

Psychological Preparations Affecting the Emotions of Children with Developmental Disorders Toward Hospitals

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ABSTRACT

Background The psychological preparation factors associated with positive or negative emotions in pediatric patients with developmental disorders are not well known. We aimed to clarify which psychological preparation factors affect positive (favorable) or negative (fear) emotions toward hospitals in pediatric patients with autism spectrum disorder (ASD) or attention deficit hyperactive disorder (ADHD), using the questionnaires for the patients and guardians.

Methods The questionnaires were sent by mail via prefectural patient-family groups to pediatric patients (6 to 15 years old; diagnosed with ASD or ADHD) and their guardians living in seven prefectures in Japan. Thereafter, we statistically analyzed the associations between the background factors or psychological preparations and the patients' positive or negative emotions toward the hospital.

Results The questionnaire results of 68 patients (age: 6–15 years; 15 = females; 53 = males) and their guardians indicated the main diagnoses for patients were ASD ($n = 54$) and ADHD ($n = 14$). Intellectual disability and hypersensitivity were positively associated with fear experiences in the hospital. In contrast, the staff's explanations during interventions negatively associated with patients' fear experiences. The psychological preparations performed by doctors during the medical checks were positively associated with the patient's positive emotions toward the hospital.

Conclusion Regarding the psychological preparations for patients with ASD or ADHD, interpersonal communication with doctors and staff promotes positive emotions and reduces anxiety in the hospital.

Key words attention deficit hyperactivity disorder; autism spectrum disorder; developmental disorder; preparation

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Abbreviations: ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder; PRC, partial regression coefficient; QA, question(s) A; QB, question(s) B; QC, question(s) C

“Psychological preparations” are especially necessary for young children receiving stressful medical interventions. It is provided especially before surgeries, and includes communications with medical staff, reduced light intensity and noise levels, written, pictorial, and verbal explanations of the interventions or treatments, and demonstrations using a role modeling approach.^{1–4} Children receive these preparations before surgeries or other potentially stressful situations, including medical checks, blood collections, and other examinations.^{5–7}

Systematic psychological preparation programs started at Mott's Children's Hospital, Michigan, the United States in 1922 and involve many factors.⁸ In 1955, Plank started the Child Life and Education Program for hospitalized children which was widely applied in hospitals in the United States.⁹ Then, during the 1970s and 1980s, psychological preparations programs became standardized.¹⁰ In recent years, most hospitals in the United States and the United Kingdom with children's wards have employed child life specialists who manage the psychological preparations.¹¹ The American Academy of Pediatrics advocated for child life service and referred to the preparations needed by children about to visit clinics/hospitals.¹²

The psychological preparations improve the emotions toward hospital itself and can help children visit hospitals smoothly.¹³

Autism spectrum disorders (ASD) and attention deficit hyperactivity disorder (ADHD) are representative developmental disorders. ASD is characterized by disturbances in social interaction and communication and restricted repetitive behaviors. ADHD is characterized by inattention and excessive activity, which becomes inappropriate as patients age. Both children with ASD and ADHD experience increased anxiety because they are not good at dealing with change of plans, interpreting situations correctly, foreseeing what will follow next, and communicating. Those children tend to have hypersensitivities in their auditory and visual perceptions. The hospital environments sometimes overwhelm their sensory perceptions.¹⁴ They tend to feel intense anxiety and fear in the hospital^{15, 16} and exhibit inappropriate rejection, escape, or panic reactions during medical

examinations or treatments.¹⁷

These developmental disorders are often complicated by other neurological or physical disorders, therefore these children visit clinics or hospitals more frequently than typically developing children.^{18, 19} Children with these developmental disorders also need psychological preparations in clinics or hospitals more than typically developing children to reduce their psychological stress. This highlights the need for appropriate examinations and treatments.

Psychological preparations suited for developmental disorders, including the visualization of examination and treatment schedules,²⁰ parental attendance,²¹ play therapy with medical tools,²² and role-playing,²³ have been reported to reduce inappropriate reactions to the medical interventions. Although these previous studies investigated the effectiveness of such preparations for each examination and treatment, to our knowledge, no studies have analyzed the psychological preparation factors associated with the positive or negative emotions of children with developmental disorders toward hospital itself. It may be important for the lives in children with developmental disorders, who tend to need frequent visit to hospitals, to improve emotions toward hospital itself. In this study, we aimed to clarify whether the psychological preparations associate with the positive or negative emotions in pediatric patients with ASD or ADHD, toward hospitals, using the questionnaires to the patients and the guardians.

SUBJECTS AND METHODS

Patients and guardians

We sent the questionnaires by mail via prefectural patient-family groups to pediatric patients (6 to 15 years old; diagnosed with ASD or ADHD) and their guardians living in seven prefectures in Japan. We received answers from 84 patient-guardian pairs and 72 answers without any missing data were analyzed. Four patients did not answer the questions about their fear experiences or feelings of acceptance toward the hospital and were excluded from the study. Consequently, the responses from 68 pairs were used. All of the responding guardians were the children's mothers.

Questionnaires about patient backgrounds (Questions A)

We asked the guardians about the patients' background using Questions A (QA): QA-1: age, QA-2: gender (answer options: male/female), QA-3: "Does he/she have an intellectual disability?" (answer options: yes/no), QA-4: "What is his/her main developmental disorder?" (answer options: ASD or ADHD), QA-5: "What is the comorbid

disorder (if any)?" (open ended answer), QA-6: "Is he/she taking medication for the neurological or psychological disorder(s)?" (answer options: yes/no), QA-7a: "Does he/she have hypersensitivity?" (answer options: yes/no), and QA-7b: "If yes, what types of hypersensitivity?" (answer options: auditory, visual, tactile, taste, or olfactory perception).

Questionnaires about psychological preparations in the hospitals (Questions B)

We also asked the guardians about the psychological preparations in the hospitals, using Questions B (QB): QB-1a: "Were there any materials which aid psychological preparation in the doctor's office?" (answer options: yes/no), QB-1b: "If yes, what were the materials used or displayed?" (answer options: open ended), QB-2a: "Did the doctors usually explain the medical treatment?" (answer options: yes/no), QB-2b: "If they did, what modes of explanation were used?" (verbal explanations/written explanations/pictorial or photo explanations/book or protocol explanations/others), QB-3a: "Did the doctors usually perform psychological preparation during the medical checks in their offices?" (yes/no), QB-3b: "If they did, what did they perform or use for the preparation?" (answer options: engaged in relaxing conversation, used toys, dolls, videos, pictures/books, electronic tablets, or other means), QB-4a: "Were there any materials which aid psychological preparation in the treatment/blood collection room?" (answer options: yes/no), QB-4b: "If yes, what types of materials?" (open ended answer), QB-5a: "Did the staff usually explain the examinations or interventions, including blood collection, injections, computed tomography, magnetic resonance imaging, electroencephalogram, or other potentially fear invoking examinations/interventions?" (answer options: yes/no), QB-5b: "If yes, what types of preparation were performed?" (answer options: verbal or written explanations, pictorial or photo explanations, book or protocol explanations, others), QB-6a: "Did the staff usually perform psychological preparations at the examinations/interventions?" (answer options: yes/no), and QB-6b: "If yes, what did they perform or use for the preparation?" (answer options: relaxed conversation/using toys/using dolls/using videos/using pictorial or books/using tablet devices/others).

Questionnaires to the pediatric patients with ASD or ADHD (Questions C)

We asked the pediatric patients two questions (simplified as much as possible for easier understanding) and recorded their answers. The questions were: QC-1: "Do you experience fear at the hospital?" (answer options:

Table 1. Answers to the questions

A. Patient background	
QA-1.	Range: 6–15 years Mean: 9.6 years Standard deviation: 2.3
QA-2.	Male: 53; Female: 15
QA-3.	Yes: 6; No: 62
QA-4.	ASD: 54; ADHD: 14
QA-5.	Congenital hypothyroidism: 1; Hyper brain dysfunction: 1
QA-6.	Yes: 34; No: 34
QA-7a.	Yes: 50; No: 18
QA-7b.	Auditory: 39; Visual: 14; Tactile: 21; Taste: 19; Olfactory: 17
B. Psychological preparations	
QB-1a.	Yes: 26; No: 38; No answer: 4
QB-1b.	Toys: 14; Dolls: 7; Picture book: 2; Wall decoration: 2; Treat: 1
QB-2a.	Yes: 51; No: 16; no answer: 1
QB-2b.	Verbal: 49; Written: 1; Pictorial/photo: 3; Books/protocol: 1
QB-3a.	Yes: 39; No: 26; no answer: 3
QB-3b.	Conversation: 35; Picture book: 6; Tablet device: 3; Video: 0; Toys: 1; Dolls: 1; Others: 4
QB-4a.	Yes: 19; No: 45; no answer: 4
QB-4b.	Toys: 8; Dolls: 6; Picture book: 2; Wall decoration: 2
QB-5a.	Yes: 51; No: 14; no answer: 3
QB-5b.	Verbal: 48, Written: 2, Pictures/photos: 5; Books/protocol; Others: 2
QB-6a.	Yes: 46; No: 19; no answer: 3
QB-6b.	Conversation: 34, Toys: 6, With mother: 28, Dolls: 3; Video: 0, Picture book: 2
C. Positive/negative emotions toward the hospital	
QC-1.	Yes: 34; No: 34
QC-2.	Yes: 31; No: 12; Neither 23; (no answer: 2)

ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder.

yes/no) and QC-2: “Do you want to go to the hospital again for your next medical appointment?” (answer options: yes/neither/no). Guardians were asked to assist the patients in understanding the questions when needed.

Statistical analyses

We tried to determine the background factors (QA’s answers) and preparations (QB’s answers) that affect the patients’ positive or negative emotions identified in the QC-1 and -2 answers.

The children’s answers [QC-1 (yes = 1; no = 0) and QC-2 answers (yes = 2; neither = 1; no = 0)] were the objective variables and the guardians’ answers (QA-1, 2, 3, 4, 6, 7a, and QB-1a, 2a, 3a, 4a, 5a, and 6a) were the explanatory variables. We used forward-backward stepwise multivariate binary (QC-1) or ordinal (QC-2) logistic regression analyses in this study and excluded patients with missing values from each analysis. For these analyses, we used the BellCurve software for Excel, version 3.20 (2020. Social Survey Research Information

Co., Ltd., Tokyo, Japan). The significance level was set as $P < 0.05$.

Ethical aspects of this study

This study was approved by the ethical committee of the Japan Developmental Disorders Network (approval number: 17-01). After we collected the completed questionnaires, a process of anonymization was applied, unlinking patients from their identifiable information, but keeping the patient-guardian links.

RESULTS

We collected answers from 68 patient-guardian pairs. The detailed results are shown in Table 1.

Patients and their backgrounds

The patient group included both genders (female: $n = 15$, male: $n = 53$) with ages ranging from 6 to 15 years (mean: 9.6 years; standard deviation: 2.3 years). The main diagnoses for the developmental disorders were

Table 2. Associations between patients' fear experiences/acceptance of medical visit and background/preparation factors

	Partial regression coefficient	Standard error	Odds ratio	P-value
A. Experiences fear in the hospital (<i>n</i> = 68)				
Intellectual disability	2.6689	1.3222	0.0693	.0435
Hypersensitivity	1.8505	0.8497	0.1572	.0294
Explanations by the staff regarding examinations/interventions*	-2.3634	0.9145	10.6268	.0098
B. Want to go to the hospital at the next visit day? (<i>n</i> = 66)				
Psychological preparations by the doctors during the medical checks**	1.5967	0.5272	4.9369	.0025

A: We used forward-backward stepwise logistic regression analysis; B: We used forward-backward stepwise ordinal logistic regression analysis. *: The answers "Yes" to QB-5a; **: The answers "Yes" to QB-3a.

ASD (*n* = 54) and ADHD (*n* = 14). One patient was diagnosed with hypothyroidism and another with higher brain dysfunction. Some patients (*n* = 34) were on medications for their neurological or psychological disorders. The guardians reported hypersensitivity in 50 patients, including auditory (*n* = 39), visual (*n* = 14), tactile (*n* = 21), taste (*n* = 19), and olfactory (*n* = 17) perception.

Psychological preparations in the hospital

The guardians' answers showed that there were materials which aid psychological preparations at the doctors' offices in case of 26 patients. Doctors explained the medical treatment to 51 patients and performed some psychological preparations during the medical checks in the office for 39 patients. The psychological preparations were performed in the treatment/blood correction room for 19 patients. The staff explained the examinations or interventions to 51 patients and performed psychological preparations for 46 patients.

Patients' positive and negative emotions toward the hospitals

In response to QC-1, 34 and 34 patients respectively reported that they had and did not have fear experiences during hospital visits. In response to QC-2, 31 and 12 patients respectively answered that they would and would not visit the hospital at the next visit day. Twenty-three patients answered, "neither of them."

Statistical results

Table 2 shows the results of the statistical analyses. Intellectual disability [$P = 0.0435$, partial regression coefficient (PRC) = 2.6689], and hypersensitivity ($P = 0.0294$, PRC = 1.8505) in the background factors were positively associated with the fear-answers of the patients. The explanation by the staff during the

examinations or interventions was negatively associated with the fear-answers ($P = 0.0098$, PRC = -2.3634). Other covariates were not associated with fear experiences.

Doctors' psychological preparations during the medical checks in the office positively associated with patients' willingness to visit the hospital again ($P = 0.0025$, PRC = 1.5967). Other covariates were not associated with this positive emotion.

DISCUSSION

In this study, we investigated the factors of patient background and psychological preparations associated with positive or negative emotions toward hospitals in pediatric patients with ASD or ADHD. We used questionnaires for the patients and guardians. Patients with intellectual disability or hypersensitivity tended to experience fear, and explanations by the staff during the examinations or interventions reduced such fear. For patients with either ASD or ADHD, the doctor's psychological preparations during medical checks were associated with the patient's acceptable emotions toward the hospital.

Some studies produced evidence about the efficacy of psychological preparations among children without ASD or ADHD. For example, during hospitalization, play programs can reduce negative emotions and anxiety.³ Moreover, playing with tablet devices before being administered anesthesia was shown to reduce anxiety.²⁴ Explaining the endoscopic procedure beforehand using the protocol document was also shown to reduce anxiety.²⁵ There have been several studies that have demonstrated the efficacy of psychological preparations for children with developmental disorders. Sallam et al. reported that explanatory pictures or videos improved the attitudes of children with ASD toward

toothbrushing.²⁶ Moreover, during a psychological preparation trial involving 253 children who received nocturnal polysomnography, 45 of the 51 patients with ASD successfully underwent the recording.²⁷

In this study, the patients with backgrounds of intellectual disability and hypersensitivity tended to have fear experiences in hospitals. Patients with developmental disorders often have hypersensitivity and intellectual disability,²⁸ and 74% and 9% of the patients in our study presented with hypersensitivity and intellectual disability, respectively. Furthermore, hypersensitivity and intellectual disability are associated with increased anxiety during medical interventions in pediatric patients.²⁹ From the results of this study and those of previous studies, it can be concluded that psychological preparations are required more for children with developmental disorders than typically developing children.

Our study revealed two factors of psychological preparations for pediatric patients with developmental disorders, which associated with their emotions toward the hospitals. One was the explanation by the staff regarding examinations or interventions, which negatively associated with the fear experiences. Another was the psychological preparation performed by doctors during the medical checks, which were associated with positive emotions toward hospitals. In the questions about these factors (QB-5a/b and QB-3a/b), most of the psychological preparations were conversational (48/51 in QB-5a/b, 35 in QB-3a/b), while preparations using materials were infrequent in both situations. Regarding psychological preparations for general pediatric patients, previous studies revealed that relaxed conversations reduced anxiety about the surgery.¹⁻⁴ Constructing relaxing relationships, via open conversations or other methods, between patients and their doctors and medical staff in stressful situations can promote a positive impression of the hospital or reduce the feeling of fear in patients with developmental disorders. However, the use of the preparation materials, including toys, dolls, picture books or wall decorations, in the doctors' offices or treatment/blood collection rooms did not affect the patients' emotions in this study. From the statistical results in this study, only the interpersonal contact seemed to associate with the improvement of the emotions toward the hospital itself. On the other hand, the effectiveness of materials preparations in each examination and treatment has been clarified in the previous studies.^{26, 27} The items of the questionnaire about the material preparations in this study might be scant or inappropriate for the evaluations.

This study has some limitations. We used questionnaires to evaluate the status of psychological

preparations in the hospitals. The data may reflect the guardian's subjective view, and potentially be different from the actual status of the preparations conducted. The guardians helped the patients with answering the questions, therefore, they may have affected the patients' answers. The items in the questionnaires might be the factors indirectly associated with the positive or negative emotions toward hospitals. Research considering potential confounding factor is necessary to clarify the association between the preparations and the emotions toward the hospital.

In conclusion, we investigated the psychological preparation factors that cause feelings of fear or acceptance in pediatric patients with ASD or ADHD toward hospitals. Regarding the preparations, establishing relaxing relationships between the patients and the staff or doctors may be important to reduce the hurdles of providing medical care for children with developmental disorders.

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