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## ORIGINAL ARTICLE

# Paediatric health-care professionals: Relationships between psychological distress, resilience and coping skills

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**Aim:** To investigate the impact of regular exposure to paediatric medical trauma on multidisciplinary teams in a paediatric hospital and the relationships between psychological distress, resilience and coping skills.

**Method:** Symptoms of post-traumatic stress disorder, secondary traumatic stress, depression, anxiety, stress, burnout, compassion satisfaction, resilience and coping skills were measured in 54 health professionals and compared with published norms.

**Results:** Participants experienced more symptoms of secondary traumatic stress ( $P < 0.01$ ), showed less resilience ( $P = 0.05$ ) and compassion satisfaction ( $\geq 0.01$ ), more use of optimism and sharing as coping strategies, and less use of dealing with the problem and non-productive coping strategies than comparative groups. Non-productive coping was associated with more secondary traumatic stress ( $r = 0.50$ ,  $P = 0.05$ ), burnout ( $r = 0.45$ ,  $P = 0.01$ ), post-traumatic stress disorder ( $r = 0.41$ ,  $P = 0.05$ ), anxiety ( $r = 0.42$ ,  $P = 0.05$ ), depression ( $r = 0.54$ ,  $P = 0.01$ ), and stress ( $r = 0.52$ ,  $P = 0.01$ ) and resilience was positively associated with optimism ( $r = 0.48$ ,  $P = 0.01$ ). Health professionals  $< 25$  years old used more non-productive coping strategies ( $P = 0.05$ ), less 'sharing as a coping strategy' ( $P = 0.05$ ) and tended to have more symptoms of depression ( $P = 0.06$ ).

**Conclusion:** Paediatric medical trauma can adversely affect a health professional's well-being, particularly those  $< 25$  years of age who make less use of positive coping strategies and more use of non-productive coping. These findings will assist the development of effective and meaningful interventions for health professionals working in paediatric hospitals.

**Key words:** multidisciplinary team; psychiatry/mental health; trauma.

## What is already known on this topic

- 1 Health-care professionals working with traumatically injured adults are at increased risk of experiencing negative psychological effects.
- 2 Research conducted in paediatric hospitals in the USA found staff to be at risk of experiencing compassion fatigue, burnout and secondary traumatic stress.
- 3 There is a growing national shortage of health-care professionals.

## What this paper adds

- 1 This paper uses a descriptive cross-sectional research design to assess prevalence rates and associations between psychological distress, resilience and coping skills in two multidisciplinary teams working in two different high acuity trauma units in a large children's hospital.
- 2 Younger health professionals ( $< 25$  years) experienced higher rates of concerning psychological symptoms. They reported less compassion satisfaction and used less functional coping strategies while demonstrating lower rates of resilience compared with their older and more experienced colleagues.
- 3 Our findings demonstrate that the use of functional coping strategies had a greater influence on the individual health professional's psychological well-being compared with a variety of other key factors.

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On a daily basis, health-care professionals are exposed to trauma such as witnessing acute medical trauma, performing painful medical procedures and dealing with end-of-life scenarios. With the pressures associated with large, complex caseloads, staff members are often unable to process their own reactions.<sup>1</sup> Paediatric medical traumatic stress refers to the psychological and physical responses experienced by children and

their families as a result of encountering pain, injury, serious illness and medical procedures which include invasive and frightening treatments.<sup>2</sup> The impact of this on health professionals caring for children and families is not clear. Health-care professionals working with traumatically injured adults are at increased risk of experiencing negative psychological effects,<sup>3–5</sup> but research investigating the well-being of multidisciplinary teams within paediatric hospitals is scarce. Children are often described as a vulnerable population in society. Paediatric health professionals recognise this, and in the context of trauma, they may be at a greater risk of experiencing psychological distress. With a growing national shortage of health-care professionals,<sup>6</sup> it is vital that efforts are made to understand and explore the factors affecting the mental health of our paediatric multidisciplinary teams.

Various terms have been used to describe the effects of occupational exposure to another person's trauma: secondary traumatic stress (STS), compassion fatigue, vicarious trauma and burnout. These terms refer to the cumulative effects of exposure to trauma, each covering a subtly different concept.<sup>7</sup> STS is the occurrence of emotional responses and symptoms associated with working with patients who have experienced trauma.<sup>7</sup> Symptoms of STS are similar to those of post-traumatic stress disorder (PTSD) and may include fear, sleep difficulties and avoidance of intrusive clinical images. The term STS is sometimes used interchangeably in the literature with the term compassion fatigue,<sup>7</sup> but 'compassion fatigue' differs slightly to STS as it also relates to the inability to provide empathy towards patients. In contrast, compassion satisfaction is the positive feelings associated with helping and caring for patients.<sup>7</sup> Burnout refers to emotional exhaustion and a decreased sense of accomplishment with professional tasks.<sup>7</sup> It is not specific to trauma work and can occur in any profession.

Three relevant studies in paediatric hospitals have been conducted in North America. A study found staff to be at risk of experiencing compassion fatigue, burnout and STS which were associated with increased length of employment and blurring of caregiver boundaries.<sup>5</sup> The other studies reported that women, third-year registrars and health professionals living alone or not in a relationship were at greater risk of developing more symptoms of burnout.<sup>6,8</sup> Thus, the literature within this area is sparse and often focuses on one aspect of exposure to trauma, such as symptoms of STS or burnout. To understand the magnitude of the problem, it is necessary to build on this North American work by measuring prevalence rates in all members of multidisciplinary teams, of several facets of suboptimal mental health, including depression, anxiety and stress, and looking at the relationship between the factors.

More investigation into pre-existing factors is also required to develop screening tools aimed at identifying those individuals at greatest risk. In order to develop interventions to maintain psychological health, we need to understand the potential barriers and facilitators to developing psychological distress.

Resilience refers to the capacity to positively adapt and cope despite adversity.<sup>9</sup> To date, no research has explored the role of resilience in buffering against psychological distress in multidisciplinary teams within paediatric hospitals. It is important to understand if resilience and positive coping strategies play a role in minimising the impact of exposure to paediatric medical

trauma, and whether these factors influence an individual's vulnerability to psychological distress. This knowledge would underpin the development of interventions for health professionals working in paediatric multidisciplinary teams.

This study posed three hypotheses: (i) there is a difference between the current psychological profiles of health-care professionals and that of comparison groups; (ii) pre-existing factors are associated with psychological responses in health professionals; and (iii) relationships exist between symptoms of psychological distress, resilience and coping strategies.

## Method

### Participants and procedure

Staff members at Princess Margaret Hospital (PMH), Western Australia, working with children with severe acquired brain injury or a burn injury were invited to participate in the study. PMH is the sole tertiary paediatric hospital in Western Australia. Participation was voluntary. All 68 eligible staff members were invited to participate and 54 (80%) agreed.

The burns total care unit had 291 admissions in 2011, and the Department of Paediatric Rehabilitation admitted 55 patients with acquired brain injury and spinal injury. Both units admit patients with high injury severity scores on a regular basis, suggesting staff members are exposed to medical trauma on a daily basis. Staff members were divided into two trauma exposure categories: direct exposure and indirect exposure. Those directly exposed had contact with both patient and family members, while those indirectly exposed had contact only with family members. Ward clerks represented the only group with indirect exposure to trauma in this sample. Staff recruited in this sample worked either at the burns total care unit or in the Department of Paediatric Rehabilitation, but not at both. Both units are similar in that they have a high turnover of patients with high injury severity scores; staff members on both units are offered the same support resources, work in multidisciplinary teams and have similar demographic profiles.

Ethics approval was received from the Ethics Committee of PMH (1855) and Edith Cowan University, and all participants provided informed consent.

### Measures

Several tools were selected to measure the various facets of the potential impact of paediatric medical trauma. All are screening tools and cannot provide a definitive diagnosis.

### Resilience

The 25 items of the Connor Davidson Resilience Scale (CD-RISC) are each scored on a five-point scale, with higher scores indicating greater resilience levels.<sup>10</sup> The CD-RISC has sound psychometric properties, demonstrating good internal consistency (Cronbach's alpha 0.89) and test retest reliability (intra-class correlation coefficient of 0.87).<sup>10</sup> No data have been collected on the Australian general population; comparisons were made with normative data from the US general population ( $n = 577$ ).<sup>10</sup>

## Post-traumatic stress disorder

The widely used 22-item Impact of Events Scale Revised (IES-R)<sup>11</sup> represents all Diagnostic and Statistical Manual of Mental Disorders Fourth edition symptom clusters for PTSD. Good reliability has been reported with Cronbach's alpha's ranging from 0.85, 0.88, 0.90 and 0.95 for each symptom cluster.<sup>12</sup> Scores can take values 0–12, with higher scores indicating greater distress. No data have been collected on the Australian general population; comparisons were made with 138 adults in the US general population who had no trauma history.<sup>13</sup> To enable comparison between the two populations, scoring according to the earlier version of the assessment, Impact of Event Scale was used. Scoring for the subscale hyperarousal was according to the IES-R.

## Depression, anxiety and stress

The Depression Anxiety Stress Scale (21),<sup>14</sup> in which higher scores indicate more symptoms, strongly correlates with other measures of depression and anxiety, indicating good convergent validity.<sup>14</sup> Good reliability has been reported with Cronbach's alpha's ranging from 0.82 for anxiety, 0.90 for stress and 0.93 for the total scale.<sup>15,16</sup> Comparisons were made with normative data from an Australian population sample of 497.<sup>17</sup>

## Secondary traumatic stress, compassion satisfaction and burnout

Professional Quality of Life Scale (ProQoL)<sup>7</sup> is a 30-item self-report measure in which higher scores indicate a worse quality of life. The alpha reliability for the Compassion Satisfaction scale is  $r = 0.88$  ( $n = 1130$ ), the alpha reliability for Burnout scale is  $r = 0.75$  ( $n = 976$ ) and the Compassion Fatigue scale is  $r = 0.81$  ( $n = 1135$ ).<sup>7</sup> No Australian normative data have been collected for this measure. Scores on the ProQoL were converted to  $t$ -scores to compare the sample data with a data bank of 760 cases, created from multiple studies.<sup>7</sup> Women were selected as a comparison group over men because of the gender bias of the PMH sample.

## Coping style

Coping Scale for Adults (CSA)<sup>18</sup> identifies 18 coping strategies categorised into four coping styles: dealing with the problem, optimism (thinking positive), sharing (problem solving with the help of others) and non-productive coping. Dealing with the problem is a coping style which 'encompasses working hard and solving the problem while maintaining a social dimension characterised by relaxing and indulging in humorous diversions and physical recreation as well as attempting to improve the significant relationships in one's life. It also includes the use of techniques which aim at the maintenance of self esteem' p. 36,<sup>18</sup> whereas non-productive coping involves strategies such as 'worry, keep to self, self blame, wishful thinking, ignore the problem and tension reduction' p. 36.<sup>18</sup> Higher scores indicate greater use of coping strategy. The CSA has good psychometric properties with internal consistency ranging from  $\alpha = 0.69$ – $0.92$ .<sup>18</sup> Normative data of a sample of 371 Australian adults were used as comparison.<sup>18</sup>

Additional information, collected by self-administered questionnaire, included gender, age, ethnicity, occupation, duration

of service at PMH, troubles experienced at work and whether a mental illness had ever been diagnosed.

## Data analysis

Visual inspection of histograms, Shapiro–Wilk and Kolmogorov–Smirnov tests confirmed that none of the outcome variables (except resilience and compassion satisfaction) were normally distributed. For this reason, the data were described with non-parametric statistics. We were, however, restricted to using parametric statistics ( $t$ -tests) when comparing our data with previously published control data as most articles did not report median values. Cohen's  $d$  (effect size) was reported for the  $t$ -tests to indicate the magnitude of the difference between sample mean and population mean. The H statistic, computed from the Kruskal–Wallis one-way anova, ranked test corrected for ties, examined the significance of differences between outcome variables in groups defined by pre-existing factors such as age, occupation and length of employment. This is an exploratory, descriptive study, and we found that there was a clear break between those aged less than 25 years old and those who were at least 25 years old. This cut point is also described in the literature as the turning age where individuals begin to establish a career for themselves and were therefore deemed appropriate to divide the sample into such age groupings.<sup>5</sup> Spearman's Rho estimated correlations between outcome variables. A  $P$ -value  $< 0.05$  was considered statistically significant. All analyses were performed using SPSS version 19 (IBM Corp., Armonk, NY, USA).

## Results

The majority of participants (72.7%) were born in Australia, and 40.7% were married. The mean length of employment at PMH was 5 years and 74.1% worked full time. Four health professionals reported a previously diagnosed mental illness. The majority of the participants were female (83.3%) which is representative of the work force at PMH, Table 1.

The mean scores for PTSD, intrusion and avoidance were slightly, but not significantly, lower than US population means (Table 2). The mean score for depression was slightly, but not significantly, lower than Australian population mean scores, and there was no difference between mean scores for anxiety. Twenty-one percent of the sample experienced above-average symptoms of depression of whom 11% experienced mild symptoms, 6% moderate symptoms and 4% severe symptoms. Above-average symptoms of anxiety were reported by 17% of the sample, of whom 4% experienced mild symptoms, 7% moderate symptoms and 6% severe symptoms. Nineteen percent of the sample experienced above-average symptoms of stress, of whom 7% reported mild symptoms of stress, 6% reported moderate symptoms and 6% reported severe symptoms.

Compared with population means, participants demonstrated statistically significant more symptoms of STS, lower resilience, greater use of optimism and sharing, and less use of 'dealing with the problem' and non-productive coping; they also demonstrated statistically significant less compassion satisfaction and had slightly, but not statistically significant, more symptoms of burnout (Table 2).

### Pre-existing factors, psychological distress, resilience and coping strategies

Symptoms for health professionals aged 25–64 did not vary greatly with age, but differed from those aged less than 25 years,

**Table 1** Sample demographics distribution of gender, age and occupation

Sample descriptor	<i>n</i>	%
<b>Gender</b>		
Female	45	83.3
Male	9	16.7
<b>Age</b>		
Less than 25	8	14.8
25–34	22	40.7
35–44	11	20.4
45–54	12	22.2
55–64	1	1.9
<b>Occupation</b>		
Doctor	6	11.1
Nurse	23	42.6
Occupational therapist	6	11.1
Physiotherapist	3	5.6
Social worker	2	3.7
Speech pathologist	2	3.7
Pharmacist	1	1.9
Play co-ordinator	4	7.4
Teacher	2	3.7
Therapy assistant	2	3.7
Ward clerks	3	5.6

see Table 3. Health professionals under the age of 25 years demonstrated higher mean and median symptoms of PTSD, depression, anxiety, stress, burnout and STS, and lower resilience and compassion satisfaction than those aged 25–64 and were significantly more likely to use non-productive coping strategies ( $P = 0.05$ ), less likely to share ( $P = 0.05$ ), and had a tendency towards more symptoms of depression ( $P = 0.06$ ). No other significant differences in outcome measures were found between groups defined by gender, occupation or length of employment.

Staff who reported difficulties at work with their superior, a colleague or a colleague under their supervision demonstrated significantly lower levels of resilience ( $P = 0.037$ ) and higher levels of stress ( $P = 0.031$ ) than staff who did not report troubles at work.

There were significant positive correlations between PTSD, depression, anxiety, stress, burnout and STS which were particularly strong for symptoms of stress and symptoms of both depression and anxiety (see Table 4). There was also a moderately strong correlation between compassion satisfaction and resilience, and, as anticipated, both these factors were negatively correlated with all other outcome measures.

Non-productive coping strategies were positively correlated with all adverse psychological outcomes and negatively associated with both resilience and (non-significantly) with compassion satisfaction, see Table 5. However, the three positive coping strategies were not significantly negatively correlated with adverse psychological outcomes, the exception being burnout with optimism. Of the positive coping strategies, dealing with the problem was significantly positively correlated with compassion satisfaction, and optimism was associated with resilience.

**Table 2** Outcomes compared with population reference groups

Variable	Sample	Reference group	Mean difference (CI)	<i>d</i> †	<i>P</i>
	<i>M</i> (SD)	<i>M</i> (SD)			
PTSD	7.43 (7.12)	8.10 (12.3) <sup>12</sup>	-0.67 (-2.67, 1.33)	-0.05	0.50
Intrusion	3.23 (3.35)	3.9 (6.2) <sup>12</sup>	-0.68 (-1.63, 0.26)	-0.11	0.15
Avoidance	3.78 (3.79)	4.2 (6.8) <sup>12</sup>	-0.41 (-1.48, 0.65)	-0.06	0.44
Hyperarousal	0.30 (0.47)	Not available			
Resilience	74.57 (12.35)	80.4 (12.8) <sup>9</sup>	-5.83 (-9.23, -2.42)	-0.46	<0.01
Depression	2.12 (2.94)	2.21 (3.60) <sup>14</sup>	-0.09 (-0.91, 0.72)	-0.02	0.82
Anxiety	1.48 (2.55)	1.48 (2.60) <sup>14</sup>	0.00 (-0.70, 0.70)	0.00	1.00
Stress	3.94 (3.93)	3.79 (4.10) <sup>14</sup>	0.15 (-0.93, 1.24)	0.04	0.78
Compassion satisfaction	39.72 (06.01)	50.14 (9.77) <sup>7</sup>	10.42 (-12.10, -8.72)	1.07	<0.01
STS	58.59 (6.88)	50.18 (10.15) <sup>7</sup>	8.41 (6.47, 10.34)	0.83	<0.01
Burnout	51.02 (6.94)	50.37 (10.26) <sup>7</sup>	0.65 (-1.28, 2.58)	0.06	0.50
Dealing with the problem	66.83 (10.09)	92.38 (14.31) <sup>15</sup>	-25.55 (-28.4, -22.6)	-1.79	<0.01
Optimism	52.01 (9.58)	41.39 (8.06) <sup>15</sup>	10.63 (7.99, 13.27)	1.32	<0.01
Sharing	50.72 (19.83)	27.82 (7.52) <sup>15</sup>	22.90 (17.38, 28.42)	3.04	<0.01
Non-productive coping	46.30 (10.51)	66.04 (15.73) <sup>15</sup>	-19.74 (-22.62, -16.84)	-1.25	<0.01

†Cohen's *d* (effect size) was reported for the *t*-tests to indicate the magnitude of the difference between sample mean and population mean. CI, confidence interval. SD, standard deviation; STS, secondary traumatic stress; PTSD, post-traumatic stress disorder.

**Table 3** Outcomes by age <25 and ≥25 years

	PTSD	PTSD	Resilience	Resilience	Depression	Depression	Anxiety	Anxiety	Stress	Stress	Compassion satisfaction	Compassion satisfaction
	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years
Age	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years
n	6	44	8	45	7	45	8	46	8	45	7	44
Mean (SD)	2.49 (1.63)	1.13 (1.28)	65.25 (18.01)	76.22 (10.50)	6.86 (5.27)	3.82 (5.92)	3.75 (5.99)	2.83 (4.99)	10.25 (8.64)	7.45 (7.74)	36.86 (8.53)	40.14 (5.50)
Median	3.08	0.63	67	76	6	2	2	0	10	4	39	41
Range	0-3.92	0-5.42	41-91	56-96	0-14	0-24	0-18	0-18	0-26	0-28	24-50	29-50
	STS	STS	Burnout	Burnout	Dealing with the problem	Dealing with the problem	Non productive	Non productive	Optimism	Optimism	Sharing	Sharing
Age	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years	<25 years	25-64 years
n	7	44	7	44	7	43	7	46	7	46	7	45
Mean (SD)	20.71 (5.88)	17.50 (4.20)	23.43 (5.77)	21.00 (4.80)	61.45 (11.76)	67.70 (9.66)	53.33 (12.73)	45.23 (9.86)	48.79 (13.01)	52.51 (9.04)	35.36 (23.52)	53.11 (18.36)
Median	18	16	23	22	66.14	68.43	56	43.64	50.75	51.12	32.50	52.50
Range	14-29	11-27	16-33	12-31	42-72.86	48.43-84.00	27.86-65.14	28.43-69.86	34-70.75	35.25-77	7.50-75.00	10-105

This is an exploratory, descriptive study and we found that there was a clear break between those aged less than 25 years old and those who were at least 25 years old. This cut point is also described in the literature as the turning age where individuals begin to establish a career for themselves.<sup>5,19</sup> SD, standard deviation; STS, secondary traumatic stress; PTSD, post-traumatic stress disorder.

Dealing with the problem was significantly associated with both optimism and sharing. Non-productive coping showed little association with the three positive strategies, see Table 6.

The only significant or clinically meaningful relationships between demographic variables and psychological factors are shown in Table 7. With increasing length of employment (and age), health professionals were more likely to share their problems and deal with them productively, less likely to have symptoms of anxiety or use non-productive coping strategies, and reported greater compassion satisfaction.

## Discussion

In relation to hypothesis (i), no significant differences were identified between levels of PTSD, depression, anxiety and stress when comparing health professionals with the general population. However, cumulative exposure to paediatric medical trauma places health professionals at risk of developing more symptoms of STS and burnout while having less resilience and compassion satisfaction than general population samples. These findings are consistent with previous studies reporting the impact of trauma exposure on various health-care professionals.<sup>5,20-22</sup> Acknowledging the impact of paediatric medical trauma on health professionals' mental health is an important step towards maintaining a healthy workforce.

To test hypothesis (ii), this study compared health professionals aged 25 years or above with health professionals aged below 25 years. Those aged less than 25 years experienced more symptoms of PTSD, depression, anxiety, stress, burnout and STS, and had less compassion satisfaction, used more non-productive and sharing coping strategies, and demonstrated lower levels of resilience. These results indicate that young health professionals are vulnerable to experiencing significant distress, and interventions are required to support them. Supporting health professionals as they transition from university into clinical practice may be an important time for occupational assistance. Further longitudinal research is required to determine if young health professionals leave the profession after experiencing distress, so that only the most resilient remain, or if they acquire more productive coping skills as they mature and learn to adjust to the work environment. High staff turn over rates may suggest the former, in which case more investigation is required to understand this complex and poorly researched area of occupational hazard.

In contrast to US findings,<sup>5</sup> length of employment had a moderate, significant and positive relationship with productive coping strategies and compassion satisfaction. The US findings suggest a model of cumulative stress, in which continued exposure to trauma over time is associated with increasing symptoms of distress,<sup>5,23</sup> whereas results from this study support recent research suggesting that cumulative traumatic exposure can instead lead to vicarious post-traumatic growth<sup>24,25</sup> with empathy found to be a predictor of growth.<sup>24</sup> A component of compassion satisfaction is a health professionals' ability to empathise with patients, and findings from this study show a moderate, positive relationship between length of employment and compassion satisfaction. A randomised controlled trial found that it is possible to teach physicians effective empathy skills.<sup>8</sup> The practice of empathy was found to be associated with

**Table 4** Correlations (Spearman's Rho) between outcome variables

	Resilience	PTSD	Depression	Anxiety	Stress	Burnout	STS	Compassion satisfaction
Resilience	1.000	–	–	–	–	–	–	–
PTSD	–0.356*	1.000	–	–	–	–	–	–
Depression	–0.507**	0.608**	1.000	–	–	–	–	–
Anxiety	–0.445**	0.362**	0.546**	1.000	–	–	–	–
Stress	–0.500**	0.518**	0.773**	0.719**	1.000	–	–	–
Burnout	–0.649**	0.483**	0.591**	0.469**	0.576**	1.000	–	–
STS	–0.441**	0.461**	0.390**	0.437**	0.437**	0.597**	1.000	–
Compassion satisfaction	0.426**	–0.048	–0.201	–0.244	–0.123	–0.533**	–0.284*	1.000

\*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed). STS, secondary traumatic stress; PTSD, post-traumatic stress disorder.

**Table 5** Correlations between coping strategies and psychological factors

	Resilience	PTSD	Depression	Anxiety	Stress	Burnout	STS	Compassion satisfaction
Dealing with the problem	0.220	0.238	–0.185	0.099	0.410	–0.170	0.169	0.300*
Optimism	0.482**	–0.091	–0.179	–0.122	–0.231	–0.370**	–0.046	0.172
Sharing	0.119	–0.064	–0.236	–0.065	–0.022	–0.082	0.042	0.260
Non-productive coping	–0.322*	0.411**	0.542**	0.417**	0.519**	0.453**	0.504**	–0.210

\*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed). STS, secondary traumatic stress; PTSD, post-traumatic stress disorder.

**Table 6** Correlations between coping strategies

	Dealing with the problem	Optimism	Sharing	Non-productive coping
Dealing with the problem	1.000	–	–	–
Optimism	0.394**	1.000	–	–
Sharing	0.421**	0.136	1.000	–
Non-productive coping	0.096	–0.124	–0.174	1.000

\*Correlation is significant at the 0.05 level (two-tailed); \*\*Correlation is significant at the 0.01 level (two-tailed).

**Table 7** Linear correlations between demographic variables and psychological factors

	Dealing with the problem	Non-productive coping	Sharing	Anxiety	Compassion satisfaction
Age	0.295*	–0.192	0.320*	–0.224	0.294*
Length of employment	0.333*	–0.284**	0.483**	–0.280*	0.348*

\*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed).

improvements in patient satisfaction,<sup>26</sup> reductions in medical errors<sup>27</sup> and malpractice claims,<sup>26</sup> suggesting that it is an important skill to teach all health professionals.

Individuals who experienced difficulties at work, including difficulties with their superior and colleagues, demonstrated significantly less resilience and more stress. These findings support research reporting increased symptoms of emotional exhaustion and depersonalisation in nurses who experience negative perceptions of their environment and decreased supervisor support.<sup>28</sup> Our research may provide new evidence and direction for paediatric health services when they review their practices to improve staff well-being and function.

In relation to hypothesis (iii), non-productive coping was associated with significantly higher levels of STS, burnout, PTSD, anxiety, depression and stress, while resilience was associated with positive coping strategies, particularly optimism. Findings suggest that coping strategies had a greater influence on health professionals' psychological profiles than pre-existing factors such as gender, occupation, and length of time employed at PMH. In this study, health professionals used 'dealing with the problem' as a coping strategy significantly less than the general population. Results suggest that staff members are less willing to problem solve or resolve conflicts as a first point of action. These results are consistent with research conducted in the USA which suggests that paediatric health professionals who use more effective self-care coping strategies have lower stress levels.<sup>20</sup> In a qualitative research sample of 20 paediatric nurses, coping strategies such as exercise, meditation and journaling were reported to be critical in managing symptoms of burnout and compassion fatigue.<sup>29</sup> In order to prevent the development of STS, burnout, PTSD, anxiety, depression and stress in health professionals, it is imperative that effective interventions are recommended.

### Strengths and limitations

The high response fraction (approximately 80%) provided an accurate representation of the two medical departments. A control group was not utilised in this design, limiting our ability to draw definite conclusion about the impact of paediatric medical trauma. This effect was however minimised by selecting outcome measures with normative data available. It should be noted that Australian normative data were not always available, in which case US data were used which may limit the validity of the comparisons. The cross-sectional design means that conclusions cannot be drawn about the causal direction of identified relationships highlighting the need for prospective longitudinal research. In addition, small numbers in subgroups such as those <25 years old suggest findings should be interpreted cautiously, and further research with larger numbers is required. This was an exploratory study in which we wanted to describe the experience of health professionals exposed to paediatric trauma. Despite recruiting all available willing participants, this study is underpowered for many desirable subgroup analyses, but being the first such study in Australia, we wish to identify any associations that may be useful in promoting psychological resilience in paediatric health professionals exposed to trauma. We therefore consider that falsely rejecting possible associations is a lesser evil than accepting false associations, in which case setting

statistical significance at the traditional value of  $P < 0.05$  (i.e. a 5% likelihood that the association arose as a result of chance sample selection) must be considered conservative, and correction for multiple comparisons is not appropriate. Some of these associations may be the result of chance sample selection, identifying which of these associations are not generalisable must be the subject of research in independent samples. Therefore, all associations are reported as we did not want to miss any associations that may prove to be clinically useful.

### Conclusion

Findings from the present study highlight that exposure to paediatric medical trauma affects health professionals' well-being and mental health, particularly those under 25 years of age, and that resilience is associated with the use of positive coping strategies, particularly optimism. The relationships identified in this research may assist in developing organisational systems to facilitate optimal mental health and coping strategies in health professionals, thereby reducing sick leave, absenteeism, early retirement and staff turnover, resulting in the maintenance of a healthy workforce and ameliorating shortages of health professionals in Australia.

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