〔原 著〕

Psychological distress and related factors during hospitalization among young patients undergoing minor surgery in a Japanese suburban hospital

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Abstract

In Japanese pediatric surgery, most minor surgeries (about 80%) are for conditions such as inguinal hernia, hydrocele or undescended testis. The research on the basic facts concerning children's psychological distress associated with hospitalization and surgery has not been executed in Japan sufficiently, although clinical nurses had reported that most Japanese young patients show psychological distress severely before and after surgeries.

This study aimed to describe temporal shifts of psychological distress experienced during hospitalization among young patients undergoing minor surgery, and to investigate factors related to such distress. Data were prospectively collected using observational and questionnaire methods from 24 sets of young patients and mothers in a Japanese suburban hospital.

This study presented that young patients were already distressed on admission and maintained distress during hospitalization, and following four major factors were associated with such distress: 1) length after diagnosis, 2) parents' valid explanation of hospitalization and surgery, 3) children's understanding of their own condition, and 4) children's weak constitution.

The findings suggested that medical staffs including outpatient nurses should provide knowledge of hospitalization and surgery and psychological support sufficiently for the guardian so that each child could receive a valid explanation of hospitalization and surgery from guardian in an understandable manner at home. Moreover, it was also suggested that the continual psychological follow-up system through the hospitalization should be provided for vulnerable children and families under close mutual cooperation between outpatient and ward staffs.

Key words : elective surgery, minor surgery, pediatric nursing, prospective study, psychological distress

I. INTRODUCTION

In Japanese pediatric surgery, most minor surgery is for conditions such as inguinal hernia, hydrocele or undescended testis. Recent report from the Japanese Society of Pediatric Surgeons indicates that minor surgery accounts for 80% of all pediatric surgeries in Japan.[1] Especially, inguinal herniorrhaphy is world-widely recognized as the most common general surgical procedure performed in chil-

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dren.[2] Although elective surgical procedures increasingly either avoid hospitalization or are performed on an outpatient basis in Western countries, most children undergoing minor surgery are hospitalised for a few days in Japan.[3]

Medical intervention usually involves separation from family, interrupting regular routines and interfering with attempts by children to maintain autonomy and control. Early studies in Western countries focused primarily on the effects of separation from parents that accompanied hospitalization,[4][5] and began to explore children's fears about body integrity in the face of surgery.[6]~[8] Moreover, extensive investigation of such psychological impact of hospitalization has been undertaken.[9][10] For children undergoing surgery, medical and surgical procedures and the hospital stay itself were inevitably intimidating and disruptive.[10]~[13] It has been well documented that most young patients undergoing minor surgery become agitated, display increased stiff resistance, and actively attempt to escape from medical staffs during perioperative period.[14][15] Post-hospital negative behavioral changes, such as nightmares and separation anxiety, occurred in up to 60% of children undergoing general anesthesia and surgery, and probably resulted from interactions between psychological distress experienced during preoperative period and individual personality characteristics of each child.[16] It has been also demonstrated that children hospitalized for 2-3 days exhibit more behavioral distress than children hospitalized for shorter or longer periods.[16]

Based on the result of investigations,[16] a large number of studies have examined various interventions designed to prevent or ameliorate children's distress.[17] Most studies have concluded that such psychological preparation programs were beneficial, as evidenced by reduced maladaptive post-hospital behaviors, more rapid signs of physiological recovery, and growth in knowledge or understanding.[17]

Western countries have seen a great deal of discussion concerning psychological distress among children undergoing surgery, factors related to psychological distress, and psychological preparation programs designed to prevent distress.[16][17] In clinical practice, in fact, 70% of pediatric hospitals in the United States have provided some kind of preparation programs before surgery.[18][19]

In Japan, radical changes over the past decade in hospital policies have created an environment increasingly supportive of children and families. Liberal visiting policies, parent rooming-in and systematic approach for hospitalization have become almost routine. Likewise, psychological preparation programs for children and families have recently gained interest among researchers and practitioners in pediatric nursing and have been piloted in various clinical settings in Japan. However, excepting our research that focused on the psychological upset after leaving hospital from undergoing minor surgery,[20] little has been done to investigate the impact of hospitalization or surgery on children, thus preventing nurses from practicing evidence-based care, such as preparation programs. In particular, it has never been well documented how young patients undergoing minor surgery are distressed during hospitalization in Japan. Thus accumulating empirical knowledge about the phenomena should help researchers and practitioners develop evidence-based nursing care for preventing or ameliorating the distress of children.

II. PURPOSE

The present study had two purposes. The first

purpose was to describe temporal shifts of psychological distress during hospitalization among young Japanese patients undergoing minor surgery from the standpoint of mothers. The second purpose was to determine the factors associated with children's psychological distress.

In the present study, 'psychological distress' was considered as children's manner and mental posture representing their emotional stress like anxiety, fear, and concerns caused by medical procedures associated with hospitalization and surgery.

III. METHODS

1. Design of research

An exploratory study was performed at a hospital for three months, using prospective methods to gather continuous data on psychological distress among young patients undergoing minor surgery during their hospitalization.

2. Sample

A purposive sample included 24 children (15 boys, 9 girls) undergoing minor surgery in a short-term hospital admission at a general hospital in a suburban area (this hospital was given certification as a classification B general hospital by the Japan Council for Quality Health Care, and designated bed capacity was 461 in total ward), and their mothers. Mean age of children was 5.5 years (range, 4-7 years). Diagnoses included inguinal hernia (n=17), hydrocele testis (n=1) undescended testis (n=2), and those complications (n=4). All patients spoke Japanese.

3. Data collection

This study was conducted in outpatient ward, pediatric surgery ward, and operating room of hospital by a researcher having a license of registered nurses. In this hospital, a guardian was permitted to stay by the child's bedside during hospitalization.

In this hospital, young patients underwent outpatient care and examination 1 week before surgery, and stayed in hospital 3 days and 2 nights, undergoing surgery the day after admission. On the morning of surgery, after an anesthetic premedication was given orally, young patients were transported to operating rooms by stretcher with nurse. In operating rooms, patients were given general anesthesia (sevoflurane) by a pediatric anesthetist and conducted surgery by two pediatric surgeons. Young patients were managed by measured amount of analgesic and adequate volume expansion through operation until the time of waking on pediatrics ward. Then, patients were given water orally. The next day, young patients were permitted to discharge from the hospital if there was no problem after surgery.

At 1 week before surgery, young outpatients and mothers were requested to participate in this study. For 24 sets of children and mothers who willingly consented to participate in the study, we provided written instruction and explained the purpose and outline of this study. All 24 mothers provided written informed consent on the spot.

During hospitalization, mothers, who took care of young patients on a daily basis as primary guardian, were asked to observe their own children comprehensively and estimate levels of their psychological distress.

4. Selection criteria

Selection criterion included 4- to 7-year-old children with normal development without mental retardation, not taking any medicine during hospitalization, without chronic pain or disease, without disabilities, and assent from both children and mothers to participate in this study.

5. Instruments

1) Children's psychological distress

To sort out scenes when children's psychological distress was especially high, a focus group interview was conducted among 6 groups of 5 nurses (regional breakdown for nurses: 15 nurses from the pediatric ward, 15 nurses from the operating department). After the interview, a verbatim transcript was formulated based on the recorded interview and it was analyzed using a technique described by Anme.[21]

Analysis revealed that children's distress were particularly high when separating from parents and entering operating room (time of separation), when inducing anesthesia (time of induction), when returning to ward (time of return), and when waking up for the first time after surgery and recovering from anesthesia (time of waking). Of these 4 situations, 3 scenes (time of separation, time of return, and time of waking) were chosen because mothers could observe and assess psychological distress in children at such scenes, and the time of admission, and the time of discharge were added. A total of 5 scenes were thus selected for mothers to observe and assess children's psychological distress.

A visual analogue scale (VAS)[22] was used by mothers to estimate children's psychological distress as a simplified measure and shorthand notation. A VAS rating system comprises a 10-cm line that represents two behavioural extremes at either end of the continuum, with 0 representing "never distressed" and 10 representing "extremely distressed".

2) Related factors

With reference to reviews of literature on issues of young patients undergoing minor surgery achieved in the areas of pediatric nursing,[8)10)] pediatric anesthesiology,[13)15)] pediatric psychiatry and pediatric psychology,[19)23)] factors associated with children's psychological distress were extracted. Therefore, the following children's internal factors (①～③) and external environmental factors (④) were extracted.

①Children's attributes and character traits

For children's attributes, mothers were asked about sex, age, order of birth, and diagnosis of children. In addition, mothers were asked to estimate degree of behavioural characteristics or nature of their own children using "The TS diagnostic test of young children's character traits"[24]. This test includes 139 items of 13 traits to determine character traits of each child. Thirteen traits consist of 'self-confident', 'nervous constitution', 'emotional instability', 'self-disciplined', 'dependence', 'regression', 'aggressiveness', 'sociality', 'maladaptation in family', 'maladaptation in school', 'constitutional instability', 'personal instability', and 'social instability'. Each item was judged on a scale of 1 to 3 and total scores for each trait were counted and diagnosed by three stages as follows 'No problem', 'A little problem', and 'Problem'. The reliability of 13 traits was respectively 0.59-0.80. This test was considered a reliable and valid instrument to estimate Japanese children's attributes and character traits and used in clinical practice.[25]

②Preoperative mental experience of children

i) Parents' valid explanation of hospitalization and surgery

In this hospital, explanations about hospitalization and surgery were generally given to each guardian of young patients from medical staffs.

In this study, therefore, mothers were asked whether parents have explained the reason and details about hospitalization and surgery in an understandable manner to children at home. First, mothers were asked the following question 'Have you

ever explained the reason and details about hospitalization and surgery to your child?' and if a mother answered 'yes', the second question 'How did you explain those things to your child?' and third question 'What exactly did you explain?' were followed. After responding to interviewer as above, mothers were asked to estimate 'explained level to child' using a 4-point Likert-type scale, from "not explained at all" to "well explained". For analysis, either the presence or absence of a valid explanation of hospitalization and surgery by parents was considered.

ii) Children's understanding of their own condition and the purpose of hospitalization

Mothers were asked whether children understood their own condition in lower abdomen. First, mothers were asked the following question 'Have you ever felt your child's understanding of his/her condition of lower abdomen?' and if a mother answered 'yes', the second question 'How did your child understand his/her condition?' and third question 'What exactly did your child say about the condition?' were followed. After making such conversation with interviewer as above, mothers were required to mark an appropriate state of the child on a 4-point Likert-type scale, from "not understanding his/her condition at all" to "understanding clearly his/her condition". For analysis, either the presence or absence of each child understanding of his/her own condition was considered. In the same way, whether children understood the purpose of hospitalization was also asked.

iii) Medical history of present conditions

As factors relevant to mental experience of children, mothers were asked about the "length of time after diagnosis","length of time waiting for elective surgery", and "medical history with or without hospitalization or surgery". "Length of time after diagnosis" was answered using a 5-point Likert-type scale ranging from "<1 month" to "≥4 years". Responses were used as an ordinal scale for analysis. In the same way, "length of time waiting for elective surgery" was answered using a 4-point Likert-type scale from "<10 days" to "≥1 month", using responses as an ordinal scale for analysis.

③Mother-child relationship

i) Mother's attributes

As attributes, mother's age and type of employment were determined.

ii) Mother's anxiety regarding child's surgery

Mother's anxiety regarding her child's surgery was assessed using a VAS due to shorthand notation. In the present study, A VAS rating system comprised a 10-cm line representing level of anxiety, from 0 (never anxious) to 10 (extremely anxious). Height of the line represented the level of anxiety and it was used directly as the mother's anxiety score. Total score for the 5 scenes mentioned above was considered as the "mother's anxiety regarding her child's surgery".

iii) Mother's attitude toward child-rearing

Mother's attitude toward child-rearing in everyday life was supposed to profoundly affect a child's psychological distress. In this study, mothers were asked about their own attitude toward child-rearing using "The TK diagnostic test of child-parent relationship"[26]. The test reveals 5 important negative aspects of maternal attitudes toward child-rearing: "rejective"; "domineering"; "overprotective"; "submissive"; and "inconsistent". Each aspect of attitude toward child-rearing was rated on a 3-point grade.

Results at the 50th percentile and above were considered 'No problems', with the 20th～50th percentile considered 'A little problem', and below the 20th percentile considered 'Ploblem' with the

parent-child relationship. Both reliability and validity of the TK diagnostic test have been verified.[26]

④Environment and experience during hospitalization

i) Emotional support from medical staffs

Mothers were asked to evaluate 'emotional support from medical staffs to children and mothers during hospitalization' using a 4-point Likert-type scale, from "not supportive at all" to "fully supportive". For analysis, either the presence or absence of emotional support from medical staffs was considered.

None of the members of the medical staffs was informed of participants for the present study on the principle of ethical considerations, so it might not affect the way mothers estimated.

ii) Hypnotic effect and postoperative mood & pain

In this hospital, patients were orally administered premedication on a ward, and then general anesthesia was induced using sevoflurane by mask in an operating room.

Presence or absence of the hypnotic effect (caused by premedication and anesthetic) and postoperative mood were examined using observational methods. Postoperative pain was judged by additional usage of analgesics.

6. Ethical considerations

This study was approved by the Ethical Review Board of the hospital where we collected data. Written informed consent was obtained from all participants with each mother's signature.

7. Data analysis

SPSS Version 12.0J was used for statistical analysis (SPSS Japan, Tokyo). Changes over time in child VAS score were analyzed using repeated measures analysis of variance (ANOVA), followed by a Bonfferoni multiple comparison testing. Moreover, significance of temporal shift in VAS score was analyzed using Friedman's test.

In this study, VAS score at 5 scenes was summed as "psychological distress during hospitalization", because we wanted to develop a consistent policy on the nursing care of pediatric surgery. Such a consistent policy might not change according to each scene but be consistent through hospitalization. When exploring significant related factors contributing to "psychological distress during hospitalization", total VAS score was used as the dependent variable for multiple regression analysis. Each parameter of related factors that were correlated with a dependent variable at some level as a result of ANOVA or Spearman's rank-correlation analysis (values of $p<0.2$) was made into an independent variable for stepwise regression analysis.

In this study, values of $p<0.05$ were considered statistically significant.

IV. RESULTS

1. Study sample and attributes

Through the recruitment during this study, subjects who fulfilled the selection criteria were 24 sets of child and mother. Twenty-four of the 24 sets of child and mother agreed to participate (acceptance rate 100%). And all 24 sets of child and mother participated in the overall process of the investigation and responded to all the test and questionnaires.

Attributes of children and mothers are shown in Table 1. Mothers were given a major role in evaluating the level of psychological distress for children in this study, as we considered the mothers would best know the usual condition of children. Mean age of mothers was 33.2 years (range, 24-43 years).

2. Children's psychological distress

Figure 1 represents changes in VAS score over time during hospitalization ($n=24$). Mean VAS

Table 1. Attributes of children and mothers (n = 24)

	n	%	Mean ± SD
Children			
Gender			
Boys	15	62.5	
Girls	9	37.5	
Age			5.5 ± 1.3
4-year-old	7	29.2	
5-year-old	7	29.2	
7-year-old	10	41.7	
Order of birth (siblings)			
1 (−)	3	12.5	
1 (+)	10	41.7	
2 or later	11	45.8	
Diagnosis			
Inguinal hernia (one side)	15	62.5	
Inguinal hernia (both sides)	2	8.3	
Hydrocele testis	2	8.3	
Undescended testis	1	4.2	
Complications	4	16.7	
Mothers			
Age			33.2 ± 5.6
20's	6	25.0	
30's	16	66.7	
40's	2	8.3	
Type of employment			
None	8	33.3	
Part-time job	11	45.8	
Full time job	3	12.5	
Independent business	2	8.3	

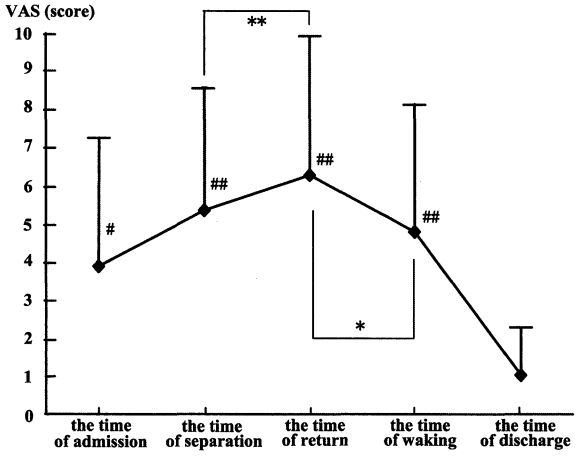

Figure 1. The VAS scores during hospitalization (n=24). The data are plotted at the time of admission, separation, return, waking, and discharge. Data are expressed as mean ± SD. # $p < 0.005$, ## $p < 0.001$, compared with baseline (data at the time of discharge) using repeated measure analysis of variance (ANOVA), followed by a Bonfferoni multiple comparison testing. Data are also expressed as * $p < 0.05$, ** $p < 0.01$, for correlations between score at each scene, using Pearson's correlation coefficient.

Table 2. Character traits of children : the degree of behavioural characteristics or nature (n = 24)

	n	%
Self-confident		
No problem	15	62.5
A little problem	6	25.0
Problem	3	12.5
Nervous constitution		
No problem	20	83.3
A little problem	4	16.7
Problem	0	0.0
Emotional instability		
No problem	20	83.3
A little problem	4	16.7
Problem	0	0.0
Self-disciplined		
No problem	18	75.0
A little problem	4	16.7
Problem	2	8.3
Dependence		
No problem	19	79.2
A little problem	4	16.7
Problem	1	4.2
Regression		
No problem	19	79.2
A little problem	5	20.8
Problem	0	0.0
Aggressiveness		
No problem	17	70.8
A little problem	5	20.8
Problem	2	8.3
Sociality		
No problem	17	70.8
A little problem	6	25.0
Problem	1	4.2
Maladaptation in family		
No problem	18	75.0
A little problem	4	16.7
Problem	2	8.3
Maladaptation in school		
No problem	17	70.8
A little problem	6	25.0
Problem	1	4.2
Constitutional instability		
No problem	15	62.5
A little problem	8	33.3
Problem	1	4.2
Personal instability		
No problem	19	79.2
A little problem	3	12.5
Problem	2	8.3
Social instability		
No problem	19	79.2
A little problem	3	12.5
Problem	2	8.3

Each trait was evaluated by the TS diagnostic test of young children's character traits, with diagnosed by three stages as follows 'No problem', 'A little problem', and 'Problem'.

Table 3. Mothers' attitude toward child-rearing (n = 24)

	n	%
Rejective attitude		
No problems	13	54.2
A little problem	5	20.8
Problem	6	25.0
Domineering attitude		
No problems	11	45.8
A little problem	11	45.8
Problem	2	8.3
Overprotective attitude		
No problems	7	29.2
A little problem	13	54.2
Problem	4	16.7
Submissive attitude		
No problems	12	50.0
A little problem	8	33.3
Problem	4	16.7
Inconsistent attitude		
No problems	9	37.5
A little problem	10	41.7
Problem	5	20.8

Each attitude was evaluated by the TK diagnostic test of child-parent relationship, with diagnosed by three stages as follows 'No problems', 'A little problem', and 'Problem'. 'Problem' is the following definition that there is something excessive in mothers' attitude.

score (±SD) was 3.88 (±3.35) at the time of admission, 5.85 (±3.21) at the time of separation, 6.27 (±3.60) at the time of return, 4.77 (±3.35) at the time of waking, and 1.24 (±1.02) at the time of discharge. Score at the time of admission, score at the time of separation, score at the time of return, and score at the time of waking were each significantly higher than at the time of discharge ($p<0.05$). A significant change in mean VAS score over time was also apparent (Friedman's test; $p<0.05$).

As for correlations between score at each scene, score at the time of separation was positively correlated with score at the time of return, while score at the time of return was also positively correlated with score at the time of waking (Figure 1).

3. Related factors

Each parameter for attributes of children and mothers (Table 1), character traits of children (Table 2), mothers' attitude toward child-rearing (Table 3) and children's internal & external environmental factors (Table 4) was comprehensively analysed with ANOVA or Spearman rank correlation analysis. Results of univariate analysis between children's psychological distress and each related factor were represented (Table 5).

4. Related factors contributing to children's psychological distress

Multiple linear regression analysis (Figure 2) identified four major factors associated with children's psychological distress: 1) Length after diagnosis ($\beta=-0.469$, $p<0.001$); 2) parents' valid explanation of hospitalization and surgery ($\beta=-0.416$, $p<0.01$); 3) children's understanding of their own condition ($\beta=-0.412$, $p<0.01$); and 4) children's weak constitution ($\beta=0.266$, $p<0.05$). Adjusted coefficient of determination (adjusted R^2) was 0.767.

V. DISCUSSION

1. Children's psychological distress

In this study, psychological distress in young patients undergoing minor surgery was already high at "time of admission", and maintained until "time of discharge" (Figure 1). This finding suggested that medical staffs including outpatient nurses should take a comprehensive approach such as psychological or educational intervention associated with hospitalization and surgery for young patients and family, as early as pre-admission.

The peak in children's psychological distress was at "time of return", no different from other studies which have shown that maladaptive behaviors of young patients were often seen immediately after surgery.[27] Both the hypnotic effect caused by anesthesia and postoperative pain could incite such children's distress as seen immediately after surgery, on the other hand, parental presence could also af-

Table 4. Children's internal factors & external environmental factors (n = 24)

	n	%
Children's internal factors		
Parents' valid explanation of hospitalization and surgery		
Presence	14	58.3
Absence	10	41.7
Children's understanding of their own condition		
Presence	20	83.3
Absence	4	16.7
Children's understanding of the purpose of hospitalizatior		
Presence	19	79.2
Absence	5	20.8
Length of time after diagnosis		
Less than one month	2	8.3
From one month to less than half year	8	33.3
From half year to less than one year	3	12.5
From one year to less than four years	6	25.0
Four years or more	5	20.8
Length of time waiting for elective surgery		
Less than 10 days	1	4.2
From 11 to 20 days	3	12.5
From 21 to 30 days	7	29.2
One month or more	13	54.2
Medical history with or without hospitalization		
Presence	8	33.3
Absence	16	66.7
Medical history with or without surgery		
Presence	2	8.3
Absence	22	91.7
Mother's anxiety levels for child's surgery* VAS scores		
Mean ± SD ; 20.5 ± 9.1, Range ; 5.5-38.0 (n = 24)		
External environmental factors		
Emotional support from medical staffs		
Presence	22	91.7
Absence	2	8.3
The hypnotic effect		
Presence	8	33.3
Absence	16	66.7
Postoperative mood		
bad	11	45.8
good	13	54.2
Postoperative pain		
Presence	2	8.3
Absence	22	91.7

All the information was provided by mothers.

fect the incidence or severity of the psychological distress in children at "time of return".

Correlations between "time of separation" and "time of return" and between "time of return" and "time of waking" indicated that a management perspective for continued nursing care over scenes was needed. Medical staffs should thus observe young patients consistently and carefully during hospitalization and share information about psychological distress in each child with staffs over scenes.

2. Related factors contributing to children's psychological distress

As factors associated with psychological distress in young patients undergoing minor surgery, following four major factors have been identified: 1) length after diagnosis; 2) parents' valid explanation of hospitalization and surgery; 3) children's understanding of their own condition; and 4) children's weak constitution (Figure 2).

For "length after diagnosis", we considered that

Table 5. Univariate analysis between children's psychological distress and each related factor (n = 24)

	correlation coefficient (significance probability)	P values < 0.2
Attributes of children and mothers		
Children		
Gender		
Age		
Order of birth		
Diagnosis		
Mothers		
Age	− 0.412 (0.046)	*
Type of employment		
Character trait of children		
Self-confident		
Nervous constitution		
Emotional instability		
Self-disciplined		
Dependence	− 0.381 (0.066)	*
Regression	− 0.297 (0.159)	*
Aggressiveness		
Sociality		
Maladaptation in family		
Maladaptation in school	− 0.361 (0.083)	*
Constitutional instability	0.347 (0.097)	*
Personal instability		
Social instability		
Mothers' attitude toward child-rearing		
Rejective attitude		
Domineering attitude		
Overprotective attitude		
Submissive attitude		
Inconsistent attitude		
Children's internal factors		
Parents' valid explanation of hospitalization and surgery	− 0.599 (0.002)	*
Children's understanding of their own condition	− 0.646 (0.001)	*
Children's understanding of the purpose of hospitalization		
Length of time after diagnosis	− 0.429 (0.036)	*
Length of time waiting for elective surgery		
Medical history with or without hospitalization		
Medical history with or without surgery		
Mother's anxiety levels for child's surgery	0.292 (0.166)	*
External environmental factors		
Emotional support from medical staffs		
Hypnotic effect		
Postoperative mood	− 0.599 (0.002)	*
Postoperative pain		

Each parameter of related factors that were correlated with each child's total VAS scores during hospitalization, which were summed as "psychological distress during hospitalisation" at some level as a result of ANOVA or Spearman's rank-correlation analysis (values of $P < 0.2$) would be made into an independent variable for stepwise regression analysis.

4- to 5-year-old children could gain a vague consciousness of their own condition by receiving regular outpatient treatment until elective surgery was performed. During such periods, children could have many chances to talk about hospitalization or surgery with family. Thus, the longer the period of elective surgery after diagnosis was, the lower the psychological distress was, because children could develop gradually a level of psychological preparation for surgery in their own way. On the other hand, Maw et al.[28] showed that "timing of surgery after diagnosis" was not a critical factor for those children having bilateral hearing impairment.

For "parents' valid explanation of hospitalization

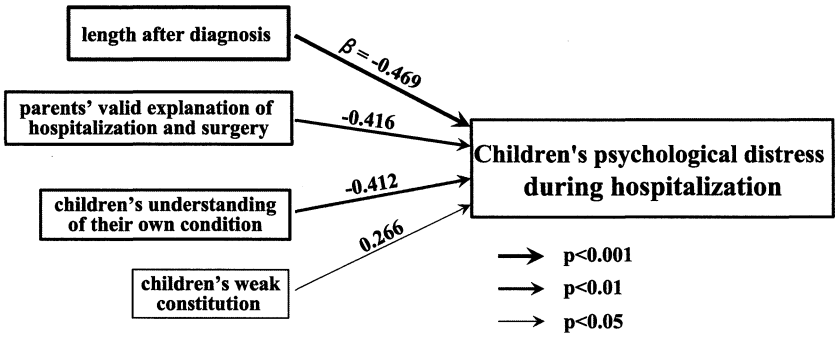

Figure 2. A multiple linear regression model associated with children's psychological distress during hospitalization (n=24). β values of each effect factor represent a standardized partial regression coefficient. p values of each effect factor ratchet the width of arrowed lines up. Adjusted coefficient of determination (adjusted R^2) of this model was 0.767 ($p < 0.001$).

and surgery", children who had received preliminary accurate information from parents at home showed less psychological distress than children who had not received. This finding suggested that children who had received preliminary accurate information from parents at home could be more prepared for unfamiliar situations and unknown changes associated with hospitalization and surgery. It has been ever considered that children, by 4- to 5-years-old, begin to acquire concepts of numeric and time through neighborly interaction with accompanying developments in linguistic competence.[23)29)] In fact, a study on psychological preparation in Japan has already suggested that 'verbal explanation' was one of effective strategies in preparing young patients psychologically.[30)]

For "children's understanding of their own condition", children who was conscious of their own condition represented lower level of psychological distress. Malone[31)] suggested that responses of 3- to 6-year-old children showed more imagery related to their own disease, descriptions of disease, future, and so forth. They could accept unfamiliar situations despite feeling anxiety or fear by using rationalization for surgery such as "surgery might be needed to cure my sickness". Such rationales could allow the child to challenge the event in a positive manner.

For "children's weak constitution", the more delicate children's constitution was, the higher children's psychological distress was. Generally, children with delicate constitutions were assumed to display more emotional disorders and depressive symptom compared with normal children. Bonito[32)] reported that physically fragile children showed higher psychological distress in the treatment and they also needed more restraints during treatment compared with normal children.

VI. Limitations of this study

The present study was limited to a small subject population in a Japanese suburban general hospital. Regarding the results of multiple regression analysis (Figure 2), adjusted R^2 might be overestimated due to the small sample size. We reviewed the problem of the rationale for statistical analyses and two experts in medical statistics had supervised the decision of the present statistical method including parametric analysis with 24 sets of subjects.

In future, a larger sample size collected from every region of the country may be needed to revalidate the results of this study.

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VII. Suggestions for nursing practice

The present study has contributed to reveal the psychological distress in young Japanese patients undergoing some lower abdominal minor surgery and explore four major factors related to such distress.

The findings of this study suggested that medical staffs including outpatient nurses should provide accurate information about hospitalization and surgery and psychological support sufficiently for each guardian so that guardians could give an appropriate explanation at home to children in an understandable manner about hospitalization and surgery as early as pre-admission.

Moreover, it was also suggested that outpatient medical staffs should assess major factors such as each child's personality characteristics, past medical history, and the level of child's understanding of his/her condition, and on the basis of such assessment, the continual psychological-follow-up system should be provided especially for vulnerable children and families under close mutual cooperation between outpatient and ward staffs through hospitalization.

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外科的小手術を受ける子どもの入院中の心理的混乱およびその関連要因

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わが国の小児外科では，鼠径ヘルニア，精巣水瘤，停留精巣などに対する小手術が約80％を占める．これまで，手術を受ける大多数の幼児が，手術前後に強い心理的混乱を呈することが報告されてきたが，わが国では，入院・手術にともなう子どもの心理的混乱に関して，じゅうぶんな実態の調査は行われてこなかった．

本研究では，小手術を受ける幼児を対象に，入院時から退院時までの心理的混乱の経時的変化の実態を記述し，心理的混乱の関連要因を探索することを目的とした．すべてのデータは観察法および質問紙法を用いて，幼児とその母親24組から，前向きに収集した．

結果，幼児は入院時からすでに心理的混乱を呈し，その混乱は入院中を通して，持続していた．また，心理的混乱の関連要因として，1）診断を受けてからの期間，2）親からの入院・手術に関する適切な説明，3）子ども自身の病気に関する自覚，4）子どもの体質的な不安定さ，の4要因が抽出された．

結果より，子どもが家庭において「親からの入院・手術に関する適切な説明」を分かりやすく受けられるよう，外来スタッフをはじめとする医療者は，親への情報提供やサポートを十分におこなう必要がある．さらに，心理的混乱を引き起こす可能性の高い親子に対しては，外来と病棟のスタッフが互いに連携し，入院を通して，継続的なフォロー体制を提供していく必要が示唆された．