged, reformulated, reorganized and adapted to the context of the Valencian Community by three academic researchers specializing in child maltreatment and neglect. These experts – two social workers and a psychologist – reviewed, purged, reformulated and added various indicators of risk and protection. A final set of 201 indicators were established. These indicators were arranged in blocks – with each block being a particular subject area – which were in turn grouped into two bigger sections.

- *Consultations with experts:* Three consultation sessions were then held with internationally renowned research teams specializing in child maltreatment and decision making in child neglect risk assessment. An exhaustive analysis was carried out of the extensive descriptive qualitative content involving the use, purpose and implementation of the child maltreatment assessment instruments and the indicators of risk and protection collected to date. The experts' suggestions were noted and copied to the set of indicators for subsequent evaluation by professionals. The resulting blocks and indicators can be seen in the first column of Table 2.

3.2. Stage 2. Pre-diagnosis study

Two parallel processes were carried out in this stage. First of all, 20 focus groups were conducted, in which professional workers each made an individual evaluation of the 201 risk indicators using the following criteria:

- *IN – Inclusion of the indicator.* This denotes whether or not a particular indicator should be included in the final instrument for the purposes of determining a situation of risk or neglect. Response format: yes (it should be included) or no (it should not be included).
- *RL – Relevance.* This uses a scale of 1 to 4 to determine the relevance of each indicator in determining a situation of risk or neglect. Response format: of little importance (1), fairly important (2), important (3) and very important (4).
- *Indispensability of the indicator.* The indicators seen as being most relevant for detecting situations of risk or neglect in children were highlighted. Participants had to highlight at least 2 and up to a maximum of 5 indicators in each block, except in those that contained only one or two, in which case either one or two indicators were highlighted, or none. Response format: yes (it is indispensable in the block) or no (it is not indispensable).

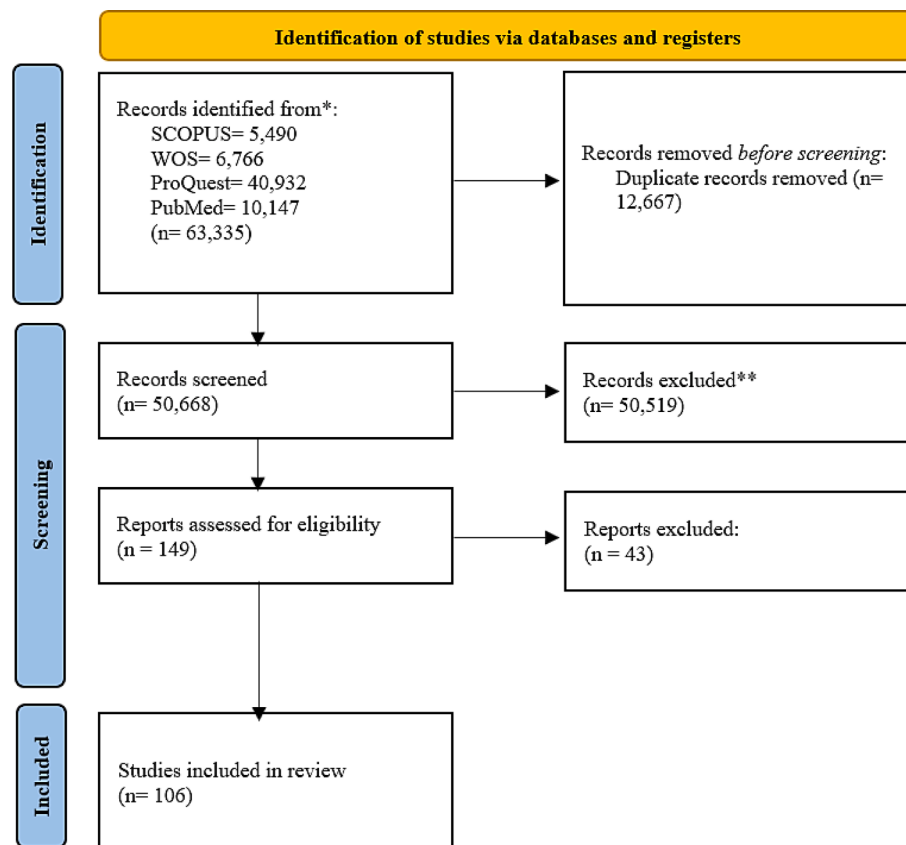


Fig. 1. PRISMA 2020 flow diagram.

Table 2

Names, indicators and evolution of the conceptual blocks of risk and vulnerability.

Stage 1 (n° of indicators)		Stage 2 (n° of indicators)		Stage 3 (n° of indicators)	
B1	Parental variables (9)	B1	Parental variables (6)	Section I. Parental and Caregiver Factors	
B2	Neglect of physical needs (15)	B2	Neglect of physical needs (6)	B1	Parental variables (6)
B3	Neglect of safety needs (10)	B3	Neglect of safety needs (4)	B2	Neglect of physical needs (4)
B4	Neglect of educational needs (2)	B4	Neglect of educational needs (1)	B3	Neglect of safety needs (3)
B5	Neglect of mental needs (10)	B5	Neglect of mental needs (4)	B4	Neglect of educational needs (2)
B6	Physical maltreatment (11)	B6	Physical maltreatment (1)	B5	Neglect of mental needs (3)
B7	Emotional maltreatment (13)	B7	Emotional maltreatment (7)	B6	Physical maltreatment (1)
B8	Instrumentalization (4)	B8	Instrumentalization (3)	B7	Emotional maltreatment (6)
B9	Corruption (1)	B9	Corruption (1)	B8	Instrumentalization (3)
B10	Sexual abuse (19)	B10	Sexual abuse (10)	B9	Corruption (1)
B11	Prenatal maltreatment/risk (7)	B11	Prenatal maltreatment/risk (3)	B10	Sexual abuse (10)
B12	Abandonment (6)	B12	Abandonment (4)	B11	Prenatal maltreatment/risk (3)
B13	Labor exploitation and begging (2)	B13	Labor exploitation and begging (2)	B12	Abandonment (1)
B14	Family environment (1)	B14	Family environment (1)	B13	Labor exploitation and begging (2)
B15	Socioeconomic environment (3)	B15	Socioeconomic environment (1)	B14	Parental inability to control the child/adolescent's behavior (6)
B16	School environment (7)	B16	School environment (4)	Section II. Factors Associated with the Community and Protective Factors	
B17	Health environment (5)	B17	Health environment (4)	B15	Unaccompanied foreign children and adolescents (10)
B18	Techno-political intervention (4)	B18	Techno-political intervention (2)	B16	Community factors (20)
B19	Migration of child/adolescent unaccompanied by an adult (14)	B19	Migration of child/adolescent unaccompanied by an adult (11)	Socioeconomic and family	
B20	Parental inability to control the child/adolescent's behavior (8)	B20	Parental inability to control the child/adolescent's behavior (6)	(2)School	
B21	Institutional maltreatment (18)	B21	Institutional maltreatment (10)	(4)Techno-political intervention	
				(2)Administrations	
				(2)Health	
				(3)Institutional maltreatment	
				(7)	
B22	Protective factors (32)	B22	Protective factors (19)	B17	Protective factors (18)

The same participants then repeated the assessment in order to reach a group consensus through discussion, rechecking the quantitative criteria against the group's consensual decisions. In this stage we were

therefore able to collect quantitative information deriving from the data obtained from the individual and group questionnaires, plus qualitative information deriving from the recording and transcription of the focus

group discussions along with the individual comments of each participant.

For the data analysis we calculated the percentage of yes responses for the dichotomous variables and the accompanying averages. Each indicator was color-coded (green, yellow or red) according to the percentile in which it was located (green, > percentile 75 or higher; yellow, between percentiles 25 and 75; red, percentile less than 25) according to each of the criteria evaluated in each block, the aim being to carry out a reasoned reduction of the indicators with the worst results. In order to synthesize the results, we present them in Table 3 as the means for each block. Looking at the results for the inclusion variable in the table, we see that the blocks with the highest percentage averages of yes responses were Block 9 (Corruption), Block 14 (Neglect of educational needs) and Block 6 (Physical maltreatment). All have percentage means of yes responses of 80–90 %, while those with the lowest averages were Block 15 (Family environment) and Block 18 (Health environment), which nevertheless had averages of between 60 and 70 %. Similarly, as far as relevance is concerned, which was initially scored between 1 (Not very important) and 4 (Very important), we see that the range of averages covers from 3.88 (B9 Corruption) to 2.63 (B16 Socioeconomic environment), which means that even the lowest average for relevance is between fairly important (2) and important (3). The same pattern can be seen with the indicator's indispensability variable (*), which ranges from 0.99 (B9 Corruption) to 0.30 (B23 Protective factors), indicating that the average percentage for the indicators highlighted in the block as being indispensable is at least 30 %.

In addition, content validity indexes (CVI) were calculated on the basis of the Relevance variable, the values for which were dichotomized, with 1 and 2 being seen as denoting an indicator not accepted by the professional workers and 3 and 4 as indicator accepted. The CVI values were interpreted as being acceptable if they were equal to or greater than 0.3 (Ayre & Scally, 2014). In line with this criterion, 178 indicators in this stage obtained an acceptable CVI, while only 23 were rejected.

To enable us to interpret these results with greater rigor, the individual qualitative comments and the information obtained from participants in the focus groups were transcribed so that the quantitative and the qualitative information could be interpreted jointly. Using the information now available, the initial set of indicators was reformulated and reduced to 111 indicators of risk and protection organized into 22 blocks. Many indicators were unified and others rephrased in line with suggestions from the professionals. The blocks and indicators resulting from this second stage are shown in the second column of Table 2.

3.3. Stage 3. Evaluating and perfecting: Generation of the pilot version

This stage saw another round of content validation, this time with the new set of indicators obtained after they were reduced and reformulated in the previous stage. This time we established online contact with 80 professionals working in care services specializing in children and adolescents, they formed 15 focus groups whose aim was to validate the content of the new set of 111 indicators. These professionals first validated the content on an individual basis and then through inter-rater agreement. In this case the indicators were evaluated using the variables from the previous stage (inclusion of the indicator, relevance and indispensability) along with three additional ones:

- *IF- Indicator functionality.* This responds to the following questions: Is it possible to record this indicator objectively and measure it descriptively using ranks of severity? Is it possible to gather this information from absolutely reliable sources? Response format: yes (it is functional), no (it is not functional).
- *ED - Distorting elements.* Are there any elements that might distort the measurement or objectivity of a particular indicator? Response format: yes (there are), no (there are not).
- *TI - Type of indicator.* This column is for determining how the indicator evolves over time. The response options are: 1 = Dynamic, 2 =

Possibly dynamic, but unlikely to change in 12 months, and 3 = Static.

Participants first completed a questionnaire with the six variables for each indicator, then emailed it back to the research team along with their consent. At a later date, in the focus groups formed so they could reach inter-rater agreement, they analyzed the concordance of the instrument's general structure and its approach, along with the representativity and presence of the indicators, and discussed relevance and suggestions for improvements. All the sessions were recorded and transcribed.

The same statistical analyses were carried out as in the previous stage, including the three new criteria (functionality, distorting elements and type of indicator), in which the averages of the dichotomous variables represent the average percentage of yes responses. Also calculated were the correlations between the relevance attributed to the indicator (RL) and its indispensability, enabling us to examine the degree to which the experts involved in the evaluation process agreed (Gisev et al., 2013), along with the content validity indexes (CVI). Once again, the qualitative comments extracted from the individual questionnaires and the focus group transcriptions were collected.

The results for the descriptive statistics from the analyses can be seen in Table 4, where the average percentage of yes responses from all the blocks range from 0.62 for B17 (Health environment) to 1 for B9 (Corruption), with the blocks for neglect of educational needs (B4) at 0.99, physical maltreatment (B6) at 0.99 and sexual abuse (B10) at 0.98 very close behind. Meanwhile the relevance variable falls within an average range of between 2.45 (B17. Health environment) and a maximum of 4 (B6. Physical maltreatment). As for functionality, this ranges from 0.61 (B7. Emotional maltreatment) to 0.99 in B4 (Neglect of educational needs) and B6 (Physical maltreatment). Regarding the existence of distorting elements, the average for yes responses varies between 0.40 for corruption (B9) to 0.50 for instrumentalization (B8). As far as the type of indicator (TI) is concerned – coded as 1 = Dynamic, 2 = Possibly dynamic but unlikely to change within 12 months, and 3 = Static – it can be seen that the average for most of the blocks falls between 1 and 2, i.e., between dynamic and possibly dynamic but unlikely to change within 12 months, except for blocks 1, 6, 9, 10, 11 and 12, the averages for which fall between 2 and 3, i.e., between possibly dynamic but unlikely to change within 12 months and static. Finally, as regards the indispensability of each block, Table 4 shows a range from 0.27 for B22 (Protective factors) to 0.95 for B9 (Corruption).

Table 5 below shows the descriptive statistics for the correlations between relevance and indispensability by block, thus synthesizing the information relating to the interrater agreements. We see that these agreements evaluated using tau-B correlations are lowest for the protective factor block and highest for the maltreatment and prenatal risk section, which means that the professionals were in closer agreement about the relevance of this latter section. The same pattern can be seen with the Spearman correlations, with the lowest level of agreement being for Block 22, i.e. protective factors, and the highest again being for Block 11, i.e. prenatal risk. As for the content validity indexes (CVI) based on the Relevance variable, the values were dichotomized as in the previous stage on the basis of the same criterion. In this stage a total of 91 out of the 111 indicators exceeded the range proposed, while only 20 failed to obtain an acceptable CVI.

The indicators were again examined along with the qualitative comments supplied by the professionals in order to complete the quantitative results. The qualitative information was extracted from the transcriptions of the 15 online focus groups plus the individual qualitative comments of each professional. Following suggestions from the professionals, 8 indicators were reformulated, making a single instrument with a total of 99 indicators to be tested.

Finally the content validity of the pilot version of the ACRAM was verified for a third time with the participation of the committee of experts made up of 13 professionals in two focus groups, the aim being to

Table 3
Descriptive statistics by blocks of variables to be assessed in Stage 2.

		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22
IN	Min	0.83/	0.69/	0.89/	0.99/	0.64/	0.90/	0.78/	0.80/	1.00/	0.89/	0.84/	0.70/	0.98/	0.00/	0.65/	0.59/	0.54/	0.72/	0.68/	0.81/	0.69/	0.66/
	ind/	0.80	0.50	0.80	1	0.45	0.90	0.65	0.85	1.00	0.90	0.84	0.70	1	1	0.63	0.47	0.39	0.58	0.32	0.84	0.58	0.60
	gr																						
	Max	0.99/	1.00/	0.97/	0.99/	0.99/	0.99/	0.99/	0.95/	1.00/	0.99/	0.99/	0.96/	0.99/	1.00/	0.80/	0.91/	0.73/	0.85/	0.99/	0.97/	0.92/	0.98/
	ind/	1	0.95	1	1	1	1	1	1	1.00	1	0.99	1	1	1	0.74	0.89	0.56	0.79	0.79	1	0.84	1
	gr																						
RL	M	0.95/	0.87/	0.93/	0.99/	0.86/	0.97/	0.87/	0.90/	1.00/	0.95/	0.92/	0.87/	0.98/	0.66/	0.73/	0.77/	0.64/	0.79/	0.80/	0.91/	0.80/	0.89/
	ind/	0.97	0.80	0.95	1	0.86	0.97	0.88	0.95	1	0.95	0.93	0.87	1	1	0.68	0.71	0.46	0.68	0.56	0.95	0.71	0.90
	gr																						
	SD	0.05/	0.09/	0.03/	0.00/	0.10/	0.02/	0.07/	0.07/	0.00	0.03/	0.07/	0.11/	0.00/	0.47	0.07/	0.10/	0.07/	0.05/	0.11/	0.05/	0.06/	0.08/
	ind/	0.07	0.13	0.06	0.00	0.16	0.03	0.12	0.07		0.04	0.07	0.13	0.00		0.05	0.14	0.07	0.09	0.15	0.06	0.08	0.11
	gr																						
*	Min	2.87/	2.35/	2.79/	3.56/	2.22/	3.55/	2.79/	2.99/	2.00/	3.50/	3.14/	2.75/	3.76/	1.00/	2.48/	2.60/	2.52/	2.96/	2.45/	2.99/	2.78/	2.62/
	ind/	2.90	2.30	3.00	3.70	2.20	3.75	2.50	2.85	3.90	3.65	3.14	2.79	3.89	3.95	2.32	2.68	2.37	2.79	2.16	3.05	2.32	2.30
	gr																						
	Max	3.80/	3.78/	3.85/	3.69/	3.62/	3.92/	3.84/	3.36/	4.00/	3.91/	3.96/	3.81/	3.82/	4.00/	2.75/	3.26/	2.89/	3.24/	3.95/	3.81/	3.60/	3.72/
	ind/	3.85	3.90	3.90	3.90	3.95	4	4	3.75	3.90	3.95	3.96	3.74	3.95	3.95	2.74	3.32	2.53	3.26	3.53	3.83	3.42	3.85
	gr																						
*	M	3.42/	3.07/	3.34/	3.62/	3.15/	3.78/	3.21/	3.23/	3.88/	3.72/	3.54/	3.35/	3.79/	2.72/	2.63/	3.01/	2.75/	3.05/	3.06/	3.44/	3.19/	3.33/
	ind/	3.58	3.21	3.51	3.80	3.34	3.89	3.32	3.43	3.90	3.85	3.55	3.27	3.92	3.95	2.54	3.12	2.44	2.91	2.64	3.44	2.87	3.33
	gr																						
	SD	0.29/	0.47/	0.32/	0.09/	0.39/	0.11/	0.31/	0.17/	0.36	0.14/	0.31/	0.38/	0.04/	1.12	0.14/	0.21/	0.14/	0.13/	0.46/	0.28/	0.22/	0.26/
	ind/	0.28	0.45	0.30	0.14	0.47	0.09	0.41	0.41		0.10	0.31	0.43	0.04		0.21	0.22	0.06	0.24	0.44	0.29	0.29	0.41
	gr																						
*	Min	0.22/	0.09/	0.17/	0.90/	0.10/	0.22/	0.21/	0.46/	0.00/	0.02/	0.26/	0.23/	0.92/	0.00/	0.49/	0.13/	0.31/	0.51/	0.04/	0.22/	0.15/	0.04/
	ind/	0.10	0.10	0.15	0.85	0.05	0.10	0.10	0.40	0.90	0.00	0.26	0.11	1	0.50	0.47	0.21	0.26	0.47	0.00	0.32	0.05	0.00
	gr																						
	Max	0.76/	0.85/	0.85/	0.94/	0.79/	0.78/	0.97/	0.81/	1.00/	0.80/	0.95/	0.92/	0.92/	1.00/	0.65/	0.65/	0.49/	0.69/	0.94/	0.88/	0.82/	0.60/
	ind/	0.75	0.80	0.90	0.90	0.75	0.80	0.80	0.90	0.90	0.60	0.95	0.84	1	0.50	0.63	0.68	0.37	0.68	0.74	0.74	0.74	0.80
	gr																						
*	M	0.45/	0.40/	0.49/	0.92/	0.46/	0.53/	0.43/	0.68/	0.99/	0.31/	0.56/	0.60/	0.92/	0.60/	0.55/	0.46/	0.40/	0.60/	0.37/	0.58/	0.44/	0.30/
	ind/	0.40	0.36	0.48	0.88	0.47	0.51	0.42	0.71	0.90	0.27	0.56	0.54	1	0.50	0.53	0.44	0.31	0.57	0.29	0.54	0.39	0.29
	gr																						
	SD	0.17/	0.25/	0.22/	0.03/	0.19/	0.18/	0.21/	0.16/	0.11	0.21/	0.28/	0.27/	0.00/	0.49	0.09/	0.18/	0.07/	0.08/	0.29/	0.23/	0.16/	0.16/
	ind/	0.23	0.22	0.25	0.04	0.22	0.21	0.23	0.22		0.19	0.28	0.29	0.00		0.09	0.16	0.06	0.11	0.25	0.18	0.15	0.21
	gr																						

Notes: IN = Inclusion of the indicator, RL = Relevance, * = Indispensability, Min ind/gr = Minimum individual/group, Max ind/gr = Maximum individual/group, M ind/gr = Mean individual/group, SD ind/gr = Standard deviation individual/group.

Table 4
Descriptive statistics by blocks of variables to be assessed in Stage 3.

		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22
IN	Min	0.85	0.74	0.84	0.99	0.69	0.99	0.46	0.76	1.00	0.95	0.89	0.75	0.93	0.83	0.95	0.58	0.51	0.71	0.75	0.75	0.70	0.73
	Max	1.00	0.98	1.00	1.00	0.95	0.99	1.00	0.88	1.00	1.00	0.96	0.99	1.00	0.83	0.95	0.90	0.78	0.84	0.99	0.95	0.96	0.92
	M	0.96	0.89	0.94	0.99	0.85	0.99	0.78	0.80	1.00	0.98	0.93	0.90	0.96	0.83	0.95	0.78	0.62	0.78	0.87	0.89	0.87	0.86
	SD	0.06	0.11	0.07	0.01	0.11	0.18	0.07	0.18	0.07	0.02	0.04	0.10	0.05	0.05	0.15	0.11	0.11	0.09	0.08	0.07	0.10	0.05
RL	Min	3.06	2.39	2.81	3.28	2.72	4.00	2.16	2.68	3.75	3.52	3.32	2.87	3.35	2.51	3.00	2.55	2.18	2.71	2.67	2.62	2.83	2.91
	Max	3.89	3.39	3.62	3.42	3.43	4.00	3.66	2.90	3.75	3.97	3.78	3.69	3.75	2.51	3.00	3.12	2.77	3.04	3.90	3.65	3.50	3.64
	M	3.44	3.07	3.26	3.35	3.06	4.00	2.88	2.77	3.75	3.76	3.51	3.36	3.55	2.51	3.00	2.78	2.45	2.87	3.19	3.25	3.27	3.30
	SD	0.39	0.38	0.37	0.10	0.29	0.47	0.11	0.11	0.89	0.63	0.81	0.90	0.91	0.85	0.91	0.48	0.59	0.84	0.61	0.64	0.58	0.74
IF	Min	0.74	0.62	0.54	0.97	0.45	0.99	0.39	0.45	0.89	0.63	0.81	0.90	0.91	0.85	0.91	0.48	0.59	0.84	0.61	0.64	0.58	0.74
	Max	0.99	0.95	0.97	1.00	0.88	0.99	0.79	0.82	0.89	0.99	0.97	0.96	0.96	0.85	0.91	0.90	0.88	0.84	0.99	0.97	0.94	0.96
	M	0.90	0.84	0.76	0.99	0.71	0.99	0.61	0.64	0.89	0.83	0.92	0.94	0.94	0.85	0.91	0.72	0.75	0.84	0.86	0.88	0.79	0.90
	SD	0.09	0.13	0.18	0.02	0.21	0.13	0.13	0.19	0.13	0.12	0.10	0.03	0.04	0.44	0.31	0.18	0.13	0.00	0.13	0.12	0.12	0.05
ED	Min	0.14	0.26	0.29	0.16	0.34	0.27	0.38	0.41	0.14	0.19	0.15	0.16	0.12	0.44	0.31	0.28	0.21	0.37	0.09	0.18	0.13	0.12
	Max	0.56	0.51	0.53	0.31	0.55	0.27	0.51	0.58	0.14	0.33	0.31	0.26	0.36	0.44	0.31	0.49	0.52	0.42	0.39	0.45	0.43	0.24
	M	0.37	0.38	0.41	0.23	0.42	0.27	0.43	0.50	0.14	0.27	0.23	0.22	0.24	0.44	0.31	0.42	0.43	0.40	0.23	0.31	0.27	0.17
	SD	0.16	0.10	0.11	0.11	0.10	0.04	0.04	0.09	0.04	0.04	0.10	0.05	0.17	1.60	1.73	1.40	1.50	1.56	1.39	1.63	1.57	1.43
TI	Min	1.81	1.25	1.50	1.48	1.52	2.42	1.69	1.48	2.16	2.18	1.92	1.96	1.78	1.60	1.73	1.40	1.50	1.56	1.39	1.63	1.57	1.43
	Max	2.61	1.92	2.22	1.60	1.97	2.42	2.05	1.71	2.16	2.79	2.73	2.55	1.90	1.60	1.73	1.75	1.91	1.84	2.07	2.00	2.08	2.09
	M	2.07	1.61	1.76	1.54	1.72	2.42	1.81	1.60	2.16	2.47	2.29	2.32	1.84	1.60	1.73	1.54	1.64	1.70	1.58	1.77	1.75	1.79
	SD	0.28	0.22	0.33	0.09	0.22	0.96	0.13	0.11	0.95	0.23	0.41	0.26	0.08	0.60	0.67	0.33	0.22	0.47	0.20	0.14	0.16	0.14
*	Min	0.35	0.19	0.35	0.65	0.30	0.96	0.05	0.39	0.95	0.28	0.63	0.44	0.63	0.60	0.67	0.33	0.22	0.47	0.08	0.20	0.13	0.05
	Max	0.92	0.76	0.92	0.77	0.85	0.96	0.90	0.65	0.95	0.95	0.91	0.80	0.87	0.60	0.67	0.75	0.61	0.61	0.91	0.87	0.65	0.67
	M	0.64	0.54	0.66	0.71	0.58	0.96	0.45	0.51	0.95	0.57	0.77	0.61	0.75	0.60	0.67	0.50	0.36	0.54	0.37	0.55	0.38	0.27
	SD	0.26	0.26	0.24	0.08	0.22	0.26	0.26	0.13	0.24	0.24	0.14	0.16	0.17	0.60	0.67	0.18	0.17	0.10	0.24	0.23	0.17	0.16

Notes: IN = Inclusion of the indicator, RL = Relevance, IF = Functionality, ED = Distorting elements, TI = Type of indicator, * = Indispensability, Min = Minimum, Max = Maximum, M = Mean, SD = Standard deviation.

Table 5

Averages and standard deviations of the correlations between RL and * by block (Stage 3).

Blocks	Average and DT Tau B	Range Tau B	Average and DT Rho	Range Rho
B1. Parental variables	0.43 (0.13)	[0.20 - 0.56]	0.45 (0.14)	[0.20 - 0.60]
B2. Neglect of physical needs	0.34 (0.13)	[0.19 - 0.47]	0.36 (0.14)	[0.20 - 0.49]
B3. Neglect of safety needs	0.35 (0.14)	[0.16 - 0.46]	0.37 (0.16)	[0.17 - 0.49]
B4. Neglect of educational needs	0.45 (0.04)	[0.42 - 0.49]	0.48 (0.05)	[0.45 - 0.51]
B5. Neglect of mental needs	0.47 (0.09)	[0.38 - 0.57]	0.50 (0.11)	[0.40 - 0.61]
B6. Physical maltreatment	-	-	-	-
B7. Emotional maltreatment	0.36 (0.09)	[0.24 - 0.47]	0.39 (0.10)	[0.26 - 0.51]
B8. Instrumentalization	0.43 (0.05)	[0.39 - 0.48]	0.46 (0.06)	[0.42 - 0.53]
B9. Corruption	-	-	-	-
B10. Sexual abuse	0.28 (0.09)	[0.10 - 0.41]	0.29 (0.10)	[0.10 - 0.41]
B11. Prenatal maltreatment/ risk	0.53 (0.05)	[0.47 - 0.58]	0.55 (0.04)	[0.50 - 0.59]
B12. Abandonment	0.48 (0.16)	[0.33 - 0.69]	0.51 (0.16)	[0.34 - 0.70]
B13. Labor exploitation and begging	0.26 (0.27)	[0.07 - 0.46]	0.28 (0.29)	[0.07 - 0.48]
B14. Family environment	-	-	-	-
B15. Socioeconomic environment	-	-	-	-
B16. School environment	0.44 (0.05)	[0.38 - 0.50]	0.48 (0.05)	[0.41 - 0.54]
B17. Health environment	0.41 (0.14)	[0.20 - 0.48]	0.44 (0.15)	[0.22 - 0.53]
B18. Techno-political intervention	0.44 (0.23)	[0.27 - 0.60]	0.48 (0.26)	[0.29 - 0.66]
B19. Unaccompanied foreign children and adolescents	0.27 (0.13)	[0.04 - 0.49]	0.29 (0.14)	[0.04 - 0.53]
B20. Parental inability to control the child/ adolescent's behavior	0.45 (0.08)	[0.36 - 0.54]	0.48 (0.08)	[0.37 - 0.58]
B21. Institutional maltreatment	0.32 (0.11)	[0.17 - 0.48]	0.33 (0.12)	[0.17 - 0.50]
B22. Protective factors	0.24 (0.15)	[-0.13 - 0.47]	0.25 (0.16)	[-0.14 - 0.50]

obtain a global assessment of the instrument and of its approach, structure and four-category response format (the information cannot be gathered, there is evidence that this does not happen, there are indications that this happens but it cannot be confirmed, or there is evidence that this happens). Contact was made by email with an attachment containing the pilot version of the instrument, allowing participants a margin of time before the focus group to enable them to examine it and pass on their suggestions. The group meetings were recorded and transcribed, and the final modifications were made to the instrument.

The result of both content validation stages was a set of 99 indicators of risk and protection forming a total of 17 conceptual blocks which, in turn, were subdivided into two sections. Both, conceptual content and title of the instrument was validated and proposed by the group of experts. The final result composed of blocks and indicators can be seen in the third column of Table 2.

Some examples of items of the parental variables could be "The primary caregiver has other children in the child protection system (with declaration of risk and/or neglect)."; an example of Unaccompanied foreign children and adolescents could be "The child has difficulties in communicating, due to language issues, affecting the socialization/ integration of the child, without the existence of a cultural mediator.", an example of Community factors can be "Coordination between welfare

administrations that collaborate with the family and the child (health, education, social services and/or others) is deficient/inadequate/non-existent.”, and an example of an item of Protective factors is “The child has his or her own self-care resources and personal capacities to anticipate situations that may pose a personal or social risk (invitation from peers to commit a crime, attack others, etc.).”.

Once the content validity of the set of indicators was proven, we proceeded to test the pilot version with a longitudinal study using real cases. This enabled us to examine the set’s main psychometric properties as regards convergent and discriminant validity along with its structural validity and its reliability statistics.

4. Discussion and conclusion

This study has presented the development and content validation of the first comprehensive tool for detecting and assessing risk and maltreatment in children and adolescents, known as the ACRAM. The process involved the triangulation of different data sources at various stages of the research, including an exhaustive search of the literature, inter-rater agreement and expert and professional opinions, thereby guaranteeing methodological rigor (Juárez-Hernández & Tobón, 2018; Newman et al., 2013) and encouraging professional consensus in the decision-making process (Zejlman et al., 2017).

The results deriving from the first stage of the research identified key factors and produced a large set of indicators to represent all the dimensions of maltreatment. The mixed-methods process used to validate the instrument’s content reduced the initial pool of items to the most relevant and effective indicators for professionals involved in child protection. The evaluation by the professionals and the *ad hoc* committee of experts enabled us to make a conscious, in-depth reduction of the indicators, modifying them meticulously in the way the professionals suggested. Most of the items included were agreed according to the content validation indexes, bearing in mind Yusoff’s (2019) recommendations. Others were reformulated. In addition, the quantitative results obtained in the different stages defined the response scale and its structure as in Weiner et al. (2012), who stress that responses should capture relevant experiences as lived by the target population.

Unlike other tools used previously, which focus especially on assessing risk behaviors in parents and caregivers (Assink et al., 2018; Lo et al., 2019; McMillin et al., 2016), the ACRAM is presented as a comprehensive assessment tool that covers not only the characteristics and behaviors of the caregiver but also other factors recommended by other authors, such as the characteristics of the child or adolescent, socioeconomic factors, family relationships (Euser et al. 2011; Skeen and Tomlinson, 2013), and protective factors understood as the family, community and personal resources the child can use to deal with or offset the risks of maltreatment (Counts et al. 2010, Ridings et al. 2017). In concordance with these authors, the final version of the ACRAM tool, after its content validation consists of 99 indicators of risk and protection divided into 17 conceptual blocks, which in turn compose two sections. The first of these concerns parental and caregiver factors and includes the following constructs: 1) parental variables, 2) neglect of physical needs, 3) neglect of safety needs, 4) neglect of educational needs, 5) neglect of mental needs, 6) physical maltreatment, 7) emotional maltreatment, 8) instrumentalization and abandonment, 9) sexual abuse, 10) prenatal maltreatment/risk, 11) labor exploitation and begging, and 12) parental inability to control the child/adolescent’s behavior. The second concerns environment-related and protective factors, which include 1) Unaccompanied foreign children and adolescents, 2) Community factors, including socioeconomic and family setting, school, techno-political intervention, administrations, health and institutional maltreatment, and 3) protective factors. Thus, the creation of this tool represents an important advance in updating the concept of child maltreatment, integrating into a single instrument all the various situations of risk as multidimensional constructs involving multiple factors of risk and protection, as proposed by the WHO (2021).

According to Boateng et al. (2018), a tool designed by the end users has a greater chance of working correctly than a tool based solely on the scientific literature. As far as we are aware, ACRAM is the first tool for detecting and assessing risk and maltreatment in children and adolescents that goes beyond a merely theoretical construct. It was designed and developed by and for the target population, with professionals who work with children and adolescents, participating in all stages of its creation and development in order to adapt it to their own reality and experience. In line with Almanasreh et al. (2019), therefore, we can state that content validity has helped to narrow the gap between academic research and professional experience as far as maltreatment in childhood and adolescence is concerned.

Although it is the first step in validating an instrument, validating the content of this tool made it possible to discover and include the most representative indicators and conceptual blocks and provided relevant information before evidence was gathered regarding the structural and external aspects of validity (Peeters & Harpe, 2020). However, our study does have limitations. The COVID-19 health crisis meant that we had to rethink our methodology and restructure our information gathering, ensuring continuity via online platforms (Crescenza et al., 2021). This may have led to a loss of information and naturalness in the participants’ discourses. And although the quantitative analyses took the inter-rater agreements into consideration, the qualitative results of the study could be subject to bias and different interpretations of the elements between experts. This means that a manual will need to be developed for use when training future users of the tool. Lastly, as this instrument has been developed in a sample of children and adolescents in one region of Spain, future analysis of validation needs to be performed in other contexts where legislation and the action protocol regarding child protective services could be different.

Despite these limitations, it is important to stress that the content validity and the inclusion of professionals and experts in the process has enabled the tool to be adapted to the target collective, to its psychosocial and geographic setting and to the various different realities that describe maltreatment in different settings. Nevertheless, more research will be needed in the future to evaluate the instrument’s psychometric properties and for its rigorous validation in different contexts before we can see the consolidation of the ACRAM tool as a comprehensive global instrument to help decision making in the area of child maltreatment.

The study provides evidence of the development process and content validity of the ACRAM tool in the risk assessment of child maltreatment. This finding shows that early detection and intervention carries much weight for public policies and care services involving children and adolescents. It is therefore important to provide the professionals with up-to-date, rigorous, objective, scientific tools that emerge from the real needs detected by the target population. In same line, decision making or performing research with instruments of poor or unknown quality is unethical, especially considering the nature of this topic, and can also be a waste of resources (Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018). Therefore, identification and comprehensive assessment of child maltreatment will have significant implications for the quality of life of children and adolescents and their families and for the welfare of the people working in child protection systems.

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CRediT authorship contribution statement

José-Javier Navarro-Pérez: Conceptualization, Funding acquisition, Investigation, Project administration, Resources, Supervision, Writing – review & editing. **Paula Samper:** Conceptualization, Funding acquisition, Investigation, Project administration, Supervision, Writing – review & editing. **Patricia Sancho:** Formal analysis, Methodology,

Supervision, Writing – review & editing. **Sylvia Georgieva**: Data curation, Formal analysis, Methodology, Writing – original draft. **Ángela Carbonell**: Data curation, Methodology, Writing – original draft. **Maria-Vicenta Mestre**: Conceptualization, Funding acquisition, Project administration, Resources, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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