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ORIGINAL ARTICLE

Validation and reliability study of the parent concerns about surgery questionnaire: What worries parents?☆

Alberto Gironés Muriel[a,*], Ana Campos Segovia[b], Patricia Ríos Gómez[b]

[a] *Servicio de Anestesiología, Hospital Universitario Sanitas La Moraleja, Madrid, Spain*
[b] *Servicio de Pediatría, Hospital Universitario Sanitas La Moraleja, Madrid, Spain*

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Abstract
Introduction: The study of mediating variables and psychological responses to child surgery involves the evaluation of both the patient and the parents as it regards different stressors.
Objective: To have a reliable and reproducible valid evaluation tool that assesses the level of paternal involvement in relation to different stressors in the setting of surgery.
Materials and method: A self-report questionnaire study was completed by 123 subjects of both sexes, subdivided into 2 populations, due to their relationship with the hospital setting. The items were determined by a group of experts and analysed using the Lawshe validity index to determine a first validity of content. Subsequently, the reliability of the tool was determined by an item-re-item analysis of the 2 sub-populations. A factorial analysis was performed to analyse the construct validity with the maximum likelihood and rotation of varimax type factors.
Results: A questionnaire of paternal concern was offered, consisting of 21 items with a Cronbach coefficient of 0.97, giving good precision and stability. The posterior factor analysis gives an adequate validity to the questionnaire, with the determination of 10 common stressors that cover 74.08% of the common and non-common variance of the questionnaire.
Conclusion: The proposed questionnaire is reliable, valid and easy-to-apply and is developed to assess the level of paternal concern about the surgery of a child and to be able to apply measures and programs through the prior assessment of these elements.

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* Corresponding author.
E-mail address: alberto@gironesmuriel.com (A. Gironés Muriel).

PALABRAS CLAVE
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CPPC

Estudio de validación y fiabilidad del cuestionario de preocupación paterna sobre la cirugía. ¿Qué preocupa a los padres?

Resumen
Introducción: El estudio de las variables mediadoras y las respuestas psicológicas ante la cirugía infantil conlleva la evaluación tanto del paciente como de sus padres frente a los distintos elementos estresantes.
Objetivo: Contar con un instrumento de evaluación válido, fiable y reproducible que valore el grado de afectación paterno frente a distintos elementos estresantes en el entorno de una cirugía.
Material y método: Se realizó un estudio mediante un autocuestionario a 123 sujetos de ambos sexos subdivididos en 2 poblaciones por su relación con el ámbito hospitalario. Los ítems fueron determinados por un grupo de expertos y analizados mediante el índice de validez de Lawshe para determinar una primera validez de contenido. Posteriormente, se determinó la fiabilidad del instrumento mediante un análisis ítem-reítem de las 2 subpoblaciones. Para analizar la validez del constructo se realizó un análisis factorial con el método de máxima verosimilitud y rotación de factores tipo varimax.
Resultados: Se ofrece un cuestionario de preocupación paterna formado por 21 ítems con un coeficiente de Cronbach de 0,97, lo que le da una buena precisión y estabilidad. El análisis factorial posterior otorga una adecuada validez al cuestionario, con la determinación de 10 factores estresantes comunes que engloban al 74,08% de la varianza común y no común del cuestionario.
Conclusión: El cuestionario propuesto es un instrumento fiable, válido y de fácil aplicación, desarrollado para valorar el nivel de preocupación paterna frente a la cirugía de un hijo y aplicar medidas y programas mediante la valoración previa de dichos elementos.

Introduction

The study of psychological responses to surgery in children and their mediator variables involves the assessment of paediatric patients as well as their parents in relation to the different stressors at play. Several authors have proposed a series of objectives for an assessment of these characteristics.

1. Establish how a child feels about and reacts to the experience of surgery.
2. Establish how parents and individuals accompanying the child perceive and feel about surgery.
3. Analyse the parent-child relationship in the perioperative period.
4. Plan a psychological preparation program based on the obtained data, individual needs and resources available in the specific hospital. Thus, Jay et al. already recommended the assessment of certain clinical variables as a first step to decide on the preparation programme most suitable for each facility.

The availability of pre-surgical assessment tools that are reliable, valid, feasible and allow making comparisons would be helpful in achieving efficacious and efficient results. At present, the evaluation of paediatric surgical patients is carried out through a few tools that were developed and validated appropriately. However, there is no tool to specifically assess parental levels of anxiety or stress in relation to surgical intervention in children, as anxiety is assessed with general tools that were not developed or validated for populations of these particular characteristics.[1]

The aim of this study was to develop and test a questionnaire to identify the events that most worry the parents of children facing surgery in order to have a valid and reliable tool to help design suitable programmes for psychological preparation for surgery adapted to the particular circumstances of each facility.

Method

Description of the instrument

The original version of the Questionnaire on Parental Concerns regarding Surgery (QPCS) included the main stressors for parents related to surgery in a child based on the scientific literature and our professional experience. Table 1 presents the wording of the 37 original questionnaire items addressing different elements that may be associated to parental concerns regarding a future surgery in a child. These items address different aspects, such as those related to the underlying disease requiring surgery, those related to the surgery itself and its outcomes, issues related to the hospital environment and lastly personal issues concerning the parental role. These issues were presented in the form of a self-administered questionnaire that assessed the degree of concern associated with each item.

The degree of concern was self-reported on a 5-level Likert scale going from 1 (not worried) to 5 (very worried).

Table 1 Wording of the 37 items of the original questionnaire. Concern percentages and content validity index.

Item	Lawshe CVI	% of experts that considered the item important	% of health care workers that considered the item important	% of non-health care workers that considered the item important
1. Concern about how long the process will last until the child heals	0.4	70	74	85
2. Concern about the severity of disease	0.8	90	88	96
3. Concern about knowing or not knowing alternatives to surgery or alternative approaches to a cure	0.4	70	49	74
4. Concern about having fully understood what the physician has conveyed about the child's disease	0.6	80	61	75
5. Concerned about the symptoms the child will experience (fever, nausea...)	0.6	80	74	78
6. Concerned about the pain the child will experience	0.8	90	79	91
7. Concern about potential psychological sequelae in the child (nightmares, fears, phobias...)	−0.4	30	51	88
8. Concern about the discomfort the child may experience (lack of appetite, insomnia...)	−0.2	40	49	75
9. Concern about the post-operative diet	−0.2	40	47	37
10. Concern about how long it will take the child to recover and resume a normal lifestyle	0.4	70	75	71
11. Concern about the scars the child will have	0	50	58	53
12. Concern about potential behavioural changes (tantrums, aggressive behaviours...)	−0.6	20	42	75
13. Concern about surgical complications			96	0
14. Concern about the risks of surgery	0.8	90	93	97
15. Concern about the risks of anaesthesia	0.8	90	93	94
16. Concern about the child waking mid-surgery	−0.4	30	60	71
17. Concern about the possibility that serious complications result in the child's death	0.4	70	86	97
18. Parental concern about how to appropriately behave towards the child	−0.4	30	53	0
19. Concern about pricks or jabs experienced by the child	−0.4	30	51	47
20. Concern about the procedure that will be used to anesthetise the child	0.4	70	79	68
21. Concern about the procedure that will be used to operate on the child	0.2	60	77	81
22. Concern about what the child will see and how it will affect the child (blood, needles, scalpels...)	−0.4	30	33	51
23. Concern about who will accompany the child when the parents leave the child	0	50	68	72
24. Concern about the scarcity of the information received during the surgery	0.4	70	72	76
25. Concern about the child being alone throughout the surgical process	−0.4	30	60	74
26. Concern about the state of the facilities (room, operating theatre...)	−0.6	20	23	47
27. Concern about whether the facilities are appropriate for the child's age (is it a children's hospital?)	−0.4	30	35	53
28. Concern about wait times before and during surgery	−0.2	40	56	59
29. Concern about the clothing of professionals caring for the child	−0.6	20	0	22
30. Concern about the design of the facility (modern, functional...)	−0.6	20	5	24
31. Concern about the competence or qualifications of the physicians managing the child	0.8	90	81	91
32. Concern about the competence of the nursing and housekeeping staff caring for the child	0.4	70	63	90

Table 1 (*Continued*)

Item	Lawshe CVI	% of experts that considered the item important	% of health care workers that considered the item important	% of non-health care workers that considered the item important
33. Concern about the compassion and empathy exhibited by hospital staff in their interactions with the child	0.4	70	70	68
34. Concern about parental nervousness or anxiety	0	50	67	53
35. Concern regarding adequate adherence to the directions given by the physician	0.2	60	47	62
36. Concern about how act appropriately with the child throughout the surgery process	0	50	56	68
37. Concern about how surgery will affect everyday life routines			60	18

Thus, the possible total score for the 37 items of the original questionnaire ranged between 37 and 185 points.

Sample and procedure

We randomly selected a sample of 123 adults of both sexes, none of who had a recent experience with surgery, either personally or in a child. Table 2 presents the sample distribution. Of all the participants, 74.8% were female and 78.05% had children. All were provided with a questionnaire with a series of items that they were asked to complete and submit anonymously. All respondents resided in the Madrid metropolitan area (Spain). The time spent completing the questionnaire ranged from 1.5 to 5 min.

Psychometric analysis

We performed the psychometric analysis using R Commander version 2.2-1,[2] an interface for the R free software for Mac OS GUI.[3]

In a first stage, to achieve adequate content validity, we distributed the original 36-item questionnaire to a group of physicians expert at paediatric surgery and requested their feedback in the following terms: indispensable item, useful item, or dispensable item. Based on the Lawshe content validity index (CVI) and the feedback provided by the experts, we removed items 13 and 18 for being redundant. We waited to assess the individual reliability of 11 items with a CVI of less than 0.4 to decide whether they remained in the questionnaire. Item 37 (parental concerns about changes in everyday routines) was added at the request of several experts.

We calculated the reliability of the instrument by means of the Cronbach alpha, whose value, of 0.97 for every item, established the adequate accuracy and stability of the questionnaire.

We assessed individual items through item-total correlations (Table 3) and analysing the impact of removing each item on the Cronbach alpha. We defined 2 populations to calculate item-total correlations: a population with hospital experience (medical and nursing staff) and another without hospital experience. Items 17 (possibility of death), 28 (concern about wait times) and 30 (concern regarding the design of hospital facilities) were discarded because they had low correlation coefficients in both populations as well as low CVIs.

Of all items, 65.7% corresponded to correlation coefficients greater than 0.5%, indicative of a good performance relative to the overall analysis.

We performed factor analysis to assess construct validity. We used the maximum likelihood method with varimax rotation of the remaining 32 items.

As the first step, we performed principal component analysis, which identified 8 components with eigenvalues equal to or greater than 1. However, the eigenvalues of the common components 9 and 10 was 0.9 and 0.8 respectively. We ought to add that the cumulative percentage of the common and specific variance explained by the 10 components amounted to 74.08%. This led to performance of factor analysis using the 10 common components. This decision was supported by a statistical analysis of the model through hypothesis testing. The chi square value was 247.23 with 221 degrees of freedom and a *p*-value of .109, sufficiently high to accept the hypothesis that 10 components were sufficient to explain the model. This was not the case when only 9 components were included ($P = .014$).

Thus, the pattern matrix revealed 10 components (Table 4) that explained 63.9% of the common variance and 74.08% of the common and specific variance in the analysis. The first principal component, concerns on the sequelae of surgery, explained 9.2% of the variance and encompassed 3 items (7, 8 and 12) pertaining to the potential physical and psychological sequelae of surgery. The second principal component, concerns regarding the appropriateness of the respondent's own behaviour, explained 8.9% of the variance. This component encompassed 4 items (35, 36, 4 and 34) relative to the thorough understanding of the surgery and adherence to provided directions. The third component, concerns regarding anaesthesia, accounted for 7.3% of the variance and comprised 3 items (20, 15 and 19) regarding the risks of anaesthesia. The fourth component, concern

Table 2 Sample distribution.

Sample distribution	*n*	%
Total	123	
Female	92	74.80
Male	31	25.20
Parents	96	78.05
Health care workers	56	
Sex		
Female	45	80.36
Male	11	19.64
Occupation		
Assistant	11	19.64
Nurse	23	41.47
Physician	22	39.29
Has children		
Yes	29	51.79
No	27	48.21
Non-health care workers	67	
Sex		
Female	47	29.85
Male	20	70.15
Educational attainment		
Primary school	1	1.49
Secondary school	12	17.91
Vocational certification	11	16.42
University	43	68
Age		
30–45 years	42	62.7
>46 years	25	37.3
Number of children		
1	16	23.88
2	43	64.18
3	8	11.94
Personal history of surgery		
Yes	53	79.1
No	14	20.9
Previous surgery in a child		
Yes	27	40.3
No	40	79.1

about hospital personnel, comprehends items 32 and 31 relative to the training and attitude of the hospital staff. The fifth component, concern about parental absence, explained 6.8% of the common variance and comprised items pertaining to the child's anxiety due to the absence of the parents, the child's perception of the environment or the presence of strangers (22, 23 and 25). The sixth component, concern about the underlying disease, explained 6.5% of the common variance of the analysis and included items 1, 2 and 3 regarding disease severity, duration of recovery and alternative treatments. The seventh component, associated with items 26 and 27, explained 5.7% of the variance and pertained to concerns on the appropriateness of the hospital itself as a structural element (modern, appropriate for children, good rooms). The eighth component, pertaining to changes in the normal routine of the child, accounted for 5.5% of the variance and was represented by item 10.

The ninth and tenth components only explained 3.8%and 3.2% of the variance, and included the items pertaining to the risks of surgery and the knowledge of the surgical technique, respectively. Items with a representative factor loading for these factors (14 and 21) were eliminated from the final questionnaire.

Descriptive analysis of the sample

The mean score of the self-reported questionnaire was 139.9 (77% of the maximum possible score) with a standard deviation of 20.05 points. Table 5 shows the items reported to cause the most and the least concern. The greatest concern involved the risks of surgical intervention, including anaesthesia and the procedure itself. Our analysis of the items associated with the greatest concern found small differences in the ratings given by respondents whose occupation related to health care versus those not familiarised with the hospital environment. There was a greater difference in the items reported to cause the least concern (29, 30, 37), which involved the facilities, attire of health care personnel and changes in everyday routines, between respondents not involved in the hospital environment and respondents working in the hospital environment (physicians, nurses and housekeeping staff).

To assess for significant differences in the responses given by the sample under study based on various factors, we selected some variables that were significant in previous studies on preoperational anxiety,[4] such as sex and parenthood status. We also assessed the impact of the number of children and employment in the health care field to determine whether they were significant variables to be taken into account. To this end, we performed analysis of variance comparing different groups in relation to: having or not having children, being male or female, and working or not working in health care. We confirmed the homogeneity of variance by means of Bartlett's test ($p = .07$) and the normal distribution of the data by means of the Kolmogorov-Smirnov test (p-values ranging between .29 and .93 in different groups). The analysis of variance did not reveal significant differences in any of the groups ($p = .036$). We also found no significant difference when we compared the means of the different groups, with performance of normality tests. As for potential variations in the questionnaire score based on the number of children, the analysis of variance did not reveal any significant differences.

Discussion

Hospitalisation and surgery entail exposure to stressors that can themselves elicit responses that hinder the normal development of common surgical processes. This phenomenon is more marked in paediatric patients, whose self-control mechanisms are not sufficiently developed to handle the situations experienced in the context of surgery.[5–7] The parent-child relationship is an essential factor in psychological balance in the context of these stressful situations. The assessment of anxiety and stress levels in both parents and children is a necessary step in the

Table 3 Correlation coefficient of the different items.

Item	Mean	Standard deviation	Item correlation in health care population	Item correlation in non-health care population
1. Concern about how long the process will last until the child heals	4.3	0.87	0.48	0.51
2. Concern about the severity of disease	4.7	0.65	0.41	**0.39**
3. Concern about knowing or not knowing alternatives to surgery or alternative approaches to a cure	3.8	1.18	0.45	0.51
4. Concern about having fully understood what the physician has conveyed about the child's disease	4	1.08	0.56	0.61
5. Concerned about the symptoms the child will experience (fever, nausea...)	4.2	0.92	0.53	0.51
6. Concerned about the pain the child will experience	4.5	0.76	0.58	0.59
7. Concern about potential psychological sequelae in the child (nightmares, fears, phobias ...)	3.9	1.16	0.5	0.50
8. Concern about the discomfort the child may experience (lack of appetite, insomnia...)	3.8	1.06	0.65	0.63
9. Concern about the post-operative diet	3.3	1.06	0.59	0.60
10. Concern about how long it will take the child to recover and resume a normal lifestyle	4	0.86	0.48	0.43
11. Concern about the scars the child will have	3.6	1.02	0.45	0.45
12. Concern about potential behavioural changes (tantrums, aggressive behaviours...)	3.6	1.13	0.71	0.66
13. Concern about surgical complications				
14. Concern about the risks of surgery	4.8	0.49	0.53	0.52
15. Concern about the risks of anaesthesia	4.7	0.71	**0.35**	0.43
16. Concern about the child waking mid-surgery	3.9	1.34	0.68	0.69
17. Concern about the possibility that serious complications result in the child's death	4.7	0.81	**0.37**	**0.37**
18. Parental concern about how to appropriately behave towards the child				
19. Concern about pricks or jabs experienced by the child	3.4	1.08	0.53	0.58
20. Concern about the procedure that will be used to anesthetise the child	4.1	1.05	0.54	0.58
21. Concern about the procedure that will be used to operate on the child	4.2	0.95	0.62	0.58
22. Concern about what the child will see and how it will affect the child (blood, needles, scalpels...)	3.3	1.14	0.57	0.64
23. Concern about who will accompany the child when the parents leave the child	4	1.08	0.53	0.60
24. Concern about the scarcity of the information received during the surgery	4.2	1.01	0.59	0.63
25. Concern about the child being alone throughout the surgical process	4	1.16	**0.38**	0.53
26. Concern about the state of the facilities (room, operating theatre ...)	3.2	1.04	**0.36**	0.57
27. Concern about whether the facilities are appropriate for the child's age (is it a children's hospital?)	3.3	1.18	0.49	0.56
28. Concern about wait times before and during surgery	3.6	0.98	**0.11**	0.37
29. Concern about the clothing of professionals caring for the child	2.1	1.1	**0.3**	0.45
30. Concern about the design of the facility (modern, functional...)	2.4	1.07	**0.02**	0.40
31. Concern about the competence or qualifications of the physicians managing the child	4.5	0.83	0.44	0.48
32. Concern about the competence of the nursing and housekeeping staff caring for the child	4.2	0.99	0.53	0.52
33. Concern about the compassion and empathy exhibited by hospital staff in their interactions with the child	3.9	1	0.64	0.44
34. Concern about parental nervousness or anxiety	3.6	1.19	0.56	0.58

Table 3 (*Continued*)

Item	Mean	Standard deviation	Item correlation in health care population	Item correlation in non-health care population
35. Concern regarding adequate adherence to the directions given by the physician	3.6	1.11	0.6	0.64
36. Concern about how act appropriately with the child throughout the surgery process	3.7	1.05	0.58	0.60
37. Concern about how surgery will affect everyday life routines	3	1.24	0.53	**0.26**

Values of less than 0.4 are presented in boldface.

Table 4 Factor analysis: factor loading of each item.

	Item factor loading									
	Fact1	Fact2	Fact3	Fact4	Fact5	Fact6	Fact7	Fact8	Fact9	Fact10
Item1	0.183	0.162	0.142		0.155	**0.730**		0.238		
Item2	0.136					**0.742**			1.142	0.130
Item3	0.295	0.196				**0.460**				
Item4	0.337	**0.527**				0.336	0.132		0.118	0.104
Item5	0.323	0.187	0.129	0.266	0.149	0.375	0.125	0.166		
Item6	0.300	0.149	0.174	0.346	0.273	0.132	0.274	0.278		
Item7	**0.706**	0.113	0.212	0.122						
Item8	**0.722**	0.110	0.265	0.168	0.122	0.186				
Item9	0.235	0.395	0.334	0.170	0.123	0.343	0.140			
Item10	0.103	0.162	0.195	0.**778**						
Item11	0.286	0.313	0.108	0.399	0.160					
Item12	**0.640**	0.224	0.233	0.194	0.102	0.254	0.179	0.117		
Item14	0.235	0.165	0.139	0.168	0.152	0.225	**0.793**	0.129		
Item15	0.120	0.155	0.685	0.105	0.390					
Item16	0.397	0.370	0.367	0.214	0.164	0.150	0.224	0.107		
Item19	0.367	0.200	**0.490**	0.175	0.116	0.246				
Item20	0.110	0.143	**0.791**	0.110	0.233	0.260				
Item21	0.217	0.193	0.204	0.215	0.154	0.212	0.236	0.131	**0.825**	
Item22	0.337	0.250	0.265	0.151	**0.492**	0.226	0.157			
Item23	0.285	0.162	0.281	**0.716**	0.159	0.238				
Item24	0.216	0.164	0.339	0.205	0.366	0.231	0.153	0.253		
Item25	0.115	0.160	0.162	**0.721**	0.163	0.215	0.146			
Item26	0.251	0.319	0.150	0.105	0.**648**					
Item27	0.108	0.220	0.252	0.**907**	0.183					
Item29	0.373	0.112	0.337	−0.110						
Item31	0.117	**0.771**	0.242	0.154						
Item32	0.231	**0.934**	0.132	0.115	0.102					
Item33	0.126	0.201	0.370	0.281	0.297	−0.194				
Item34	0.171	**0.575**	0.281	0.252	0.182					
Item35	0.104	**0.761**	0.195	0.234	0.159	0.164	0.178			
Item36	0.107	**0.649**	0.198	0.186	0.199	1.155	1.151			
Item37	0.376	0.306	0.262	−0.126						
Proportion var	0.092	0.089	0.073	0.070	0.068	0.065	0.057	0.055	0.038	0.032
Cumulative var	0.092	0.181	0.254	0.324	0.392	0.457	0.514	0.569	0.608	0.639

implementation of a hospital programme aimed at mitigating such stress. There are reliable and validated instruments to accurately assess the level of anxiety of children who are going to have surgery, but when it comes to instruments used specifically to assess paternal anxiety or stress, we only found tools that address general situations or situations that have little in common with surgery in a child. On the other hand, many of these instruments have such characteristics as to be of little use in the context of everyday clinical practice, due to their complexity and length.

Table 5 Analysis of items with the highest and lowest ratings.

Items rated highest	Mean	% of questionnaires where the item was given a 5-point rating
Item 14: Concern about the risks of surgery	4.8	81
Item 15: Concern about the risks of anaesthesia	4.7	79
Item 17: Concern about adverse or fatal outcomes of surgery	4.7	82
Items rated lowest	**Points**	**%**
Item 29: Concern about the clothing of the hospital staff	2.1	20
Item 30: Concern about the clothing of the hospital staff	2.4	30
Item 37: Parental concern about changes in everyday life	3	10

Table 6 Final questionnaire (Questionnaire on Parental Concerns regarding Surgery, QPCS).

1. How long will the process last until my child heals?
2. Severity of underlying disease
3. Do I really know the alternatives to surgery or alternative curative approaches?
4. Do I understand everything the doctor has told me about my child's disease?
7. Possible psychological sequelae in my child (nightmares, fears, phobias...)
8. Discomfort child may experience after surgery (lack of appetite, insomnia...)
10. Duration of recovery before returning to a normal lifestyle
12. Possible behavioural changes in my child (tantrums, aggressive behaviour..)
15. Risks of anaesthesia
19. Jabs or pricks experienced by my child
20. The procedure used to anaesthetise my child
22. Things my child may see in the operating room and their potential impact (blood, needles, scalpels...)
23. Who will accompany my child when we leave
25. My child feeling lonely when I'm not around
26. What hospital facilities will be like (the room, the operating theatre...)
27. The adequacy of the hospital for my child's age group (is the hospital actually adapted to children?)
31. The training and qualifications of the doctors caring for my child
32. The training of the nursing and housekeeping personnel that will take care of my child
34. My own nervousness or anxiety
35. Whether I will correctly follow the directions given by the doctor
36. The appropriate way to behave with my child throughout the process

I am concerned about: rate your level of concern between 0 and 5 (0 not worried, 5 very worried).

Unlike other published studies on the subject of surgery-related stress, the results obtained in our study sample did not reveal any significant differences based on sex, the number of children or familiarity with the hospital setting, although this was not the main objective of our study. We are aware that an appropriate generalisation from the sample to the population may require a larger number of respondents.

What our analysis for confirming the validity and reliability of the questionnaire did reveal was a series of concerns or stressors that would be easy to address with a programme specifically designed for their management. Many of these fears can be allayed through simple methods of communication, using channels others than those usually employed in the traditional medical interview, in which the physician, patient and parents can resolve concerns in a relatively short time. Addressing the various aspects that the questionnaire items can provide information on can result in significant improvements, both in the development of a surgical programme and as regards the personal perception of parents regarding the medical care received and its quality.

Thus, our Questionnaire on Parental Concerns regarding Surgery (Table 6) is a reliable, valid and feasible instrument for use in any surgical context requiring the assessment of the level of parental worry regarding surgery in a child for the subsequent implementation of measures and programmes based on the previous assessment of such stressors.

Conflicts of interest

The authors have no conflicts of interest to declare.

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