

A Comparison of Quality of Life and Support Mechanisms After Childhood Burn Injuries in Asian and European Countries: A Systematic Review

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Abstract

Background: Childhood burns are the leading cause of unintentional injuries, with more incidences in Asian than in European countries. This systematic review aims to compare the differences in extent and type of burns in children from Europe and Asia, along with the differences in the coping strategies and the quality of life these children possess after the event of the burn.

Methods: This systematic review was conducted along the PRIMSA guidelines. We systematically searched DOAJ, Google Scholar, Ingentaconnect, Jurg, Popline, Prof Search, Pubmed, Pubmed Abstract, Pubpsych, Pakmedinet and PMC on 10th May 2016. Studies were selected if they met the following criteria: (1) must be based in Asia or Europe (2) must be related to burns (3) must be related to children (4) must not be treatment specific (5) must be in English (6) must be a published in a journal (not in a

conference). A self-made proforma was used to extract data for mean duration of hospitalization, extent of burns, coping strategy, quality of life of paediatric burn victims, psychosocial effects, family of burn victims, educational impact post burn in children, post-traumatic stress disorder among burned children and altered pain sensations among burned children.

Findings: European children are more likely to be burnt by scalds than Asian children. European children suffer from superficial burns whereas Asian children suffer from deep burns. Situation in Asian children is intensified by the fact that there are fewer burn centres per capita and have low funds for post-burn care. In addition to it, many burnt children are not hospitalized in Asian countries. Parents of burnt children from both continents show immense feeling of guilt and inadequacy. Almost one-fifth of European burnt children suffered from post traumatic stress disorder. There is altered perception of pain in children who had experienced burns. European burn centres are more concerned about psychological aspects of children whereas there is a trend of child abuse in Asian countries.

Interpretations: A greater body of research is carried out on this issue in European countries, showing an eagerness on behalf of the health community to provide superior care for the victims of burns.

Mesh Terms: Childhood burn Extent of Childhood Burn·Childhood Burns in Europe ·Childhood Burns in Asia·Childhood Burns and Quality of Life·Types of Childhood Burns Quality of Life after Treatment of Childhood Burns in Europe and in Asia Childhood burns in Developed Countries Childhood Burns in Developing Countries.

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All Authors have contributed in Study Design, Data Collection, Data Analysis, Data Interpretation, Manuscript Writing and Approval.

Introduction

Burns are one of the leading types of unintentional childhood injuries worldwide.¹⁻³ The incidence of childhood burns is greater in developing Asian countries as compared to European Countries, where public awareness of child safety measures is greater.^{4,5} Numerous researches have attempted to explore the different dimensions of how a burn attained during ones early years affects them throughout life.⁶ A smaller number has explored psychosocial support mechanisms for these children.⁷

A disproportionately larger contribution to the literature relating to this topic was made by European Institutes. In this Systematic Review, we have compared the body of work originating from Asian and European Countries and attempted to consolidate the findings. This comprehensive review will benefit medical professionals and parents in designing/implementing newer mechanism to improve QOL of the children affected by burns. Moreover, no systematic review has been done on this topic. We aimed to compare three areas. First, differences in extent and type of burns in children from Europe and Asia. Second, differences in coping strategy the children with burn undergo in these two continents. Thirdly, differences in the quality of life for these children post treatment.

Methods

Search Strategy and Selection Criteria

This systematic review was conducted in accordance with the PRIMSA Checklist guidelines.⁸ To identify eligible studies we searched DOAJ, Google Scholar, Ingentaconnect, Jurg, Popline, Prof Search, Pubmed, Pubmed Abstract, Pubpsych, Pakmedinet and PMC on 10th May 2016. We used Mesh terms to search those studies: "Childhood burn", "Extent of Childhood Burn", "Childhood Burns in Europe", "Childhood Burns in Asia", "Childhood Burns and Quality of Life", "Types of Childhood Burns", "Quality of Life after Treatment of Childhood Burns in Europe and in Asia", "Childhood burns in Developed Countries" and "Childhood Burns in Developing Countries." No limits regarding language or publication were applied. The selection and exclusion of papers is shown in figure 1.

Authors independently reviewed citations, abstracts and full articles to select eligible studies for review. Consensus was used to resolve disagreements on the eligibility of abstract reviews. Studies were selected if

they met the following criteria: (1) must be based in Asia or Europe (2) must be related to burns (3) must be related to children (4) must not be treatment specific (5) must be in English (6) must be a published in a journal (not in a conference).

Data Collection Tool

MHM and SK developed a self-made proforma on the basis of our research protocol and we used this proforma to extract data from individual 12 studies. The proforma included differences in extent and type of burns in children from Europe and Asia, differences in the coping strategy and the quality of life these children possess after the event of the burn.

Data Extraction

Data were extracted for the mean duration of hospitalization, extent of burns in Europe, extent of burns in Asia, coping strategy in Europe, coping strategy in Asia, quality of life of pediatric burn victims in Europe, quality of life of pediatric burn victims in Asia, psychosocial effects in Europe, psychosocial effects in Asia, family of burn victims in Europe, family of burn victims in Asia, educational impact post burn in children from Europe, educational impact post burn in children from Asia, posttraumatic stress disorder among burned children from Europe, post-traumatic stress disorder among burned children from Asia, post-burn pain among burned children from Europe and post-burn pain among burned children from Asia.

Synthesis of Results

Synthesis of results was done manually by MHM and SK. A forest plot showing the duration of hospitalization was made on Microsoft Excel by MHM using the means from different studies.

Results

Of 603 studies screened, 26 were considered potentially eligible (Figure 1). Fourteen trials were excluded because they assessed childhood burns outside Europe and Asia. We used 12 studies to do this systematic review and 5 out of 12 studies to do meta-analysis. Titles of these 12 studies are shown in figure 1. We found four articles from Asia and eight from Europe as shown in table 2. Of the 4 articles from Asia, 3 were

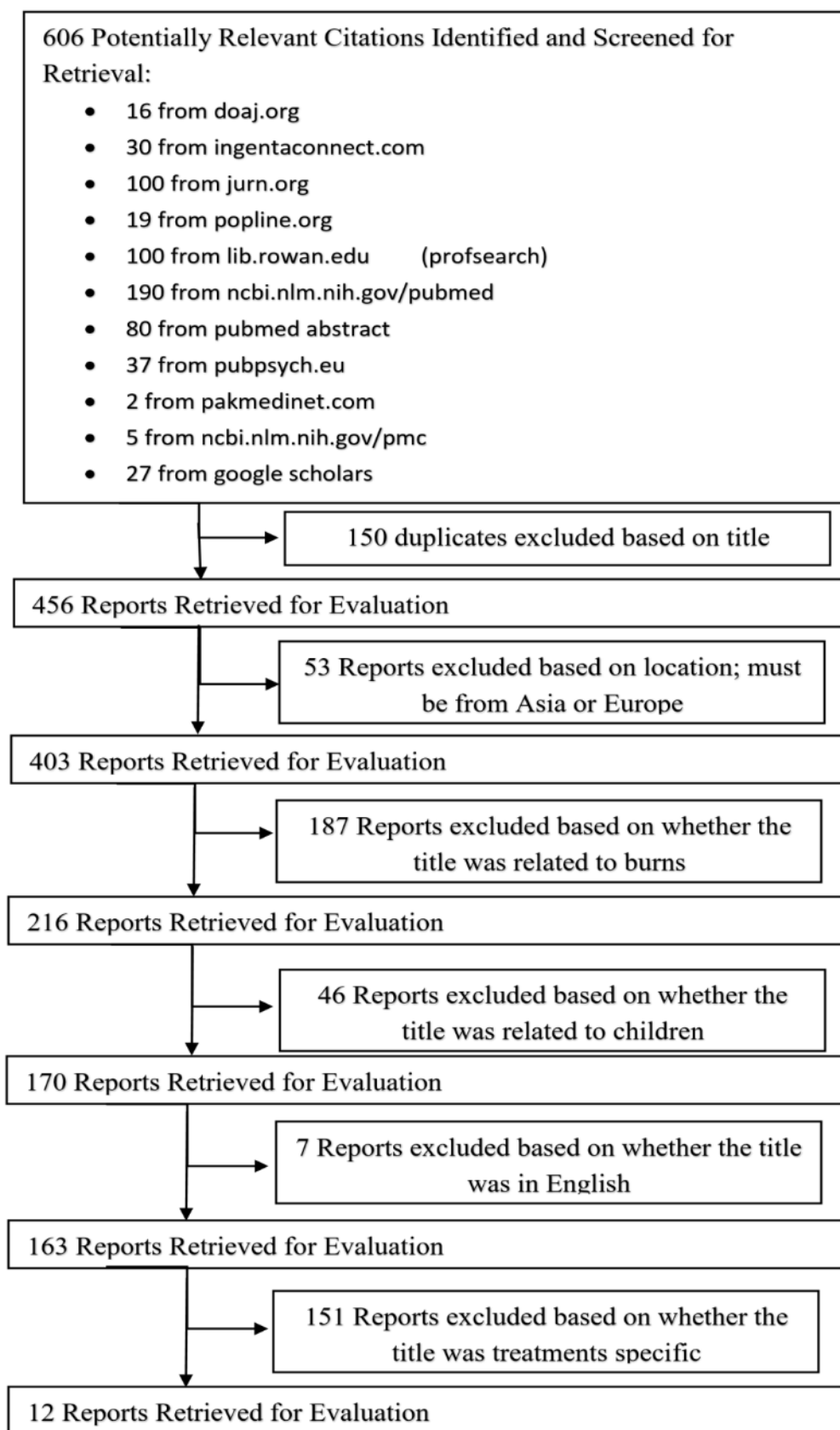


Fig. 1: Flow diagram of literature search results.

Table 1: Article number and titles of selected articles.

Article Number (from 606)	Title
53	Brief report: Quality of life is impaired in pediatric burn survivors with posttraumatic stress disorder
63	Burn Ed: parental, psychological and social factors influencing a burn-injured child's return to education.
85	Childhood burn injury and suffering of affected families
117	Consequences of childhood burn: Findings from the largest community-based injury survey in Bangladesh
118	Coping style, personality and adolescent adjustment 10 years post-burn
133	Do burn injuries during infancy affect pain and sensory sensitivity in later childhood?
136	Do school-aged children with burn injuries during infancy show stress-induced activation of pain inhibitory mechanisms?
200	Health seeking behaviour of parents of burned children in Bangladesh is related to family socioeconomics.
244	Long-term psychosocial sequelae of paediatric burns
330	Psychological Aspects of Paediatric Burns (A Clinical Review)
336	Quality of life after burns in childhood (5-15 years): Children experience substantial problems
357	Self-and parent-perceived stigmatisation in children and adolescents with congenital or acquired facial differences

Table 2: Shows regions to which the articles belong.

European		Asian
53	136	85
63	244	117
118	336	200
133	357	330

from Bangladesh and 1 was from India. The Vann diagram shows the topic addressed by these articles.

Statistical Analysis

We used 5 studies to find average length of hospital stay out of which 2 were from Asia and 3 were from Europe. Length of hospital stay was plotted as forest plot (figure 3). It showed no significant difference between duration of hospitalization in two continents which depends only on the severity of burns.

Findings

Extent of Burns in Europe

Across two studies^{9,10} it was demonstrated that in Europe, male children were almost twice as likely to suffer a burn injury as compared to female children. Burns involved various areas of the body including face, chest, arms, hands, torso, thighs, buttocks, and feet.¹⁰ The total body surface area affected by burns ranged from 1.5 to 13%¹⁰ the average body burn was 11.9%.³ Across the articles facial involvement in European pediatric burns ranged from 44.2%⁹ to greater than 50%.⁴ A majority of the burns suffered by the paediatric population where scalds (51.2%⁹ and 90.7%³), in one article 34.9% of burns were due to fire.⁹ Of all children who had skin grafts following burn injury, only 25.6% required more than one skin graft.⁹ Mothers were present at the time of injury in 46% of incidences.⁹ Only two articles explored the socioeconomic determinant of burns in these European countries; both showed that almost half of all children with childhood

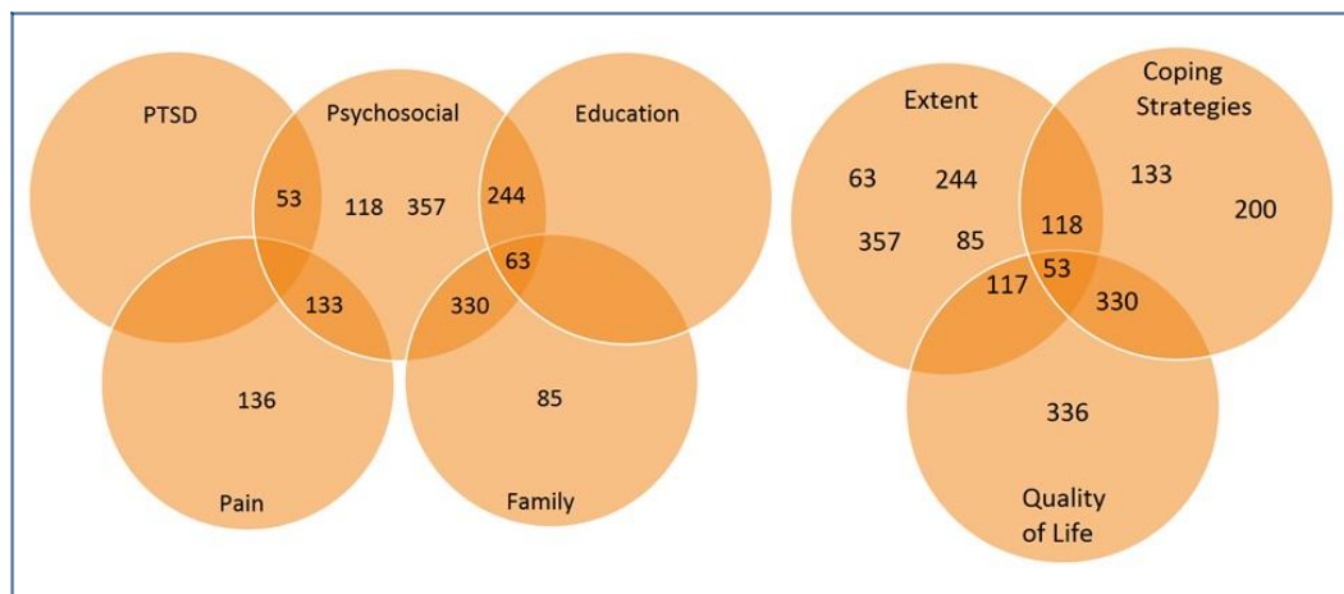


Fig. 2: Venn diagrams showing the topics related to burns covered by the Articles.

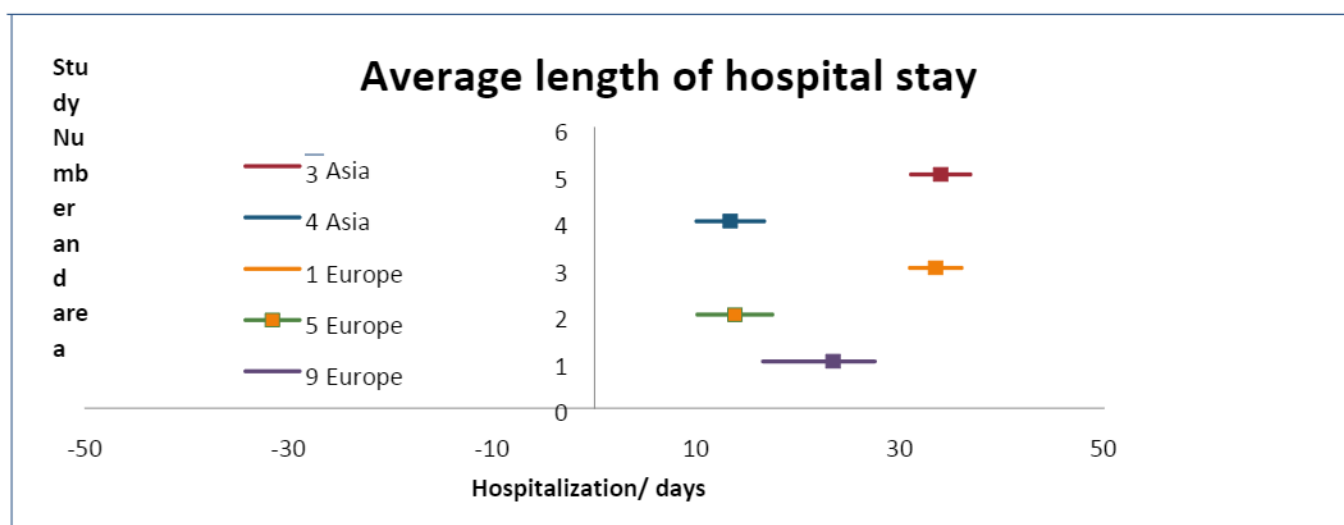


Fig. 3: Average length of hospital stay.

burns came from middle class families and surprisingly only 11.6% to 13% of children with burns were from lower class backgrounds.

Extent of Burns in Asia

In Asian countries, approximately 2/3rd of paediatrics burn victims are female (62%).⁵ A disproportionate percentage (80%) of childhood burns occur in villages.⁵ Fire is the biggest contributor (68%) to burns followed by electrocution (11%). Scalds make up a mere

8% of all burns.⁵ The majority of these burn victims come from poor socioeconomic backgrounds.⁶ Only 2% of burns lead to permanent disability; 65% of them were due to injury to arms and hands.⁶ 92% of burns were not hospitalized.⁶ It was also mentioned that 50% of burns happen to the leg and thigh, 25% to the arms and hands and 12% to abdomen/pelvic regions.

Coping Strategy in Europe

The coping strategies in Europe for children with bur-

ns are: compression therapy (100%), splints (34.9%), physical therapy (30.2%), occupational therapy (20.9%), psychotherapy (4.7%) and plastic and reconstructive surgery (18.6%).⁹ Compression garments were used in severe burns.⁷ It was found that more agreeable personalities had poorer coping strategies⁸ and that children with burns have greater coping abilities than controls.^{8,9}

Coping Strategy in Asia

Coping strategies mentioned included wound breakdown, dressing changes, exercises, splints, pressure garments, a hypothetical burn camp for interaction of burn children and child psychiatrist. The articles did not elaborate the percentage of the paediatric burn victims used these.

Quality of Life of Paediatric Burn Victims in Europe

With regards to quality of life for burn victims from the paediatric population we found that articles differed in the outlook they presented. The dominant view is that children who recovered from burns have near normal health related quality of life (HRQOL).⁹ It was also suggested that social functioning was the deficiency that was present and this was mainly the outcome of the negative reactions that others showed upon seeing their burn scars.⁹ Other studies show that most parents report that their children mostly complain about Itch and appearance.¹⁰ 6% of parents reported mobility issues, 9% of parents reported problems with their children being able to take care of themselves and 11% of parents said their children could not preform normal activities.¹⁰ 18% of children reported pain/discomfort and 20% reported anxiety and depression.¹⁰ It must be mentioned that reporting of suboptimal outcomes most frequently would occur if parents had a child with extensive burns, recent burns or a daughter who suffered from burns.¹⁰

Quality of Life of Paediatric Burn Victims in Asia

In Asia 16% of patients require assistance with daily activities for one to three months.⁶ 19.9% of children missed school for extended period of time.⁶ 8.9% of burnt children were working and of them 18% were absent from work for 1 – 3 months.⁶ Reconstructive surgery began mostly one year following the burn inj-

ury and continued for many years.⁶ It was found that for treatment of severe burns, the family needed to spend \$462.¹¹ This is a significant amount considering majority of families in this region whom have the misfortune of having their children suffer burns are often earning \$67 a month.⁶

Psychosocial Effects in Europe

Amongst this paediatric population 20.9% of patients remembered the event in which they were burnt and 25.3% remembered hospitalization. Also, 23.1% showed fear of hot water and fires, whilst 42.9% are just cautious. 20% of children with burns had difficulties in contact with members of the opposite gender, 33% would hide scars in public and 5.5% of children with burns had no memories of how they got their scars. It was noted that post-burn people do not have any issue with hypo-pigmentation.³ Victims of childhood burns complained of disturbed sleep, depression and anxiety, made worse by the uncertainty of recovery. This had the knock on effect of causing parental anxiety. Professional care that promoted physical recovery was found to relieve parental anxiety and parents rated it as 'Ideal Care'. Soon after slight physical and psychological recovery, children were eager to return to normal life; like going to school, but the main barriers remained i.e. psychological issues arising from altered physical appearance and situational changes. The mothers of these children professed that they felt guilty and were over-cautious with respect to that child.⁸ Mothers were present during the burn event 46% of the time.⁹ It was noted that personalities that were less agreeable, had better passive coping skills, as did children burned during infancy and young girls.^{8,12} After 10 years, adolescents with childhood burn were no longer at risk of depression and behaviour changes.¹⁶ Emotional stability is an important factor for recovery after burn.^{16,21} Severely burned children have more behavioural issues.²³ Some post burn people have difficulty in choosing profession.¹¹ Adolescents with facial burns have poor self-image that those with congenital defects.^{22,23}

Patients would be more likely to remember the period of hospitalization and have memories of the pain if they were older than 3 years at the time of burn. With regard to ICU burn patients 28.6% had memories of pain, 14.3% remembered the incident and 42.9% had memory of hospitalization.¹¹

Psychosocial Effects in Asia

Psychotherapy of paediatric burns aims to overcome anxiety, stigma, promote positive self-image, help children come to terms with their situation and assist reconstruction and rehabilitation. However, burn centres have limited funds for psychosocial services. The therapeutic strategy is breaking links between cognition, emotion and behaviour. Then it is desired to replace them with more adaptive thought and behaviour patterns through cognitive behaviour therapy, family support therapy, psycho-education and psychopharmacology.¹⁹ All psychosocial effects are worsened by the fact that children with burns looked more normal at acute discharge than one year post burn.¹¹

Family of Burn Victims in Europe

The guilt and anxiety experienced by parents throughout both the burn and the healing process led them to question their ability to be good parents. Parents often expressed being unable to effectively protect their children and would become over anxious when allowing their children to be involved in activities that could be dangerous in any way.

Family of Burn Victims in Asia

Burns place an immense strain on families, whether it is the loss of working hours or physical stress and PTSD in children.¹³

Parental inadequacy during the event of the burn is a major and recurring problem being reported. 60% of children with burn are treated by unqualified health service providers. Unqualified health service providers include: Medicine shopkeepers (44% parents sought their help), traditional healers and homeopaths (5%), friends and relatives (5%) and herbal medicine practitioners (more than 5%). This trend is understandable considering that burns in Asian countries mostly affect rural people (64.1%) where families are often poor (66.5%), and illiterate (72.5%). Educated mothers are more likely to visit qualified service providers.²⁴⁻²⁸ Only 40% of burn victims seek professional care, 23% are taken to hospitals and 17% are seen by registered medical practitioner. A families' first born is more often taken to qualified service providers than the following children and parents with 2 or less number of children are more likely to visit qualified service provider.

Sometimes parental inadequacy is in fact abuse of a child.^{19,29} Abused children have complications throughout their recovery related to family dysfunctions.

Health professionals tend to continue working with the family of the abused child, sometimes including the abuser stating that not doing so would not change the fact that the child often returns to the family.

Educational Impact Post Burn in Children from Europe

A strong factor in return to education for a child with burns was the degree of support the school offered during the child's period of absence. A lack of contact from the school was seen as especially important when children were studying for their GCSEs. Government agencies played important roles in helping children return to school without exacerbating the parental stress by connecting the burn care team with school professionals to create the initial bridge between the child and normality.

51.7% of patients did achieved good or excellent marks in their last school reports. Interesting it seemed that children with burns were more likely to gain educational qualifications that the population as a whole. 70% of female burn victim and 92.9% of male burn victims gained qualifications, whereas for the rest of the population at the same time period (1992) the average for both genders was 46.9%.

Educational Impact Post Burn in Children from Asia

Studies exploring this impact have not been performed.

Post-Traumatic Stress Disorder among Burned Children from Europe

Post-traumatic stress disorder (PTSD) is higher among burned children than in normal population and 18.6% of burned children are later diagnosed with PTSD. Interestingly, presence of mother at the time of accident shows less symptoms of PTSD.²⁹

Post-Traumatic Stress Disorder among Burned Children from Asia

Studies exploring this impact have not been performed.

Post-Burn Pain among Burned Children from Europe

In Europe, moderately burned children shows greater post-burn perceptual sensitization than controls and severely burned children. Second degree burns are very painful.^{7,30} Moderately burned children experience short period of intensive pain while severely burned children experiences long period of intensive pain.⁷ Severe burn during infancy decreases stress induced activation of endogenous pain inhibition.

Post-Burn Pain among Burned Children from Asia

Studies exploring this impact have not been performed.

Discussion

This systematic review of quality of life and support mechanisms for children who have survived burns, has the following findings:

Firstly the characteristics of burns in these two regions are very different. European children are far more likely to be burnt by scalds, whereas Asian children are most likely to be burnt by fire. This has the implication that burns suffered in Europe were more likely to be superficial. Burns in Europe is also most likely to affect middle class families as compared to Asia where low class families are most at jeopardy of having a family member suffer burns. Another interesting characteristic is that in Europe boys are more likely to suffer burn injuries; however in Asia, girls are the predominant victims.

Secondly European children have access to significantly better after care that is aimed at both improving health related quality of life and helping the patient attain independence. A point exemplified by the offering of occupational therapy. In Asian countries very few burn victims have access to psychiatrists.

Research discussing quality of life for European children post burn emphasized on anxiety, pain and social functioning. However, amongst Asian children the emphasis was on loss of daily activities, school, working hours and the financial toll of treatment on the family. From these differing foci it is clear that the superior social welfare offered in Europe is keeping families in a far more stable situation as their counterparts in Asia.

Psychosocial affect from burns on both the child and their parents was comparable in the two regions.

Some children reported traumatic memories and others expressed behavioural issue. Parents in both regions expressed a sense of guilt and anxiety which was only alleviated to a major degree when their child was able to return to normal daily activities.

With regards to family life after burn of a child, we found that in both regions parents expressed immense guilt and would be reluctant to trust that their children could take care of themselves. This was expressed by parents reporting increase anxiety when their child would desire to perform a task that was remotely dangerous. In some of the articles from Asian countries issue of child abuse were raised along with the dilemma of medical teams in working with suspected abusive parents. It would seem that adequate lack presence/implementation of child protection laws means that cycle of abuse is being allowed to continue.

It was also seen that burn victims would make up for time lost from school and that they would typically go on to complete professional qualification at rates above the national average of their respective countries. It was made clear that role of interagency bodies and schools were important in creating an easier situation in which children with burns can successfully re-transition back to school. The impact of burns in the paediatric population on education has not been explored in Asia.

Post-traumatic stress disorder (PTSD) was explored in European countries. Its findings were that 18.6% of children who suffer burns will attain PTSD and that those children whose mothers were not present at the time of the incident were also more likely to get PTSD.

Finally, European countries also explored altered perception of pain in children who had experienced burns. They found that infants who experienced severe burns had a reduced pain threshold in later life due to decreased activation of endogenous pain inhibition. In addition to this finding, articles showed that some moderately and severely burned children would have bouts of intense pain; which would last considerably longer in severely burned patients.

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