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Psychiatric outcome following paediatric intensive care unit (PICU) admission: a cohort study

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Abstract *Objective:* To determine whether paediatric intensive care unit (PICU) admission is associated with greater psychiatric morbidity in children and parents as compared with general paediatric ward admissions. *Design:* Retrospective cohort study. *Setting:* Paediatric intensive care unit and two general paediatric wards of a London teaching hospital. *Participants:* Children aged 5–18 years discharged from PICU (exposed cohort) and general paediatric wards (unexposed cohort) 6–12 months previously, together with their parents. *Measurements and results: Children*: the Clinician Administered Post Traumatic Stress Disorder (PTSD) Scale for Children (CAPS-C), the Impact of Event Scale (IES), Strengths and Difficulties Questionnaire, Birleson Depression Scale, Revised Children's Manifest Anxiety Scale, Child Somatization Inventory. *Parents*: IES, General Health Questionnaire, Beck Depression Inventory, Hospital Anxiety and Depression Scale. Thirty-five of 46 (76%) PICU-discharged families and 33 of 41 (80%) from general paediatric wards participated. Valid CAPS-C data were obtained for 19 PICU-admitted children and 27 children admitted only to the general paediatric ward; 4/19 (21%) of PICU-discharged children developed PTSD (compared with none of 27 ward admissions), *p*=0.02. PICU children had significantly more PTSD features of irritability and persistent avoidance of reminders of the admission. Parents of PICU children were more likely to screen positive for PTSD (9/33 (27%) compared with 2/29 (7%) parents of ward-admitted children), *p*=0.04. There were no significant differences between the groups for other measures of psychopathology. *Conclusion:* Post traumatic stress disorder diagnosis and symptomatology is significantly more common in families where a child has been admitted to the PICU. Consideration should be given to providing psychological support for children and parents after PICU admission.

Keywords Psychiatric outcome · Paediatric intensive care unit (PICU) · Post traumatic stress disorder (PTSD) · Parent(s) · Child(ren)

Introduction

Interest in the psychological sequelae of childhood medical illness is increasing. This is reflected in the literature examining psychological outcome in cancer survivors [1, 2], children with chronic physical health problems [3, 4, 5] and children undergoing liver transplantation [6]. Less attention has been given to assessing psychopathology after *acute* physical illnesses in children. Despite the severity and life threat of medical illnesses necessitating paediatric intensive care unit (PICU) admission, there is little research in this area.

In adults, the potential for intensive care unit (ICU) admission to induce symptoms of post traumatic stress disorder (PTSD) [7] is acknowledged. The few studies in children have mainly focussed on symptoms of emotional distress *during* the admission [8], or used a global quality-of-life measure (including a question about emotional status) to evaluate outcome following PICU discharge [9]. Studies using well-validated measures of psychiatric disorder are needed.

One recent study of PICU-admitted children aged 2–15 with meningococcal septicaemia, found likely PTSD prevalence rates of 10% in children and 48% in mothers, 3–12 months after discharge [10]. Without a control group, it was not known whether this reflected generalised effects of the PICU experience or a specific consequence of meningococcal infection.

We hypothesised that PICU admission, with its associated invasive medical intervention and implied life threat, puts children and parents at greater risk of subsequent psychiatric morbidity, compared with admission solely to a general paediatric ward.

Aims

1. To determine whether PICU-admitted children were at greater risk of psychiatric morbidity following discharge than children admitted to a general paediatric ward
2. To compare psychiatric morbidity in the parents of these two groups

Method

Setting

The study was carried out at St Mary's Hospital, London, a university teaching hospital with an 8-bed medical PICU, acting as a tertiary referral centre for South East England. There are two general paediatric wards (totalling 50 beds), for the local population and tertiary referrals. No specific psychological support is routinely available. However, there is an attached child psychiatry liaison service through which cases can be discussed.

Sample

We performed a retrospective cohort study. The exposure of interest was PICU admission. Psychiatric outcome for children aged 5–18, discharged between 1st June, 1998, and 12th April, 2000 (exposed group), was compared with that of children admitted to a general paediatric ward during the same period (the unexposed group).

The ward admission books were examined by JG or GR to find a child of similar age to each identified PICU admission, who was in hospital at approximately the same time with a diagnosis affecting the same system and, if possible, also of the same gender. In this way, efforts were made to ensure the two cohorts were similar with regard to age, time since discharge, diagnosis and gender.

Children with meningococcal disease were excluded as they were being recruited for a parallel study. Children with terminal illness, underlying neurological disorder or admission resulting from an intentional overdose were also excluded, as their psychiatric outcome was considered less likely to relate to hospital admission. We also excluded individuals with recognised pre-contact learning difficulties, insufficient English to complete the study instruments and families not contactable by telephone.

Procedure

Informed consent was obtained from families who were interviewed by GR or JG. All interview and questionnaire data were obtained 6–12 months after discharge. Children and parents were initially seen together; older children were then interviewed alone while their parents completed questionnaires. The interview with younger children was conducted with the parent(s) present and information about their child's behaviour was also recorded.

Measures

Socio-demographic and illness data were collected using a semi-structured interview developed for the study. Discharge medical diagnosis was obtained from hospital records. Perceptions of illness severity were quantified by the children and parents using scales developed for the study. The first assessed perception of illness severity (1: not ill at all, 10: extremely ill); the second quantified the degree to which the child or parent feared for the child's life (1: not at all, 10: very much so). We were unaware of existing measures to quantify illness severity and life threat in this way. Traumatic events leading to PTSD involve threat to life or physical integrity; our measure aimed to quantify this in a way that was easy for the respondents to understand.

A child's psychiatric status was assessed with a combination of well-validated questionnaires and a semi-structured interview.

The Clinician-Administered PTSD Scale for Children (CAPS-C) [11] is a semi-structured interview which facilitated the rating of 17 PTSD symptoms for frequency and intensity (how much a symptom impairs day to day functioning) (a) in the month preceding the interview and (b) at any time since the index admission. From this, PTSD could be diagnosed according to DSM-IV criteria [12]. We used the CAPS-C with the hospital admission identified as the trauma. Its wording was slightly modified to facilitate understanding by younger children. In addition, for younger children, information from parents was requested to facilitate evaluation of CAPS-C symptoms. Coding of each interview was discussed between GR and JG. Where differences arose, diagnoses were reached by consensus. The CAPS-C includes a subjective estimate of the overall validity of the ratings obtained, acknowledging that factors such as a child's symptomatology, concentration and understanding may impact on the accuracy of responses. Analysis of CAPS-C interviews was restricted to those without reason to suspect invalid responses.

Children were also asked to complete the following self-rating questionnaires:

1. The Impact of Event Scale (IES) [13]; its 15 items measure the two core components of PTSD (intrusive re-experiencing of the trauma and avoidance of trauma-related stimuli). It is validated for children 8 years or older [14] using a cut-point of 30 or more for PTSD [15];
2. The Strengths and Difficulties Questionnaire (SDQ) [16], which generates scores for conduct, hyperactivity, emotional, peer relationship problems and pro-social behaviour; a total difficulties score and an assessment of their impact on functioning are also derived. This was completed by parents about their child in addition to self-reports by the children 11 or older;

3. The Birleson Depression Scale [17] has 18 items and screens for depressive disorder in 7–18 year olds using a cut-point of 15 or more.
4. The Revised Children's Manifest Anxiety Scale (What I Think and Feel) [18] has 37 items and screens for anxiety disorders in 6–19 year olds. A score of 19 or more suggests a risk of anxiety disorder;
5. The Child Somatization Inventory (CSI) [19] asks children to rate 35 physical symptoms on a 5-point intensity scale if present in the 2 weeks prior to interview. The total number and severity of symptoms are scored, providing an index of the extent and nature of somatic symptoms experienced. The instrument does not distinguish whether these symptoms have an organic cause.

Psychiatric status of parent

The following self-report questionnaires were completed:

a) The IES—a cut-off of 35 in adults suggests a high risk of PTSD [20];
b) The General Health Questionnaire-28 [21], using a cut-point of 5 or more for psychiatric disorder;
c) The Beck Depression Inventory [22] has 21 items with responses weighted for severity; a cut-point of 17 or more was used for depressive disorder;
d) The Hospital Anxiety and Depression Scale [23] has seven items relating to anxiety and seven to depression with responses weighted on a four-point scale for frequency; a cut-point of 11 or more was used on each sub-scale.

Data analysis

The data were analysed using SPSS (version 10.0 for Windows). Analysis of the questionnaires for children was restricted to the age group for which the instrument was validated. CAPS-C analysis included interviews with no reported concern about response validity. Consequently, the numbers of subjects vary in different tables. The Mann Whitney test was used for analysis of continuous data and the chi-square test of association (or Fisher's exact test) for categorical measures. A p value of less than 0.05 indicated statistical significance.

Results

Thirty-five of 46 (76%) PICU families which were approached and 33 of 41 (80%) non-PICU families participated. They did not differ from those who declined with regard to (a) age [median (quartiles)]: 8.8 (7.1, 10.8) years and 9.3 (7.3, 12.2), respectively (p=0.6), (b) gender (p=0.1) or (c) admission diagnosis, (p=0.6) (Table 1).

The median age at interview in the PICU group was 9.6, (8.0, 11.5) years, 9.0 (7.6, 11.1) in the non-PICU group (p=0.5). PICU and non-PICU children were closely comparable with regard to baseline demographic data although non-PICU children had more varied ethnicities than the PICU group.

There was no significant difference in the time between hospital discharge and research assessment between the two cohorts, median 7.7 (6.9, 8.6) months for the PICU group, 8.2 (7.6, 8.8) for ward admissions (p=0.1).

Illness factors

Respiratory problems were the most common reason for admission in both groups (Table 2). Two thirds of the PICU children had a previous hospital admission, 18% to an ICU. Illnesses resulting in PICU admission were more

Table 1 Socio-demographic data for paediatric intensive care unit (PICU) and non-PICU children

	PICU (n=35)	Non-PICU (n=33)	p value for heterogeneity
	Number (%)	Number (%)	(Chi-square test)
Gender			0.3
Male	23 (66)	18 (55)	
Female	12 (34)	15 (46)	
Social class[a]	(n=34)		0.2
1,2,3n	12 (35)	17 (52)	
3m, 4, 5	18 (53)	10 (14)	
Other	4 (12)	6 (18)	
Family type	(n=33)		0.6
Living with 2 natural/adoptive parents	21 (64)	23 (70)	
Reconstituted family (living with a step-parent)	3 (9.1)	0 (0)	
Single parent family	9 (27.3)	10 (30.3)	
Ethnic group			0.02
White	21 (60)	14 (42)	
Black	8 (23)	4 (12)	
Indian/Pakistani/Bangladeshi	6 (17)	8 (24)	
Other	0 (0)	7 (21)	
Mainstream school	(n=34)		0.5[b]
	32 (94)	33 (100)	

[a] Standard occupation classification 1990 Vol.1. Structure and definition of major, minor and unit groups. London: HMSO, 1991
[b] Fisher's exact test

Table 2 Illness factors in paediatric intensive care unit (*PICU*) and non-PICU children

	PICU (n=35)	Non-PICU (n=33)	p value for heterogeneity
	Number (%)	Number (%)	(Chi-square test)
Medical problem			
Respiratory	15 (43)	16 (49)	0.5
Circulation	5 (14)	1 (3)	
Neurology	4 (11)	2 (6)	
Trauma	3 (9)	4 (12)	
Postoperative	2 (6)	4 (12)	
Other	6 (17)	6 (18)	
Duration of symptoms before admission	(n=34)	(n=30)	χ^2=15.44; 2df p<0.001
Less than 24 h	20 (59)	3 (10)	
Greater than 24 h	14 (41)	23 (77)	
Elective	0	4 (13)	
Contacts with health professionals about symptoms prior to hospital presentation	(n=32)	(n=29)	χ^2=11.89; 2df p=0.003
None	18 (56)	6 (21)	
1 contact	5 (16)	16 (55)	
2 or more contacts	9 (28)	7 (24)	
Previous paediatric admission history	(n=34)		p=0.3
None	11 (33)	14 (43)	
To general ward only	17 (50)	17 (52)	
To PICU	6 (18)	2 (6)	
	Median (quartiles)	Median (quartiles)	p value (Mann-Whitney)
Total number of days in hospital[a]	8 (4–14)	3 (1–4.5)	<0.001
Parent rating of severity of child's illness[b]	10 (10–10)	(n=31) 7 (5–9)	<0.001
Parent rating of degree of fear for child's life[b]	10 (10–10)	(n=31) 4 (1–8)	<0.001
Child rating of severity of illness[b]	(n=32) 9 (6–10)	(n=31) 6 (4–7)	<0.001
Child rating of degree of fear for life[b]	(n=32) 5 (1–9)	(n=31) 1 (1–5)	0.005

[a] Refers to total number of days on PICU plus total number of days on a paediatric ward for the PICU group
[b] Likert scale: 1–10; 10 maximum (Rated retrospectively based on how they felt at the time)

likely to be of sudden onset (over half had developed symptoms within the previous 24 h). Duration of hospital stay was greater for PICU-admitted children.

Children and parents in the PICU group (as compared to general ward admissions) rated themselves higher for severity of illness and degree of fear for life. Parents' perceptions of illness severity and life threat were greater than those of their children.

Paediatric intensive care unit children have significantly longer off school after discharge although, once back, there is no significant difference in subsequent time off (Table 3). There was no difference between groups in reported residual physical health or general practitioner (GP) contacts after discharge. However, PICU children had significantly more contacts with paediatricians and more re-admissions (to the general ward).

Psychiatric adjustment in children

For the parent-rated SDQs, there was a non-significant trend towards more total difficulties (p=0.07) and conduct symptoms (p=0.06) in the PICU children for the 6 months before assessment. Child-rated SDQs showed no differences.

After discharge four PICU-admitted children fulfilled the diagnostic criteria for PTSD (assessed with the CAPS-C) (Table 4). However, at interview this diagnosis was present in only one of them. Three PTSD symptoms were significantly more marked in the PICU children following hospital discharge: (1) avoidance of places or people arousing recollections of being ill in hospital, (2) avoidance of thoughts, feelings or conversations associated with being ill in hospital and (3) irritability. Affected children described a significant impact of these symptoms on home and school life. At assessment, PICU-admitted children had higher IES scores than ward-admitted children, with persistent difficulties on the avoidance subscale.

Table 3 School attendance and medical problems in paediatric intensive care unit (*PICU*) and non-PICU children after hospital discharge

	PICU (*n*=35)	Non-PICU (*n*=33)	*p* value
	Number (%) or Median (quartiles)	Number (%) or Median (quartiles)	
Length of time off school (days)	(*n*=28) 10 (5, 14)	(*n*=27) 5 (1, 10)	0.007[a]
Days off since return to school	(*n*=33)		0.5[b]
Fewer than 7	18 (55)	21 (64)	
7–21	10 (30)	6 (18)	
More than 21	5 (15)	6 (18)	
Residual physical health problems	(*n*=34)		0.8[b]
None	14 (41)	16 (49)	
New illness episodes	13 (38)	12 (36)	
Continuing illness	7 (21)	5 (15)	
GP contacts since discharge	(*n*=33)1 (0, 3)	1 (0, 3.5)	0.5[a]
Paediatric contacts since discharge	(*n*=33) 3 (1, 4)	1 (0, 2)	0.002[a]
Re-admissions	(*n*=34)		0.001[b]
Yes (none to PICU)	12 (35)	1 (3)	

[a] Mann-Whitney U test
[b] Chi-square test

Table 4 Post traumatic stress disorder (*PTSD*) diagnosis and symptoms in paediatric intensive care unit (*PICU*) and non-PICU children

	PICU	Non-PICU	*p* value
	Median (quartiles) or Number (%)	Median (quartiles) or Number (%)	([a]Mann-Whitney, [b]Chi-square or [c]Fisher's exact test)
CAPS-C (for time since discharge)[d]	*n*=19	*n*=27	
Diagnostic criteria met for PTSD at any point	4 (21.1)	0 (0)	0.02[c]
Avoidance of places	7 (37%)	0 (0)	0.001[c]
Avoidance of feelings	7 (36.8%)	3 (11.1)	0.07[c]
Irritability	10 (52.6%)	3 (11.1)	0.002[b]
CAPS-C (for last month)[d]	*n*=19	*n*=27	
Diagnostic criteria met for PTSD in last month	1 (5.3%)	0 (0)	0.4[c]
Avoidance of places	4 (21%)	0 (0)	0.02[c]
Avoidance of feelings	6 (31.6%)	1 (3.7)	0.02[c]
Irritability	5 (26.3%)	1 (3.7)	0.07[c]
Child Impact of Event Scale (IES)[e]	(*n*=21)	(*n*=17)	
Total score	10 (6, 24)	6 (1.0, 15.0)	0.06[a]
Avoidance score	8.0 (4.0, 16.0)	1.0 (0.0, 9.5)	0.02[a]
Intrusion score	4.0 (1.0, 6.0)	3.0 (0.0, 5.0)	0.3[a]
Above cut-off (≥30) for diagnosis of PTSD	4 (17.4)	2 (9.5)	0.7[c]

CAPS-C clinician administered PTSD scale for children
[d] Reported results include only respondents with a rating validity of excellent (no reason to suspect invalid responses) for the CAPS-C interview
[e] Results for children aged 8 years or more

At interview there were no significant differences between groups in the scores on the child-rated questionnaires assessing anxiety, depression and somatic symptoms.

Parental psychiatric adjustment

Parent questionnaires were completed by mothers for 60/68 (88%) of the participating families. The parents of PICU-admitted children had significantly more current symptoms of PTSD than parents of general paediatric ward admissions (Table 5), with higher total IES scores as well as sub-scale scores for avoidance and intrusion. Significantly more parents of PICU children scored above the cut-off of 35 for high risk of current PTSD. There were no significant differences between groups on other measures of parental psychopathology.

Table 5 Post traumatic stress disorder (*PTSD*) status of the main participating parent (usually mothers) of paediatric intensive care unit (*PICU*) and non-PICU children at follow-up

	PICU (n=35)	Non-PICU (n=33)	p value
	Median (quartiles) or Number (%)	Median (quartiles) or Number (%)	
Parent Impact of Event Scale (IES)	(n=33)	(n=29)	
Total score	26 (11, 37)	2 (0.0, 19.5)	<0.001[a]
Avoidance score	12 (3.5, 20)	0.0 (0.0, 8)	0.001[a]
Intrusion score	14 (6, 19.5)	1 (0.0, 11.5)	0.001[a]
Number (%) above cut-off for PTSD	9 (27)	2 (7)	0.04[b]

[a] Mann-Whitney U test
[b] Chi-square test

Factors associated with scores on the Impact of Event scale in the whole group

Significant Spearman correlations were found between child-rated IES scores and *child-perceived* severity of illness (Spearman's $r=0.40$, $p=0.009$) and life threat (Spearman's $r=0.36$, $p=0.002$) and *parent-perceived* severity of illness (Spearman's $r=0.30$, $p=0.01$) and life threat (Spearman's $r=0.4$, $p=0.004$).

The following were found to be associated with parental IES score: days in hospital (Spearman's $r=0.49$, $p<0.001$), parent-perceived severity of illness (Spearman's $r=0.47$, $p<0.001$) and life threat (Spearman's $r=0.49$, $p<0.001$) and child IES score (Spearman's $r=0.4$, $p=0.006$).

Discussion

Post traumatic stress disorder was identified in 21% of children after PICU discharge with no cases amongst children discharged from general wards. Whilst the prevalence of disorder and intensity of symptoms diminished over time, PICU-admitted children had persistently higher avoidance scores for situations and feelings related to the admission.

Over a quarter (27%) of the parents of PICU-admitted children were assessed as at high risk for PTSD, significantly higher than for parents of ward-admitted children. There was a positive correlation between PTSD symptoms in parents and (1) PTSD symptoms in the child, (2) length of admission and (3) perceived threat of illness to the child's life.

The greater risk of psychopathological sequelae following PICU admission may be specific to PTSD symptomatology, as there were no significant differences between the cohorts with regard to anxiety and depression in children and parents, or somatisation in children.

Post traumatic stress disorder in children

The high rate of PTSD in PICU-admitted children is consistent with previous reports following specific acutely stressful and potentially life-threatening paediatric admissions, such as road traffic accidents, newly diagnosed cancer and meningococcal disease [4, 10, 24, 25].

Our findings suggest PICU admission is a more intense stressor than a general paediatric stay. Medical PICU admissions tend to occur without warning and without time for parents to obtain advice from, or share responsibility with health professionals prior to hospital presentation. Parents and children perceived PICU admission as more traumatic and life-threatening than general paediatric admission. Moreover, such admissions cause greater disruption to a child's life, with longer admissions, greater time off school and more paediatric out-patient contacts and hospital re-admissions in the 6–12 months after discharge.

Whilst parents appear to be particularly susceptible to the stress of PICU admission, it might seem surprising that children, who are usually heavily sedated, develop PTSD. However, levels of consciousness are likely to fluctuate and many remember aspects of the PICU experience [26]. It is suggested that the recollection of nightmares, delusional (non-reality based) memories and frightening hallucinatory experiences are the primary triggers for PTSD in adults treated in ICUs [27].

In contrast to studies looking at PTSD symptoms in children following non-medical stresses such as shipping disasters [14, 15] and the witnessing of parental murder [28], but in line with work examining PTSD following serious paediatric accidents and newly diagnosed cancer in children [4], our subjects had more avoidance symptoms than re-experiencing of the stressful event itself. Avoidance may be more commonly experienced and reported as a sequel to medical trauma as re-exposure to the stressor (contact with paediatric services, hospital outpatient appointments) is necessarily more frequent.

Post traumatic stress disorder in parents

The high number of parents experiencing PTSD symptoms is consistent with findings in parents of children with meningococcal disease [10, 29]. Higher levels of intrusive symptoms such as reminders of the event bringing back strong feelings, pictures of the admission coming into their mind, intrusive thoughts about their child's illness, difficulty sleeping as well as avoidance of hospital-related events were more often observed in these parents compared with those unexposed to PICU.

The relationship between PTSD symptoms, admission duration and perceived life threat probably reflects illness severity as a direct PTSD-inducing stressor. The positive correlation between child and parent PTSD symptoms may suggest interactive effects between child and parent psychopathology. For example, parents may find it difficult to help children cope with avoidance if they themselves are similarly affected.

Relevance of further hospital contact to psychiatric adjustment after discharge

In the absence of increased objective measures of physical pathology (parent-reported residual physical symptoms, time off sick after initial school return, frequency of GP contacts), more re-admissions to the general ward took place after PICU discharge as compared with the control cohort. This may be explained in one of two ways: PICU children more often become acutely ill again compared with the ward group. Alternatively, parents of PICU-admitted children have a lower threshold for returning their children to hospital if new symptoms emerge and hospital staff may have a lower threshold for re-admission in view of the previous history.

Repeated hospital contacts after PICU discharge might act in two ways. They may desensitise the child to the hospital environment and "treat" symptoms of avoidance if present. This is particularly likely if subsequent exposures are positive experiences for the child. Alternatively, renewed hospital contact may reinforce PTSD, re-triggering the symptoms in affected children and parents. Additionally, if the PICU admission was traumatic for the family, they may avoid attending follow-up, or the child may show distress or difficult behaviour at appointments without being easily able to communicate why.

There is little empirical evaluation of interventions to reduce the risk of PTSD or treat the established disorder as it relates to PICU admission in children or parents. In adult burns victims, perceived helplessness and a lack of social support increase PTSD [30]. Extrapolating this to a PICU population, it might be hypothesised that simple strategies such as maximising the involvement of parents in the physical care of their child and optimising social support both within and outside the family, e.g. from paediatric social workers or hospital chaplains, may reduce the severity of PTSD reactions. Out-patient follow-up by PICU teams is not routine; initiating this may provide clinicians with an opportunity to identify symptoms of PTSD. A close working relationship between the PICU team and liaison staff in child and adolescent psy-chiatry may facilitate recognition of the disorder and referral for treatment (normally using cognitive behavioural therapy). Additionally, other health professionals might have a useful role, e.g. telephone follow-up by nurses has been found to be helpful for parents of PICU-discharged children in providing information and emotional support [31].

Strengths and limitations

This study, using a control group, represents one of the few attempts to try to separate the specific influences of the PICU experience on psychopathology from the general effects of a paediatric admission. The consequences of possible selection bias must be considered. However, the participants did not differ from the non-participants with regard to demographic factors, suggesting systematic recruitment bias was unlikely. Whilst the two cohorts were well matched for the body system involved in the primary illness, certain diseases are more likely to lead to multiple organ failure; they may have been over-represented in the PICU group. Importantly, we used a validated semi-structured interview (the CAPS-C) to quantify our main outcome of interest (PTSD in children). Whilst recall bias may have affected the results, it is unlikely the effects of such bias would differ between the two cohorts. The interviewers were not blind to whether children were admitted to the PICU or paediatric ward. However, this might be difficult to maintain when assessing PTSD.

This study was confined to one centre and paediatric care is likely to differ between hospitals; we must be cautious in the generalisation of these results. Whilst the total number of participants satisfied our a priori power calculation, this was reduced by restricting analysis of instruments to the age group for which they were intended and only including CAPS-C data, where no concern was expressed about response validity. Our results may be under-estimates of true differences between groups. However, it is also possible that, because of the large number of analyses and multiple outcome measures, some statistically significant findings may represent Type 1 errors. Nevertheless, despite the need for replication, our most striking finding (a higher prevalence of PTSD after PICU admission) has considerable face validity.

In conclusion, about one fifth of PICU-admitted children, (no ward admissions) and a quarter of PICU parents developed PTSD after discharge. PTSD symptoms were significantly higher in parents of PICU-admitted children. Perceived severity of illness, threat to life and length of admission were risk factors for PTSD.

Paediatricians and GPs may be advised to screen for PTSD symptoms in children discharged from PICU. Professionals should be aware that, despite resolution of the acute physical illness, disabling psychological symptoms may be present in a significant proportion of PICU-discharged children and their parents.

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