



Original Article

Delirium determination form for children: A delphi method study

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Abstract

Objectives: This study aims to develop a form capable of identifying delirium in children.

Methods: To develop this form, the Delphi method was used in this study and involved the participation of specialists who have conducted scientific studies and health professionals who have previously worked in the field of pediatrics intensive care. A total of 47 items were selected from the responses given in the first stage, and these items were then prepared in the form of a five-point Likert-type questionnaire for the second stage and delivered to 46 people who participated in the first stage. The second stage was completed with 38 respondents. After the completion of the second stage, the items underwent statistical analysis and were delivered to the same 38 people. Central tendency measures, including percentage, mean, standard deviation, median, first quarter and third quarter, and range were used to evaluate the data. Median, First Quarter (Q1), Third Quarter (Q3) and Width (Q3-Q1) are the statistical measures used to identify compromised items in the analysis of data collected by the Delphi method.

Results: According to the results from the Delphi method, the participants agreed on 32 items for delirium determination in children. The most important diagnostic criteria for delirium in children was defined by the consensus derived from the Delphi method.

Conclusion: It was concluded that the delirium diagnosis form for children that was developed using the Delphi method may be suitable for nurses working in intensive care units. As this study was strictly qualitative in nature, it is recommended that the form this study developed based on the opinions of experts, be quantitatively analyzed to further confirm its suitability for the diagnosis of delirium, which is difficult for nurses to diagnose in pediatric patients hospitalized in intensive care units.

Keywords: Delirium; Delphi; intensive care; pediatrics.

Delirium is defined as an acute onset of a potentially reversible organic brain syndrome.^[1] Delirium is a behavioral manifestation of an acute brain dysfunction associated with serious underlying medical diseases. It presents as an acute and fluctuating mental change characterized by irregular states of attention and cognition.^[2] Delirium is a disorder of the consciousness and is marked by cognitive changes (language disorders, disorientation, hallucinations, delusions), attention deficit, decreased awareness, increased or decreased

psychomotor activity or sleep-wake imbalance that are rooted in physiopathological causes.^[3-5] Delirium syndrome has three motor subtypes: hypoactive (decreased physical activity), hyperactive (agitated and/or aggressive behavior), and mixed delirium.^[6]

The pathophysiology of delirium is complex but is most likely due to changes in neurotransmitter function, low blood circulation, increased energy metabolism, and irregular cellular homeostasis. The underlying disease process, side effects of

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What is known on this subject?

- The epidemiology and risk factors for pediatric delirium are not well defined due to the lack of widespread screening, recognition and evidence-based data. Unfortunately, little is known about the incidence, clinical presentation, response to treatment, and outcomes of pediatric delirium in intensive care units because of the unavailability of appropriate diagnostic tools for use on children.

What is the contribution of this paper?

- Raising awareness about delirium and identifying ways to detect it in children hospitalized in pediatric intensive care units will contribute to improving the health and quality of life of children and to facilitating treatment and reducing possible risk factors.

What is its contribution to the practice?

- In this study, a diagnostic form was created to identify children with delirium in pediatric intensive care units. Nurses in pediatric clinics will benefit from this form.

treatment, and foreign critical care environment contribute to the development of delirium in hospitalized children.^[7]

Delirium affects between 10% and 44% of hospitalized patients and 30% of pediatric intensive care unit (ICU) patients. These rates differ according to age (more common in younger children), disease severity, number of drugs used in treatment, invasive diagnosis and treatment measures, and the group studied.^[8] Epidemiology and risk factors for pediatric delirium are not well defined due to the lack of widespread screening, recognition and evidence-based data.^[2] The lack of appropriate diagnostic tools for children has resulted in little being known about the incidence, clinical presentation, response to treatment and outcomes of pediatric delirium in the ICU.^[9] Identifying and managing delirium is crucial to reducing morbidity and mortality in medically ill patients.^[1]

For clinicians, with the exception of psychiatrists, there are not many tools available to diagnose delirium in children hospitalized in pediatric ICUs. The tools for adult patients cannot be applied to the pediatric population due to the development and cognitive differences between children and adults. It is promising that valid and reliable screening tools for use in the pediatric population are being developed.^[10-13]

The awareness and detection of delirium in children hospitalized in pediatric ICUs will contribute to improving their health and quality of life, to reducing possible risk factors, and to facilitating their treatments. In this context, the creation of a form to identify delirium in children hospitalized in pediatric ICUs will serve to greatly benefit the literature on this subject.

Materials and Method

Study Design

This study used a qualitative Delphi method, a method which primarily involves multiple rounds of collecting opinions from a panel of experts on a subject with the aim of reaching consensus on opinions. There were two main reasons for choosing this method, namely, to benefit from the experience and observations of well-known academicians and of health profes-

sionals who previously worked or are currently working in pediatric ICUs, and to reach agreement on the subject.

Sampling

The population of the study included health professionals who have worked or were working on delirium in the pediatric ICU and experts who have completed a thesis and/or scientific studies on the subject. Purposive sampling was applied to select participants from this population, and all participants voluntarily agreed to participate.

Delphi Method

The Delphi method has become an increasingly common research method among researchers.^[14] In pediatric nursing, this method has been used to determine research priorities, and to develop measurement instruments for nursing interventions.^[15] The primary aim of using the Delphi method is to reach establish consensus among individuals and groups who view a problem situation from different perspectives. The ideal group size for the Delphi method is 10–20 panelists.^[16] Consensus is achieved through the administration of consecutive questionnaires. The flowchart of the Delphi operation is shown in Figure 1.

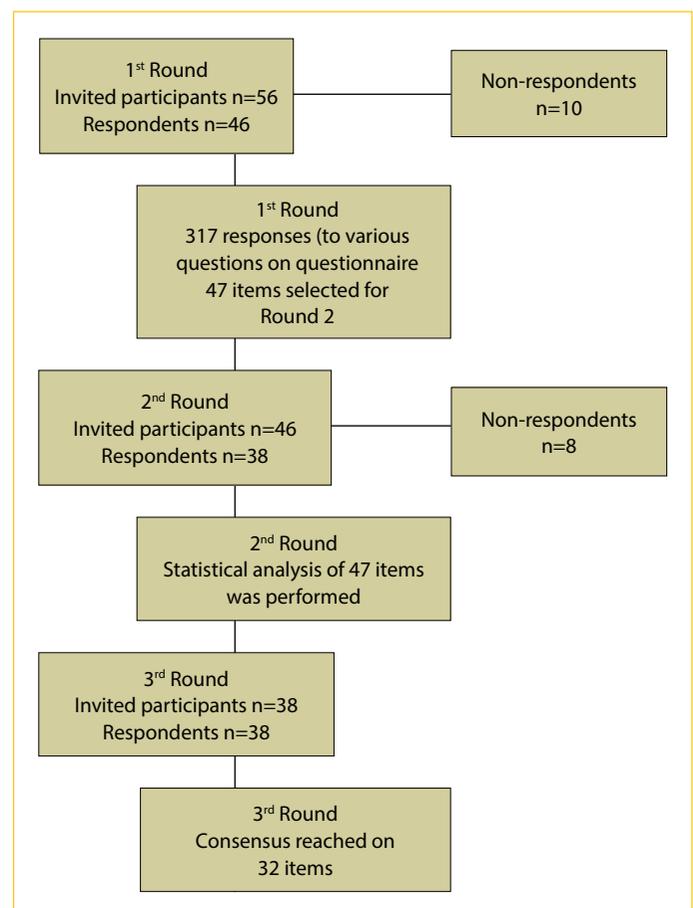


Figure 1. Flow Chart of the Delphi Method.

Selection of Participants

The study participants included health workers who had previously worked in pediatric intensive care or who were currently working in the field, and experts who had completed a thesis on delirium or who had conducted scientific studies on it, in order to gather different perspectives on the subject. The open-ended question prepared for the first round was delivered to 56 people, of whom 46 responded and voluntarily agreed to participate in the study. From the responses given in the first round, 47 items were identified. These items were used for the second round and delivered to the same 46 panelists who participated in the first round in the form of a five-point Likert-type questionnaire. In the second round, 38 of the 46 panelists completed the questionnaire, and statistical analyses were carried out on the results from these 38 panelists. The third and final round was completed with all 38 panelists responding.

Delphi Working Procedure

In addition to the one open-ended question, the first round of the Delphi questionnaire had six questions related to the socio-demographic characteristics of the participants and six other questions related to the departments where nurses work. For the open-ended question posed in the first round, the participants were asked to write their experiences and observations as they related to the basic purpose of the question. A total of 10 minutes was allotted for responding to this question, which was administered via face-to-face interviews. Before the questionnaire was delivered to the participants, they were informed about the purpose, implementation and duration of the study and asked to respond to the open-ended question within the specified time.

Following completion of the first round Delphi questionnaire, the opinions expressed by the participants were analyzed and arranged into 47 items, with each item structured on a quintet Likert scale ("1" strongly disagree ... "5" strongly agree and applied in the second round of the Delphi method. The questionnaire was presented again to the participants for the purpose of providing them with all the opinions expressed in the first round of the Delphi questionnaire, after which their levels of agreement with each of the items could be identified.

The third round of the Delphi method was carried out in the same manner as the second round. In this questionnaire, statistical analyses of the responses given by the participants to each of the items at the end of the second round were presented to the participants, as well as the first quarter, median, third quarter and width values and the responses given to each item on the questionnaire in the second round. The purpose of the third round Delphi questionnaire was to give participants the opportunity to re-consider the responses they gave in the second round of the questionnaire, taking into account the results of the statistical analyses. The third round Delphi questionnaire was prepared and given to the participants in accordance with the stated purpose.

Ethical Considerations

Approval to carry out the research was granted by the Ethics Committee of non-invasive clinical research of Dicle University Faculty of Medicine (dated 21.01.2019 and numbered 41). Verbal and written consent was obtained from the individuals who met the criteria for inclusion in the research sample and agreed to participate in the research. Written consent was obtained with an informed consent form that contained information about the purpose, duration, implementation, and collection of data and stated that participation in the research was strictly voluntary, that participants were free to withdraw from the research at any time, and that their names would be kept confidential.

Data Analysis

Central tendency measures, which included percentage, mean, standard deviation median, first quarter, third quarter and range, were used to evaluate the data. Median, first quarter (Q1), third quarter (Q3), and width (Q3-Q1) are statistical measures used to determine the reconciled items in the analysis of data collected by Delphi method. Generally, the period from Q1 to Q3 is considered to be the interval when consensus is reached. As the breadth decreases, consensus increases. According to Zelif and Heldenbrand, as reported by Shahin, it is acceptable to agree on articles with an inter-quarter width of less than 1.2.^[16] For this purpose, median, first quarter, third quarter and inter-quarter width were calculated for each item included on the questionnaire. The difference between the first quarter and the third quarter ($Q3-Q1=R$) was less than 1.2 in this study.

Limitations

The findings in this study cannot be generalized to all cases of delirium in a society. However, these findings do indicate that future studies of this kind need to be expanded to include a broader sample.

Results

Regarding the Participants

A total of 46 people, including 43 intensive care workers and three nurse academicians, participated in the first round of the Delphi questionnaire. For the second and third rounds of the Delphi questionnaires, 38 people, including 35 intensive care workers and three nurse academicians, participated.

In order for the first round to be considered successful, at least 60% of the participants must give an opinion.^[17] In the present study, 56 people were invited to the first round of the Delphi questionnaire, and 82.1% (n=46) of the invited participants reported their opinions. These same 46 people were invited to the second round of the Delphi questionnaire, and 82.6% (n=38) of the respondents reported their opinions. Finally, the same 38 people who responded to the second Delphi ques-

Table 1. Demographic data of the participants

	1 st round Delphi			2 nd & 3 rd round Delphi		
	Min-max (years)	Mean	SD	Min-max (years)	Mean	SD
Age	21–42	29.6	4.70	21–40	29.47	4.64
Number of years working in the field (in any capacity)	1–17	6.71	3.89	1–17	6.71	3.81
Number of years of practical work in the field	1–10	3.47	2.30	1–10	3.26	2.23
	Number (n)	Percentage (%)		Number (n)	Percentage (%)	
Female	29	63		23	60.5	
Male	17	37		15	39.5	
Nurse	40	87		32	84.2	
Obstetrician	3	6.5		3	7.9	
Nurse academician	3	6.5		3	7.9	
High school	3	6.5		1	2.6	
Associate degree	4	8.7		4	10.5	
Bachelor's degree	34	73.9		28	73.7	
Master's or PhD degree	5	10.9		5	13.2	
Total	46			38		

SD: Standard deviation.

tionnaire were invited to the third round of the Delphi questionnaire, and all of the participants reported their opinions. The majority of participants were women (1st Round = 63%, 2nd and 3rd Round = 60%), Nurses (1st Round = 87%, 2nd and 3rd Round = 84.2%) and held an undergraduate degree (1st Round = 73.9%, 2nd and 3rd Round = 73.7%).

First Round Delphi

In the first round, from the open-ended question, which asked about the participants' experiences and observations on the subject of delirium in pediatric ICU patients, a total of 317 responses were identified. These responses were examined, converted into short sentences, without altering the basic meaning, and recorded. Repetitive responses (e.g. 23 nurses answered "uncontrolled movements") or similar responses were eliminated. After evaluation, 47 items were identified from the first round question, and these were used for the second and third round Delphi questionnaire, which was arranged in the form of a quintet Likert-type scale ("1" strongly disagree to "5" strongly agree).

Second Delphi Round

Following the completion of the second round Delphi questionnaire, central tendency measures, such as standard deviation, mean, frequency, median, first quarter, third quarter and width (R=range), were performed on the obtained opinions. Table 2 shows the participants' degrees of agreement on items. The second and third Delphi rounds were completed with 38 participants. Results from the second round of the

Delphi questionnaires indicated that experts agreed on 29 of the 47 items (R<1.2). The responses given by the participants were re-presented to them along with the statistical analysis, without any changes to the items.

Third Delphi Round

The third round of the Delphi questionnaire was completed with 38 participants. The same central tendency measures (standard deviation, mean, frequency, median, first quarter, third quarter and width (R=range)) were performed on the responses obtained. Table 3 presents the items on which the participants were in agreement. When Table 1 and Table 2 are compared, it is observed that the participants' opinions on 7 items had changed. In the second round, consensus was reached on five items (1, 3, 16, 29 and 31) about which there were disagreements in the previous round, while in the third round they reached consensus on two articles (7 and 39) about which there was disagreement in the second round. Overall, the participants agreed on 32 items in the Delphi study for delirium determination in children (Table 3).

Discussion

Around the world, delirium is a growing problem in pediatric ICUs. Its prevalence ranges from 4% to 47%.^[12,18–20] In a study by Smith et al.^[19] found that this rate rises to 56% in children aged two and under. Disorientation, difficulty in maintaining and directing attention, memory loss, widespread cognitive impairments, and lack of consciousness are key signs of delirium. Less common signs include disorganized thinking, impaired

Table 2. Analysis of the second round Delphi

	I st Quarter	Median	3 rd Quarter	R (range)
1	2	4	5	3
2	4	4	5	1
3	3	4	5	2
4	4	4	4.25	0.25
5	4	4	5	1
6	4	4	5	1
7	3	4	4	1
8	4	4	5	1
9	4	5	5	1
10	4	4	5	1
11	4	4	4	0
12	4	4	5	1
13	4	4	5	1
14	2	3	4	2
15	4	4	4.25	0.25
16	3.75	4	5	1.25
17	3	4	4	1
18	4	4	4	0
19	4	4	4.25	0.25
20	4	4	5	1
21	4	4	4.25	0.25
22	4	4	4	0
23	3	4	4	1
24	2	3	4	2
25	3	4	4.25	1.25
26	4	4	5	1
27	4	4	4.25	0.25
28	4	4.5	5	1
29	2.75	3.50	4	1.25
30	3	3.50	4	1
31	3	4	5	2
32	3	4	4	1
33	2.50	4	4	1.50
34	4	4	4	0
35	2	3	4	2
36	2	3.50	4	2
37	4	4	5	1
38	1	2	3	2
39	2	2.50	3	1
40	2	3	3.25	1.25
41	1	2	3	2
42	2	3	4	2
43	2	3	4	2
44	3	4	4	1
45	2	3	4	2
46	3	4	4	1
47	3	3	4	2

Table 3. Analysis of the third round Delphi

	I st Quarter	Median	3 rd Quarter	R (range)	
1	No communication with the child.	4	4	5	1
2	Child has meaningless speech.	4	4	5	1
3	No eye contact with child.	4	4	5	1
4	Child has meaningless looks.	4	4	5	1
5	Child is not aware of their actions.	4	4	5	1
6	Child's unconsciousness starts suddenly and fluctuates during the day.	4	4	5	1
7	Child does not know anyone, including their mother.	3	4	4.25	1.25
8	Child has no awareness of day and night.	4	4	5	1
9	Child has attention disorder (orientation, focus, continuity).	4	5	5	1
10	Child experiences visual and audio hallucinations.	4	4	5	1
11	Very little response to stimuli directed at the child.	3.75	4	4	0.25
12	Child does not know where they are.	4	4	5	1
13	Child's perception is impaired	4	4	5	1
14	Child is unconscious but responds to painful stimuli	2	2.50	3.25	1.25
15	Child's level of consciousness changes suddenly	4	4	4	0
16	Deterioration in the child's memory.	4	4	4	0
17	The child does not respond to commands.	3	4	4	1
18	Child is restless.	4	4	4.25	0.25
19	Child shows resistance to care and treatment.	4	4	4	1
20	Child's mood is mixed, and they have emotional instability.	4	4	4.25	0.25
21	Child has fear and anxiety	4	4	4	0
22	Child overreacts to contact.	4	4	4	0
23	Child is unaware of their environment.	3	4	4	1
24	Child feels lonely.	2	3	4	2
25	Child is stressed.	3	4	4.25	1.25
26	Child is usually agitated and difficult to console.	4	4	5	1
27	Child becomes aggressive and combative	4	4	4.25	0.25
28	The child constantly moves their hands, arms, and head uncontrollably, making it difficult to restrain them.	4	5	5	1
29	Child's motor functions decrease throughout the day.	4	4	5	1
30	Child's motor functions increase throughout the day.	4	4	5	1
31	Child's motor functions changes throughout the day, decreasing in the morning and increasing in the afternoon and at night.	4	4	4.25	0.25
32	Child attempts to harm themselves or others	4	4	4	0
33	Child has urinary and stool incontinence	1	3	4	3
34	Child has tachycardia	3	4	4	1
35	Child has movement limitations	2	3	4	2
36	Child has contractions, headache, dizziness and fainting spells.	1	2.5	4	3
37	Child's sleep/wake cycle is impaired.	4	4	5	1
38	Oxygen Saturation of the child is low	1	2	3	2
39	Child's has high fever	2	2	3.5	1.5
40	Child's eyes twitch	1	2	3	2
41	Child's blood pressure is low	1	2	3	2
42	Child trembles	1.75	2	4	2.25
43	Child has difficulty breathing	2	2	3.5	1.5
44	Child's breathing is fast	4	4	4	0
45	Child has cold sweating	1	2	3	2
46	Child stays awake and makes noise	4	4	4	0
47	Child's complaints increase more at night	2	2.5	4	2

Table 4. Participants' level of agreement on delirium in children

		I st Quarter	Median	3 rd Quarter	R (range)
1	No communication with the child.	4	4	5	1
2	Child has meaningless speech.	4	4	5	1
3	No eye contact with child.	4	4	5	1
4	Child has meaningless looks.	4	4	5	1
5	Child is not aware of their actions.	4	4	5	1
6	The child's unconsciousness starts suddenly and fluctuates during the day.	4	4	5	1
7	Child has no awareness of day and night.	4	4	5	1
8	Child has attention disorder (orientation, focus, continuity).	4	5	5	1
9	Child experiences visual and audio hallucinations	4	4	5	1
10	Very little response to stimuli directed at the child.	3.75	4	4	0.25
11	Child does not know where they are.	4	4	5	1
12	Child's perception is impaired	4	4	5	1
13	Child's level of consciousness changes suddenly	4	4	4	0
14	Deterioration in the child' memory.	4	4	4	0
15	Child does not respond to commands.	3	4	4	1
16	Child is restless.	4	4	4.25	0.25
17	Child shows resistance to care and treatment.	4	4	4	1
18	Child' mood is mixed, and they show emotional instability.	4	4	4.25	0.25
19	Child has fear and anxiety	4	4	4	0
20	Child overreacts to contact.	4	4	4	0
21	Child is unaware of their environment.	3	4	4	1
22	Child is usually agitated and difficult to console.	4	4	5	1
23	Child becomes aggressive and combative	4	4	4.25	0.25
24	Child constantly moves their hands, arms, and head uncontrollably, making it difficult to restrain them.	4	5	5	1
25	Child's motor functions decrease throughout the day.	4	4	5	1
26	Child's motor functions increase throughout the day.	4	4	5	1
27	Child's motor functions change throughout the day, decreasing in the morning and increasing in the afternoon and at night.	4	4	4.25	0.25
28	Child attempts to harm themselves or others	4	4	4	0
29	Child has tachycardia	3	4	4	1
30	Child's sleep/wake cycle is impaired	4	4	5	1
31	Child's breathing is fast	4	4	4	0
32	Child stays awake and makes noise	4	4	4	0

speech, and disruption in the sleep/ wakefulness cycle. Delusions, both visual and audible, hallucinations and emotional instability are indications that delirium has organic causes.^[21] This study was conducted to determine through consensus the symptoms of delirium in children. Acquiring knowledge about the signs and symptoms of delirium, especially in children, will from experienced advocates / experts and other health workers will contribute to developing the skills necessary to address it. One of the main strengths of this study is that it drew upon the expertise and experience of these advocates, experts and other health workers. The results derived from the Delphi method applied in this study offer valuable information for the development of specialized training for pediatric nurses in the care and needs of hospitalized children.

More research that is based on expert opinions and directed at understanding the needs of children at the hospital and how best to provide them with care will contribute to the development of specialized education programs for pediatric nurses and the overall improvement in the quality of care given to these children.^[22] In this study, participants agreed on 32 items of the questionnaire for the determination of delirium in children. With this consensus an effective pediatric evaluation tool can be developed for nurses who care for children. In pediatric ICUs, children whose medical condition is worsening can benefit by undergoing an evaluation performed by a specialist. A standard measurement tool would help specialists identify signs of delirium in pediatric ICU patients. In looking at recent similar studies by Tume et al.,^[23] it can be seen that there has

been an increase in the use of the Delphi method and patient evaluation criteria in pediatric ICUs. In 2011, the Australian School of Intensive Care Nurses conducted a Delphi study on the priorities of pediatric intensive care nursing in Australia and New Zealand and identified neurological care, pain / sedation / comfort, and ventilation strategies as priorities in terms of providing care to children and further cited end-of-life of issues as priorities for nurses, in terms of stress, fatigue and professional development needs.^[24] In a study by Tume et al.,^[23] the most important research priorities identified in neonatal ICUs were end-of-life practices, pain management, nursing training, and competencies, all of which, if addressed properly through evidence, would help to reduce health-related issues, infections, and low staffing levels.

Research in intensive care has been conducted by intensive care nursing organizations around the world.^[23] Childhood delirium brings with it the high costs associated with long-term hospital stays and increased levels of health care. Thus, early diagnosis of delirium in children, along with emergency medical treatment, can minimize the associated long-term consequences.^[20]

Kim and Kim^[25] reported that the incidence of delirium was 42.1% in their study examining factors associated with pediatric delirium in the pediatric intensive care unit. In the same study it was shown that, as shown by the sources, whether or not there is physical restraint, the presence of oxygen need, the use of a mechanical device, and the presence of familiar objects around the child are all factors affecting the diagnosis of delirium in pediatric intensive care units. The study by Paterson et al.^[26] also revealed that children using mechanical devices, children under the age of five, and the drugs used by children affect the diagnosis of delirium. The associated factors presented in the present research were included in the evaluation tool created.

Conclusion

The Delphi method has proven to be an effective tool for consensus building, and as such, was useful in developing curriculum for pediatric residents. This study can serve as a guide for future studies. Further studies, however, are needed to determine the validity of the questionnaire created in this study.

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