

Development and validation of a neonatal intensive care parent satisfaction instrument*

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Objective: To develop and test the psychometric properties of the EMPATHIC-N (EMpowerment of PARENTs in THE Intensive Care-Neonatology) questionnaire measuring parent satisfaction.

Design: A psychometric study testing the reliability and validity of a parent satisfaction questionnaire by applying confirmatory factor analysis including standardized factor loadings and subsequently Cronbach's α reliability estimates across time, congruent validity, and nondifferential validity testing.

Setting: A 30-bed neonatal intensive care unit in a university hospital.

Patients: Two cohorts with a total of 441 parents whose child was admitted to the neonatal intensive care unit, January to December 2009.

Interventions: None.

Measurements and Main Results: In the first cohort, 220 of 339 (65%) parents responded; in the second cohort, 59 of 102 (58%) parents responded. Structural equation modeling and confirmatory factor analysis resulted in a sufficient model fit of 57

statements within five domains: Information, Care & Treatment, Organization, Parental Participation, and Professional Attitude. Standardized factor loading of these statements were between 0.58 and 0.91. Reliability measures, Cronbach's α , of the domains ranged from 0.82 to 0.95. Reliability across time showed no evidence of statistically significant differences between the domains. Congruent validity was confirmed by a good correlation ($p = .01$) between the domains and four general satisfaction questions. Nondifferential validity showed no significant effect sizes between the infants' characteristics and the domains, except between ventilated infants and parent participation statements and infants ≥ 30 wks gestational age and organizational statements.

Conclusions: The EMPATHIC-N questionnaire is a valid quality performance indicator to measure the delivered care as perceived by parents. (*Pediatr Crit Care Med* 2012; 13:554–559)

KEY WORDS: neonatology; parents; quality of care; reliability; satisfaction; validity

Progression of medical technology in neonatology has led to increased survival of premature infants, including improved long-term outcomes. At the same time, nonpharmacologic interventions such as the Newborn Individualized Developmental Care and Assessment

Program seems to improve, despite contrasting findings and short- and long-term outcomes (1–3). Equally important might be the changes in the roles of parents. Historical developments have led healthcare professionals toward accepting an increased involvement of parents in the care of their child (4). Today's most important parental needs concern issues of assurance such as the best care provided and accurate information (5), whereas the neonatal intensive care unit (NICU) staffs' behavior seems to direct toward emotional support, parent empowerment, supportive unit policies, and parent education (6). Therefore, assessment of parental experiences and satisfaction with care necessitate ongoing attention to improve parental care.

The increasing demand for consumer-driven care and the acceptance of patient satisfaction as a quality performance measure justify the development of rigorous parent satisfaction instruments. Although a few neonatal parent satisfaction questionnaires are reported in the literature, adopting a validated instrument is cautioned by the instrument's limitations

in validity, reliability, and covering the full scope of parent satisfaction measures (7). Nevertheless, at the same time it was recommended to continue measuring parent satisfaction with selective use of the available instruments until more evidence becomes available on parental experiences. Indeed, parental experiences have been investigated extensively over the past decade. Recent studies provide insight into factors influencing parent satisfaction such as the caregivers' communication skills and providing individual care (8–10). Besides these aspects, family-centered care issues need to be identified and integrated in satisfaction surveys to improve clinical practice based on the experiences of the parents (11).

The empowerment of the parents and partnership with the staff is beneficial in building a family-centered care environment. In this respect, parents and neonatal staff were consulted to identify satisfaction with neonatal intensive care items (12). These studies formed the basis of the present study. The objectives of this study were to develop and to test the psychometric properties of the

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EMPATHIC-N (EMpowerment of Parents in THE Intensive Care-Neonatology) questionnaire measuring parent satisfaction in the NICU.

MATERIALS AND METHODS

The psychometric study was conducted in a 30-bed NICU in The Netherlands. The yearly admission rate is approximately 750 infants, including approximately 300 very-low-birth-weight infants. Data collection was assembled during two cohort periods. The first 9-month period was from January until September 2009 followed by a 3-month period from October until December 2009. The medical ethical review board of the Erasmus Medical Center in Rotterdam approved the study and waived the need for signed written informed consent.

Participants of the study were parents whose child had been admitted to the NICU. Excluded were parents whose child's admission was <48 hrs. Parents whose child died in the unit were also excluded because of the standard practice to evaluate the care with these parents 6 wks after their child's death. Parents with multiple births received only one questionnaire. The self-administered questionnaire was mailed to the parents 3–4 weeks after NICU discharge to capture the parental opinions of the full admission process from admission until discharge. One reminder was sent after 3 wks if no response was received. In the first cohort, 339 parents of 360 children admitted to the NICU from January 1 until September 30, 2009, were invited to participate. To test the stability of the instrument over time, a second cohort of 102 parents of 111 children admitted to the NICU from October 1 until December 31, 2009, was invited.

The development of the EMPATHIC-N questionnaire was a structured process. The process started with reviewing previously developed satisfaction surveys in critical care units and general pediatrics (7, 13). Second, satisfaction with care items was identified in a three-round Delphi study among 81 NICU staff members and a survey study completed by 148 parents, published previously (12). The results of these studies were 92 neonatal care-related items prioritized by parents, nurses, and physicians. The third step consisted of generating the satisfaction with care items and drafting the questionnaire. The 67 care items rated most importantly were rephrased into statements appealing to parents. The rating scale was a 6-point scale, from 1 "certainly no" to 6 "certainly yes." An alternative box, "not applicable," was added. Furthermore, four control questions measuring overall satisfaction and a demographic section were added. Two of the four control questions had an identical rating scale as the satisfaction items, whereas the other two control questions about the overall

satisfaction about the physicians' and nurses' performances had a 10-point rating scale (ranging from 1 "very poor" to 10 "excellent"). The questionnaire was concluded with free space to allow parents to write their experiences or give comments. This part of the questionnaire was not suitable for the psychometric analysis. The last step of the questionnaire development related to content and face validity. The draft questionnaire was distributed to five parents and five NICU staff members to review the understandability and clarity of the formulated statements. Minor textual changes were needed.

Statistical analyses of the psychometric testing of the EMPATHIC-N questionnaire were performed through sequential procedures: structural equation modeling tailored to confirmatory factor analysis, reliability, and validity testing.

Structural equation modeling is an advanced multivariate analysis technique. Predetermined models need to be specified to conduct the analysis. The specification of the model needs a theoretical basis preferably based on results of previous studies (14). The defined model tested in this study related to the statements within five predefined domains: Information, Care & Treatment, Organization, Parental Participation, and Professional Attitude. Depending on the complexity of the tested model, a sample size exceeding 200 cases could be considered large (14).

Confirmatory factor analysis was performed to unravel the empirical structure of the interrelationship of the statements. The chi-square test of model fit was applied in this study and the ratio of $\frac{\chi^2}{df} < 3$ represents a good model fit. Furthermore, the comparative fit index (preferably ≥ 0.95), the Tucker-Lewis Index (preferably ≥ 0.95), the root mean square error of approximation (preferably < 0.08), and the weighted root mean square residual (preferably < 0.90) were used to test the model fit (15).

Reliability refers to the internal consistency of the statements within an instrument. Internal consistency reliability measures, the standardized factor loadings, were performed on the individual statements within the domains. Cronbach's α on the domain level was considered satisfactory with values between 0.70 and 1.00. To obtain insight into the stability of the findings across time, the means of the domains of the two cohort periods were tested in difference using the Levene's test for equality of variances and *t* test for equality of means. The reliability across time was considered adequate when no statistical difference occurred.

Validity is the degree in which an instrument measures what it is intended to measure. During the development of the questionnaire, the content and face validity were assessed as described previously.

Congruent validity was performed using the Spearman's rank correlation to estimate the relationship between the statements on the domain level and the four overall satisfaction with care scales (suggest NICU to others, come back again if needed, overall satisfaction physicians, and overall satisfaction nurses). In addition, the nondifferential validity referring to variables of which was assumed that they have nondifferential effects was analyzed using the effect size of standardized mean difference (Cohen's *d*) between demographic variables and the domains. The effect size is small with a value of 0.20, medium with 0.50, and large with > 0.80 (16).

The data were analyzed using SPSS (version 15; Chicago, IL) and the statistical modeling program *Mplus* (version 5, 2007; Los Angeles, CA). The level of significance was set at $< .05$ (two-tailed).

RESULTS

In the first 9-month cohort period, 220 of 339 (64.9%) parents responded to the questionnaire. In the second cohort, a 3-month period, the response rate was 59 of 102 (57.8%) parents. Both study populations were representative of the NICU. The characteristics of the infants and parents are presented in Table 1. There were no significant differences between both cohorts.

Regarding the information about the nonresponding group, we were able to test possible difference between the responding and nonresponding groups on five infant variables (gender, gestational age, birth weight, length of stay, and ventilation days). The nonresponding group did not differ from the responding group on these five variables ($p > .05$, two-tailed). This result means that the responding group adequately represents the patient population under study.

During the structural equation modeling technique, the structure of the questionnaire was theoretically specified in five domains including the statements. The domains were: Information (14 statements); Care and Treatment (20 statements); Parental Participation (nine statements); Organization (11 statements); and Professional Attitude (13 statements). Before the analyses, two negatively formulated statements and one statement with a 91% "not applicable" score were removed. On the remaining 64 statements, principal component analysis for nonnumerical data were performed to determine the scale value of the alternative answer "not applicable." Two-dimensional plots of each statement confirmed that this value was

strongly related to the highest score on the 6-point scale, justifying to impute the “not applicable” answer to the highest value.

The confirmatory factor analysis confirmed that seven statements did not fit into the empiric structure of the domains and were therefore omitted from further analysis. The remaining 57 statements within the five domains showed an adequate model fit (Table 2).

The standardized factor loadings of the statements within the domains were moderate to high: Information, 0.61–0.87; Care and Treatment, 0.64–0.91; Parental Participation, 0.74–0.88; Organization, 0.58–0.87; and Professional Attitude, 0.59–0.91 (Table 3).

The internal consistency reliability estimates, the Cronbach's α , of the domains were high. These estimates were calculated in both cohorts. In the first cohort, the Cronbach's α was between 0.82 and 0.91 and in the second cohort,

these values were between 0.84 and 0.95. Between the two time moments, the two cohorts did not significantly differ on the equal differences on variances and the differences on means on the domain level (Table 4). Generally, empiric evidence proved that the reliability and stability of the EMPATHIC-N questionnaire across time was adequate.

Congruent validity was obtained by correlating the domains of the questionnaire with the four overall satisfaction indicators. The Spearman's rank correlations were sufficient and significantly positive. The correlations ranged from r_s 0.37 to r_s 0.51 (Table 5). The nondifferential validity of the EMPATHIC-N questionnaire was assessed by calculating the standardized mean difference, Cohen's d , between the domains and four population variables (Table 6). The characteristics tested on the five domains showed no evidence of statistically

significant differences except for parents whose infant was ventilated and the domain Parental Participation (Cohen's d 0.42, $p < .004$) and parents whose infant was >30 wks of gestational age and the domain Organization (Cohen's d -0.47, $p < .001$).

DISCUSSION

Hospitals are increasingly being pressured to document patient satisfaction outcomes (17, 18). At the same time, patient satisfaction data are becoming an important tool for healthcare insurance corporations to fund hospitals (19). The relevance of this study is not limited to managerial or financial decisions, but rather presents a profound identification of NICU care aspects that are translated in a validated parent satisfaction instrument. The 57 statements divided in five domains provide a conceptualization of parent satisfaction within the NICU from a family-centered care perspective. Although various definitions of family-centered care are available (20, 21), the most influential factors of family-centered care are related to communication, continuity of care, and the parent–nurse/physician relationship (22). In the development phase of the EMPATHIC-N questionnaires, these factors were already identified. The statements in the five domains represent a wider perspective of the parental views believed to be important (12). Statements about medication administration, pain management, and safety might not directly relate to family-centered care according to the literature; parents have scored these issues as important. Thus, from the parents' perspective, the EMPATHIC-N questionnaire seems a more complete reflection of a renewed family-centered care concept.

Table 1. Characteristics of infants and parents

	Cohort 1	Cohort 2	<i>p</i>
Infants	n=234	n=66	
Gender: boy (%)	140 (60%)	38 (58%)	0.74 ^b
Gestational age in weeks: median (min;max)	33 (24;42)	33 (24;42)	0.77 ^a
Birth weight in grams: median (min;max)	1725 (558;5300)	1980 (535;4440)	0.60 ^a
Length of stay NICU in days: median (min;max)	7 (2;148)	7 (2;78)	0.99 ^a
Ventilation days: median (min;max)	4 (1;46)	4 (1;53)	0.33 ^a
Parents	n=220	n=59	
Cultural background			0.37 ^b
Dutch	171 (78%)	49 (83%)	
non-Dutch	49 (22%)	10 (17%)	
Education level mothers			0.44 ^a
Elementary school	17 (8%)	4 (7%)	
High school degree	95 (43%)	23 (39%)	
Bachelor's degree	83 (38%)	24 (41%)	
Master's degree and Doctorate	25 (11%)	8 (13%)	
Education level fathers ³			0.51 ^a
Elementary school	22 (11%)	5 (10%)	
High school degree	95 (50%)	22 (42%)	
Bachelor's degree	50 (26%)	21 (40%)	
Master's degree and Doctorate	25 (13%)	4 (8%)	

^aMann-Whitney *U* test; ^bchi-square test; ^cfirst cohort 28 missing and second cohort seven missing.

Table 2. Performance of the models

Domains	Items No.	No.	Chi-Square test of Model Fit			Comparative Fit Index	Tucker-Lewis Index	Root Mean Square Error of Approximation	Weighted Root Mean Square Residual
			Value	Degrees of Freedom	<i>p</i>				
Information	12	214	58.14	21	<0.001	0.97	0.98	0.09	0.92
Care & Treatment	17	214	113.96	28	<0.001	0.97	0.99	0.12	1.11
Parental Participation	8	214	52.78	12	<0.001	0.96	0.98	0.13	0.86
Organization	8	215	51.96	12	<0.001	0.96	0.97	0.12	0.97
Professional Attitude	12	215	67.13	27	<0.001	0.98	0.99	0.08	0.70

Item scoring range 1–6.

Table 3. Means, sds, and standardized factor loadings of the statements (n = 220)

	Mean	SD	Standardized Factor Loadings
Information			
The doctors and nurses gave honest information to us	5.60	0.73	0.80
We were always informed right away when our child's physical condition worsened	5.55	0.97	0.61
The information provided by the doctors and nurses was understandable	5.47	0.87	0.73
Our questions were clearly answered	5.44	0.86	0.79
The doctor clearly informed us about the consequences of our child's treatment	5.43	1.05	0.83
We were given clear information about our child's disease	5.37	1.05	0.78
We received clear information about the examinations and tests	5.33	1.06	0.87
The information brochure we received was complete and clear	5.22	1.43	0.70
We received understandable information about the effects of the drugs	5.18	1.11	0.73
We had daily talks about our child's care and treatment with the doctors and the nurses	5.08	1.31	0.61
The doctor informed us about the expected health outcomes of our child	4.82	1.54	0.61
The information given by the doctors and nurses was always the same	4.53	1.70	0.61
Care & Treatment			
When our child's condition worsened, action was immediately taken by the doctors and nurses	5.71	0.58	0.86
The doctors and nurses are real professionals; they know what they are doing	5.63	0.62	0.80
At admission our child's medical history was known by the doctors and nurses	5.61	0.91	0.74
Our child was always well taken care of by the nurses while in the incubator/bed	5.60	0.72	0.74
During acute situations there was always a nurse to support us	5.59	0.83	0.86
Our child's comfort was taken into account by the doctors and nurses	5.56	0.71	0.86
The team was alert to the prevention and treatment of pain in our child	5.56	0.77	0.86
The correct medication was always given on time	5.55	0.80	0.75
Our child's needs were well taken care of	5.52	0.76	0.82
Attention was paid to our child's developmental by the doctors and nurses	5.52	0.87	0.86
The team had a common goal: the best care and treatment for our child and ourselves	5.50	0.85	0.89
The team was caring to our child and to us	5.42	0.90	0.91
The doctors and nurses worked closely together	5.38	0.92	0.78
Transferral of care from the neonatal intensive care unit staff to colleagues in the high-care unit or pediatric ward had gone well	5.31	1.20	0.64
The doctors and nurses responded well on our own needs	5.17	1.13	0.86
We were emotionally supported	5.02	1.32	0.86
Every day we knew who of the doctors and nurses was responsible for our child	4.92	1.53	0.64
Parental Participation			
We had confidence in the team	5.64	0.70	0.80
Even during intensive procedures we could always stay close to our child	5.59	0.82	0.84
The nurses stimulated us to help in the care of our child	5.55	0.97	0.88
The nurses helped us in the bonding with our child	5.51	0.97	0.87
We were encouraged to stay close to our child	5.39	1.12	0.80
The nurses had trained us the specific aspects of newborn care	5.25	1.30	0.80
We were actively involved in decision-making on care and treatment of our child	4.84	1.54	0.74
Before discharge the care for our child was once more discussed with us	4.79	1.61	0.74
Organization			
The unit could easily be reached by telephone	5.74	0.61	0.80
Our child's incubator or bed was clean	5.69	0.65	0.80
The team worked efficiently	5.62	0.65	0.87
There was a warm atmosphere in the Neonatology unit without hostility	5.62	0.82	0.80
The Neonatology unit made us feel safe	5.57	0.83	0.80
The Neonatology unit was clean	5.26	1.07	0.68
Noise in the unit was muffled as good as possible	4.93	1.30	0.65
There was enough space around our child's incubator/bed	4.56	1.57	0.58
Professional Attitude			
Our cultural background was taken into account	5.76	0.76	0.76
Our child's health always came first for the doctors and nurses	5.75	0.55	0.88
The team worked hygienically	5.62	0.67	0.91
The team showed respect for our child and for us	5.62	0.72	0.91
The team respected the privacy of our child's and of us	5.61	0.66	0.85
There was a pleasant atmosphere among the staff	5.59	0.68	0.91
We felt welcome by the team	5.50	0.88	0.91
The doctors and nurses always took time to listen to us	5.43	0.87	0.84
Despite the workload, sufficient attention was paid to our child and to us by the team	5.42	0.87	0.87
We received sympathy from the doctors and nurses	5.37	0.97	0.80
Nurses and doctors always introduced themselves by name and function	5.29	1.11	0.65
At our bedside, the discussion between the doctors and nurses was only about our child	5.02	1.57	0.59

Item scoring range 1–6.

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Table 4. Descriptives, reliability estimates, and testing on domains of two cohorts

Domains (Statements)	Cohort 1 (n=220)			Cohort 2 (n=59)			Levene's Test Differences on Variances		t-test Differences on means	
	Mean	SD	α	Mean	SD	α	F	p	t	p
Information (12)	5.26	0.69	0.86	5.22	0.68	0.85	0.18	0.67	0.28	0.78
Care & Treatment (17)	5.45	0.57	0.91	5.53	0.60	0.95	0.12	0.73	-0.97	0.33
Parental Participation (8)	5.32	0.78	0.85	5.36	0.85	0.91	0.02	0.90	-0.33	0.74
Organization (8)	5.37	0.61	0.82	5.45	0.57	0.84	0.52	0.47	-0.90	0.37
Professional Attitude (12)	5.50	0.58	0.90	5.57	0.55	0.92	0.36	0.55	-0.80	0.43

α =Cronbach's α on standardized items as a measure of consistency; p value is two-tailed; Item scoring range 1–6.

Table 5. Congruent validity of scales used Spearman's rank correlation

	No.	Suggest Neonatal Intensive Care Unit to others	Come Back Again If Needed	Overall Satisfaction With Physicians	Overall Satisfaction With Nurses
Information	212	0.44	0.41	0.51	0.41
Care & Treatment	210	0.48	0.48	0.49	0.48
Parental Participation	211	0.44	0.49	0.46	0.37
Organization	213	0.41	0.45	0.43	0.42
Professional Attitude	215	0.39	0.45	0.42	0.45

All correlations are significant at .01 (two-tailed).

Table 6. Nondifferential validity, differences between domains and characteristics

	Yes			No			Cohen's d	p
	No.	Mean	SD	No.	Mean	SD		
Mechanical Ventilation								
Information	100	5.37	0.56	115	5.16	0.77	0.31	0.08
Care & Treatment	100	5.52	0.52	113	5.38	0.61	0.26	0.06
Parental Participation	100	5.49	0.63	114	5.17	0.86	0.42	0.004
Organization	98	5.43	0.57	116	5.32	0.65	0.18	0.27
Professional Attitude	100	5.57	0.54	116	5.44	0.60	0.22	0.19
Length of stay \leq 7 days								
Information	108	5.17	0.78	106	5.34	0.57	-0.24	0.25
Care & Treatment	107	5.38	0.61	105	5.51	0.53	-0.23	0.11
Parental Participation	108	5.20	0.87	105	5.44	0.65	-0.31	0.07
Organization	106	5.39	0.65	107	5.36	0.58	0.05	0.29
Professional Attitude	108	5.42	0.61	107	5.57	0.53	-0.25	0.17
Gestational age <30 weeks								
Information	50	5.32	0.57	164	5.23	0.72	0.13	0.76
Care & Treatment	50	5.48	0.55	162	5.43	0.58	0.08	0.73
Parental Participation	50	5.47	0.64	163	5.27	0.81	0.25	0.21
Organization	51	5.15	0.65	162	5.44	0.59	-0.47	0.001
Professional Attitude	51	5.50	0.62	164	5.49	0.56	0.01	0.94
Dutch Culture								
Information	166	5.26	0.63	49	5.23	0.86	0.04	0.48
Care & Treatment	164	5.46	0.56	49	5.40	0.62	0.10	0.54
Parental Participation	165	5.32	0.69	49	5.31	1.01	0.02	0.29
Organization	167	5.37	0.58	47	5.38	0.72	-0.01	0.54
Professional Attitude	169	5.50	0.54	47	5.49	0.69	0.02	0.50

Cohen's d = standardized mean difference; p value = Mann-Whitney test (two-tailed); item scoring range 1–6.

The psychometric tests of the EMPATHIC-N questionnaire were carefully chosen to document its reliability and validity. Unlike the published validated NICU parent satisfaction questionnaires (7, 13), the process of developing

and testing the EMPATHIC-N questionnaire started with structural equation modeling. The theoretically defined statements in the five domains provided a model that could be tested by confirmatory factor analysis. The fit indices indi-

cated that seven statements did not fit to the model in casu the domains. Indeed, it is recognized that the good model fit did not guarantee the inclusion of all of the tested statements in the domains of the model (23). However, this does not indicate that the statistically omitted statements have no clinical importance. Careful assessment of the performance of a local NICU setting might result in adding statements as "fillers" to the validated questionnaire when the questionnaire is used for ongoing assessment of parental satisfaction or as a quality control instrument.

Reliability and validity testing of the existing NICU satisfaction instruments has been generally weak. The Parent Feedback Questionnaire was not tested for reliability and only content validity was evaluated (24). A few years later, the Neonatal Index of Parent Satisfaction was only tested for test-retest reliability with an intraclass correlation of 0.71 and the construct validity with a moderate correlation of 0.61 between the questionnaire and a global rating of general satisfaction (25). Finally, the NICU Parent Satisfaction Form documented internal consistency reliability estimates, content validity, and discriminant validity (7). Of the nine scales, five scales showed reliabilities of ≥ 0.70 , whereas the discriminant validity was limited described for correct interpretation of the results. In contrast, the systematic and rigorous construction of the EMPATHIC-N questionnaire provided a scientific basis for psychometric testing. The reliabilities measures on the domain level were above the recommended standard. The validity, including the performance of the questionnaire over time, was satisfactory. Thus, the development and the psychometric testing of the EMPATHIC-N questionnaire proved to be an acceptable and feasible quality performance indicator for neonatal

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intensive care services. Although the questionnaire was tested on a large group of parents, the empiric data originate from a single center. Transferring the instrument to other settings with other languages might require further testing for its generalizability and acceptability. Thorough translation of the statements is, therefore, required to assure that the meaning of the translated statements is equivalent to the original statements (26).

Two limitations of the psychometric testing need to be addressed. First, the test-retest reliability among the same group of parents at two different time moments was not performed. We did not want to burden parents with two questionnaires in a short time period as a result of the experienced stress and anxiety of a NICU admission of their infant (27). The second cohort group was approached to participate in the study to test the stability of the questionnaire across time. The results provided sufficient reliability. The second limitation of the psychometric testing concerned the validity. The criterion validity, predicting how well the questionnaire correlates to another validated instrument, i.e., the gold standard, was not tested. Although few validated parent satisfaction instruments are available, most of them were developed over a decade ago before family-centered care was implemented in NICUs (7). Besides, many statements in the EMPATHIC-N questionnaire did not occur in these instruments. With respect of the available instruments, congruent validity was chosen to test the EMPATHIC-N questionnaire on four generally accepted overall satisfaction questions.

Other validated instruments have been used to document parental experiences and the staff's support to parents such as the NICU Family Needs Inventory and the parental stress scale NICU (6, 28, 29). However, the concept of satisfaction is not synonymous to the assessment of stress and needs (30). Having met the needs of parents does not guarantee satisfaction. In addition, the assessment of stress factors provides insight into care issues related to parental stress, but these measurements do not provide evidence of the actual performance of the NICU team. Therefore, this study presents a comprehensive parent satisfaction questionnaire measuring a wide range of today's important NICU care practices and proves to be reliable

and valid with an adequate empiric structure of the statements in the five domains. The relevance for clinical practice is that the use of the EMPATHIC-N questionnaire and the parent satisfaction outcomes might contribute to identify interventions to improve the quality of care.

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