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Psychological Trauma in Children and Adolescents With
Burns

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List of Abbreviations

BDI- Beck Depression Inventory

BSQ- Burn Severity Questionnaire

CBCL- Childhood Behaviour Checklist

CPTS-RI- Child Posttraumatic Stress Reaction Index

DAP- Draw a Person Test

DICA- Diagnostic Interview for Children and Adolescents

DISC- Diagnostic Interview Schedule for Children

df- degrees of freedom

DSM- Diagnostic and Statistical Manual

DSRS- Depression Self-Rating Scale

FSS- Fear Survey Schedule

GRI- Glasgow Royal Infirmary

HADS- Hospital Anxiety and Depression Scale

ICD- International Classification of Disorders

IES- Impact of Events Scale

LBC- Louisville Behaviour Checklist

M- mean

n-number

pb- post burn

PTS-RI- Posttraumatic Stress Reaction Index

PTSD- Posttraumatic Stress Disorder

Quest- Questionnaire

-R- revised

RHSC- Royal Hospital for Sick Children

s.d.-standard deviation

TBSA- Total Body Surface Area (burned)

T1- Time One

T2- Time Two

%- percent

Abstract

This thesis examines and describes children's and adolescent's responses to burn injuries, with a specific focus on traumatic responses. There has been increasing interest in children's responses to trauma since the diagnostic category of Posttraumatic Stress Disorder (PTSD) in children first appeared in DSM III-R in 1987. Although there have been studies examining children's responses to burn injuries since the 1950's, even the most recent studies tend to have methodological problems and few have examined accidental burn injuries from a trauma perspective.

Fifty five children, adolescents and their parents took part in this longitudinal study, a recruitment rate of 35% of the total population. All of the children had sustained accidental burn injuries of varying severity at least one month before their first assessment. Children were aged between three and eighteen years, and the mean age was seven years. Follow-up occurred six months after the first assessment and there was a study completion rate of 40%. The study group was not entirely representative of the population as a whole, being significantly younger, more likely to have been an inpatient and less likely to have required surgical intervention. It is also likely that they were not socially representative of the population as a whole.

Children under 6 years were not personally assessed. Parents reported on these children using the Child Behaviour Checklist (CBCL), and the Posttraumatic Stress Reaction Index- parent version (PTS-RI).

Children over six years took part in the Diagnostic Interview for Children and Adolescents (DICA), and completed the Impact of Events Scale (IES), the

Children's Posttraumatic Stress Reaction Index (C-PTS-RI), the Fear Survey Schedule (FSS) and the Depression Self-Rating Scale (DSRS). Parents of these children also completed DICA, the PTS-RI and the CBCL. At six months, all procedures were repeated. Medical information was collected from the participants case-notes. There was no control group.

Generally, children and adolescents adjusted well following their burn injuries. Traumatic symptoms had been experienced by over half the children, with intrusive symptoms most common. 14% had a PTSD diagnosis at some time since their burn injury. A quarter of the children were reported to have general borderline or clinical behavioural problems using the CBCL. Over half the children reported symptoms of depression.

Low study completion rates make conclusions at six months problematic. Overall, there were few significant differences between Time 1 and Time 2. Any significant differences showed an overall improvement.

The results are described with reference to the existing literature on children's traumatic responses and children's responses to burn injuries. It is suggested that there may be a "normal" acute trauma response following burn injury. Theory surrounding children's response to burn injury is examined and directions for a new theory encompassing trauma and injury in the context of development are proposed. The methodological limitations to the study are discussed and recommendations are made.

Chapter 1. The Literature Review

1.1 Rationale for the study

Interest In psychological aspects of childhood health, illness and disease has been growing since the 1970's, giving rise to the new disciplines of paediatric psychology and health psychology. Even though burn injuries are widely regarded as the most devastating of all injuries, relatively little attention has been paid to the psychological outcomes of burned children and their families compared to other interests in this field, such as in childhood cancer (Tarnowski, 1994). Burn injury research continues to be mainly adult based, with a paucity of basic and applied information about how children and adolescents are affected. Only two journals-the *European Burns* and the *American Journal of Burn Care and Rehabilitation* - deal specifically with burn care. The majority of the information available on children's psychological responses to burns is North American, and this is probably a consequence of the greater number of specialist burn hospitals. The research that has been done is inconclusive for a variety of reasons,

"most of these reports have consisted of anecdotal observations and clinical suggestions...few reports have been quantitative, and, even fewer experimental. Those studies which have attempted empirical data collection have generally suffered from serious methodologic flaws"

(Wisely et al., 1983, p.46)

The main aim of this research was to examine children's response to burn injuries with particular emphasis on psychological trauma and it's phenomenology in this age group. There follows an introduction to the whole area of the psychological consequences of trauma, injury and illness in general, leading on to burn injuries in particular, with a discussion of the specific factors believed to be involved.

1.2 Methodology of the literature review

Keyword searches of the databases Medline, BIDS Embase, BIDS Social Sciences Index and PsychLit were conducted. The reference lists in key papers and review papers were also searched. Internet access to the key journals *Journal of Burn Care and Rehabilitation* and *Burns* ensured being kept abreast of current issues and new research.

1.3 A basic introduction to the nature of burn injuries

To understand the consequences of any injury, and to put this in perspective, factual background information regarding the medical aspects of the injury is needed. For this reason, an introduction to the physical aspects of burn injuries is provided.

1.3.1 Types of burn injury

- scald - from hot liquid
- flame
- flash
- electrical
- chemical
- contact- from touching hot objects, e.g. hot iron

Burn injuries involve damage of the body's largest organ: the skin. As the major sensory organ, the skin has many complex functions such as temperature regulation, protection against infection and regulation of body fluids (Jones et al., 1979). It comprises two layers; the dermis and the epidermis, and the nature and extent of a burn injury depends on the damage to either or both of these

(Appendix 1). Burn severity is determined by the amount and depth of skin affected. Description of burn injuries are usually Total Body Surface Area Burned (TBSA) and depth of burn (degree or thickness).

1.3.2 Burn Size (TBSA)

This is expressed as a percentage of the total body surface area (TBSA) affected, and there are various ways of calculating this, depending on the age of the burned person. Standard charts dividing the body into discrete areas are generally used (Appendix 2), and shading is used to indicate the degree (depth) of the burn. A helpful example is that a hand is usually regarded as 1% TBSA.

1.3.3 Extent of the Burn

Heat intensity and duration influence the extent of the burn. There are two ways of classifying this; by the degree of the burn: 1st, 2nd and third; or by depth of the burn: superficial, partial and full thickness.

Table 1

General Characteristics of the Burn Wound (adapted from Hansborough and Hansborough, 1999)

TYPE OF BURN	PHYSICAL CHARACTERISTICS	SENSATION
First degree (superficial thickness)	red dry no epidermal sloughing/blisters blanches with pressure sensate	painful
Second degree (partial thickness)	epidermal sloughing/blisters pink/pale pink moist sensate blanches with pressure	painful
Third degree (full thickness)	white/mottled/charred dry	relatively non- painful

may be firm/leathery
insensate
no blanching

The size and extent of the burn, its cause, as well as the age of the child, all influence treatment. For general use, following the guidelines of the American Burn Association (ABA), burns are classified as minor, moderate and severe.

CRITICAL BURNS

2nd degree burns of over 25%

3rd degree burns of face, hands, feet or over 10%

Burns complicated by:

respiratory tract injury

major soft tissue injury

fractures

Electrical burns

MODERATE BURNS

2nd degree burns of 15-25%

3rd degree burns of less than 10%, except hands, face, feet

MINOR BURNS

2nd degree burns of less than 15%

3rd degree burns of less than 2%

(Moylan, J.A. (1979) in C.P. Artz, J.A. Moncrief, B.A. Pruitt. *Burns, a team approach*. W.B. Saunders Company)

1.3.4 Non-accidental Injuries

The incidence of non-accidental burn injury is difficult to determine, but can range from 4-39% of all burn injuries presented (Showers and Garrison, 1988). In the UK in 1991, the rate of non-accidental injuries was 4.2/1000 cases, a not insignificant number (Gaukroger et al., 1991). Non-accidental burn injuries have a high morbidity and mortality. They are usually suspected when the history provided by the parent or caretaker is highly incompatible with the observed physical evidence (Leonardi et al., 1999).

1.3.5 Treatment of burns

Treatment is dependent on the nature of the wound. It can be delineated into three stages: the emergency stage, the acute stage and the rehabilitation stage (Tarnowski et al., 1991). In the acute stage, minor burns can be treated conservatively with dressings, but moderate and severe burns often require painful procedures such as excision and autograft closure of the wound. The more severe burns can also require life support measures in the acute burn stage. The rehabilitation stage involves management of the healing wound such as the wearing of pressure garments and physiotherapy. Repeated hospitalisations for grafting or release of contractures may be necessary. Contracture may result in reduced physical function, and skin sensation may be affected by itching or reduced temperature moderation. The treatment of burn injuries may therefore, last for years and require careful management.

Burn care, health care, hospital systems and mortality rates 20 years ago are very different from those of today. Senior (1999) reports that whereas 30 years ago, a 40% burn would almost certainly have resulted in death, today half of those with

twice that injury, 80%TBSA, will survive. Indeed, the team at the Shriners Burns Hospital in USA report 70% of 80% TBSA burned children surviving (Herndon et al., 1986;Beard et al., 1989;Blakeney et al.,1993; Blakeney et al.,1998).

Comparing the study from 20 years ago which refers to "severe burns" which were those >15% TBSA (e.g. Vigliano et al., 1964) with a study looking at "severe burns" today, which refer to burns of up to 95%, would be a pointless exercise.

New procedures and technologies have completely changed and continue to change the medical aspects of burn care. For example, daily scrubbing and cleaning of the burn wound (debridement) to remove dead tissue (eschar), a very painful procedure, often implicated in children's adjustment in the past, is no longer the norm. Instead, wounds are surgically cleaned (Senior, 1999) under general anaesthetic, reducing both pain and distress.

More children are now surviving who have visible disfigurement and functional disability. Ongoing burn care such as grafting and release of scar tissue (contracture) as a child grows can result in many years of surgery and hospitalisations. In the older research studies, these children may have died. As a direct consequence of improved treatment and rehabilitation, *psychological* morbidity and adjustment have become more significant issues. Contemporary researchers are interested in life *after* a burn injury (Tarnowski et al., 1991; Meyers-Paal, 2000).

New Directions

Although burn injuries are the main focus of this research, the significant achievements in burn care and the resulting interest in children's adjustment after they recover from their often life threatening injury has been mirrored in the global improvements in pediatric medicine. Psychological research in this field has long

been concerned with the general effect of illness, injury and hospitalisation on children and adolescents. Research examining the effects of burn injury and hospitalisation on children for example, dates back to the Second World War.

Research has very recently taken a new direction. As the interest in the effects of trauma has developed through the nineteen nineties, researchers in this field have examined how children can experience injury, illness and hospitalisation as *stressful* events, and therefore the psychological trauma perspective has become as important a consideration as the physical trauma.

1.4 Psychological trauma

Psychological response to trauma has long been implicated in the development of problem behaviours. "Trauma" and "traumatisation" are such commonly used words in the psychological literature and in the public domain today that defining them is almost impossible. Terr (1991) posits that the term has become so ubiquitous in many later disorders that it "cancels itself out". Trauma is not a fixed concept; it is a general term which has evolved to embrace many different ideas.

Terr (1991) for example, defines childhood trauma as

"the mental result of one, sudden, external blow or series of blows, rendering the young person temporarily helpless and breaking past ordinary coping and defensive operations".

While this is a useful definition, trauma from a clinical psychology viewpoint is now more commonly defined by the diagnostic criteria for the Post Traumatic Stress Disorder (PTSD) provided by the ICD and DSM classification systems. This has been largely influenced by a global interest in organising complex reactions such as those following the experience of trauma into a diagnostic

rubric. Criterion A of the diagnostic criteria for PTSD in DSM IV most recently defines trauma as

1. (...)an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity to oneself or others.
2. the persons responses involved intense fear, helplessness, or horror.

Note: in, but children it may be expressed by disorganised or agitated behaviour (APA, 1994).

1.4.1 Posttraumatic Stress Disorder

The first inclusion of Posttraumatic Stress Disorder (PTSD) in DSM III (APA, 1980) provided clear diagnostic criteria for adults. DSM III-R (APA, 1987) followed, with specific reference to trauma and posttraumatic responses in children. Until this time, it had been generally assumed that children's traumatic reactions were largely adjustment reactions, and therefore transient and subjective, even though supportive evidence was lacking. Yule and Canterbury (1994) suggest that progression away from this assumption may in large part be due to increased rigour and directness in recent research. In opposition is the opinion that cultural determinants have influenced theory away from an *adjustment* focus and towards a *maladjustment* focus (Summerfield, 2001).

Whereas an adjustment reaction view of trauma focuses on *coping* factors in adjustment, a posttraumatic stress view (i.e. a diagnostic one) primarily considers the factors that *interfere* with adjustment following trauma. Wintgens et al. (1997) advocate this approach as it is seen to "integrate different adjustment problem symptoms into one coherent picture" (p.612). The most recent DSM IV further refines the definition of PTSD, emphasising personal threat, and recognises distinct responses in children.

(American Psychiatric Association, 1994, Diagnostic and Statistical Manual of Mental Disorders (4th Ed.). Washington DC: American Psychiatric Association.

A. The person has been exposed to a traumatic event in which both of the following have been present:

1. the person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity to oneself or others.
2. the persons responses involved intense fear, helplessness, or horror. Note: in, but children it may be expressed by disorganised or agitated behaviour.

B. The traumatic event is reexperienced in one (or more) of the following ways:

1. recurrent and intrusive distressing recollections of the event, including, images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
2. recurrent distressing dreams of the event. Note: In young children there may be frightening dreams without recognisable content.
3. acting or feeling as if the traumatic event were recurring (includes sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: in young children, trauma specific re-enactment may occur.
4. intense psychological distress at exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.
5. physiological reactivity upon exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by at least three of the following:

1. efforts to avoid thoughts, feelings, or conversations associated with the trauma.
2. efforts to avoid activities, places or people that arouse recollections of the trauma.
3. inability to recall an important aspect of the trauma.
4. markedly diminished interest or participation in significant activities.
5. feeling of detachment or estrangement from others.
6. restricted range of affect.
7. sense of foreshortened future (e.g., does not expect to have a career, marriage, children or a normal life-span).

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by at least two of the following:

1. difficulty in falling or staying asleep.
2. irritability or anger outbursts.
3. difficulty concentrating.

4. hypervigilance.
5. exaggerated startle response.

E. Duration of the disturbance (symptoms in B, C, and D) is more than one month.

F. The disturbance causes clinically significant distress or impairments in social, occupational, or other important areas of functioning.

Specify if:

Acute: if duration of symptoms is less than 3 months.

Chronic: if duration of symptoms is 3 months or more.

With delayed onset: onset of symptoms at least 3 months or more.

(Children's responses underlined by the author for clarity)

The Criterion A problem

For a posttraumatic stress model to be applied, the "trauma" encountered by the individual must meet Criterion A, as Figure 1 indicates. In earlier editions of DSM, the criterion A issue was much debated. It consisted of tightly defined stressor characteristics, e.g. the "event" had to be "outside the range of usual human experience". The problem was that although injuries such as burn injuries can be traumatic and extremely painful, they are actually the second most common cause of household injury, and therefore did not fit the definition (March, 1993) even though many studies were reporting symptoms indicative of PTSD. In the revised DSM IV, Criterion A is a mix of both subjective and objective features. Now, a burn injury of any severity can be seen to fulfil both aspects of Criterion A.

Similarly, in DSM IV, serious illness such as cancer can be included as trauma of a magnitude to meet Criterion A whereas in DSM III-R (APA, 1987) chronic illness was specifically excluded. DSM IV criteria can even include parents who have been told that their children have a life threatening illness.

The subjective appraisal of an event as traumatic and whether it fulfills Criterion A continues to be debated and is a research topic in itself. Studies have shown that treatment can be the most traumatic aspect of having a serious illness for example.

1.4.2 Children and PTSD

It is commonly recognised that while intrusion (Criterion B) and avoidance (Criterion C) are the key symptoms of PTSD, the nature of their expression may be influenced by development. For example, younger children may play games with a traumatic theme whilst older children are more likely to experience "flashbacks". Children and adolescents often show a range of other symptoms such as future foreshortening, guilt, irritability, separation anxieties and memory difficulties, for example.

"Traumatic stress reactions" may be more preferable to examine in children than PTSD diagnosis per se, and it has been recognised that the diagnostic criteria can miss the subtleties of very young children's response for example (Yule, Perrin and Smith, 1998). The clinical appeal in diagnosis is that the criteria, even with their limitations, are meaningful and relevant to those who have experienced trauma.

1.4.3 Assessing trauma in children and adolescents

Until very recently, systematic, data based research and assessment of PTSD in adults, and particularly in children, was rare (Cohen et al., 1998). When DSM III-R criteria were applied for example, incidence rates varied from 0% to 90%, which raises vital questions on the reliability and validity of assessment measures at this time (McNally, 1996).

Assessing PTSD is always going to be complex, as the type of trauma, trauma intensity, coping and individual histories will always be different. To overcome this difficulty, multiple sources of data should be collected, increasing the validity of PTSD diagnosis (Saigh et al 1996; Kratochwill, 1996; Perrin et al.,

2000). A thorough assessment of PTSD requires obtaining information directly from children and their parents, using DSM IV guidelines (Perrin et al., 2000).

The structured clinical interview is perceived by most clinicians as the "gold standard" for diagnostic evaluation (Finch and Daugherty, 1993). Specific structured interviews incorporating PTSD modules have been developed. These are

- 1.Diagnostic Interview Schedule for Children (DISC)
- 2.Diagnostic Interview for Children and Adolescents (DICA)
- 3.Childrens Posttraumatic Stress Disorder Inventory (CPTSDI)
- 4.Post Traumatic Stress Reaction Index (PTS-RI)

Some authors do not include the CPTSDI or the PTS-RI as structured clinical interviews, regarding them instead as self-report measures. It can be suggested that they should be included as structured clinical interview measures as they have been specially developed to elicit information from children using a personal interview technique. It is important to consider developmental variation in PTSD symptom presentation (e.g. Scheering et al., 1995). Pynoos and Nader (1993) indicate that

"special interview techniques may be necessary to assist children to explore thoroughly their subjective experiences and to help them understand the meaning of their responses" (p.541)

so that although in an adult context, the CPTSDI and the PTS-RI may not be strictly considered as structured interviews, in the child context, it can be appropriate to regard them as such.

DISC

This interview is one of the most structured interviews available, and has been adapted from the widely used Diagnostic Interview Schedule (DIS; Robins et al, 1981) for adults. The DISC specifically assesses DSM III-R and DSM IV categories, including a module for PTSD (Finch and Daugherty, 1993). It can be used for both the parent and the child individually, and covers a range of psychiatric disorders in children aged 6-18 years, with high interrater reliability ($r=0.94-1.0$) (Angold, 1989).

There are recognised problems with the DISC, such as poor results in children under 10 (Edelbrock et al., 1985) in certain categories. For studies which wish to include a wide age range of children and adolescents, this may make use of this instrument problematic. Robins (1985, 1989) questions the validity of the Diagnostic Interview Schedule itself, which would also therefore apply to the children's version. The DISC has probably been subjected to the most stringent investigations, of all the interviews available.

DICA

This includes supplemental questions for PTSD diagnosis, and like the DISC, has both parent and child versions (DICA-P and DICA-C respectively). The DICA PTSD module incorporates the DIS, which means that in essence, it carries all the problems of the DISC mentioned above (McNally, 1996). The DICA has been found to have good interrater reliability (95%) and test-retest stability over seven days (Herjanic and Reich, 1982). However, in opposition to this, in a study on abused children found a large discrepancy between DICA-C and DICA-P results (Famularo et al. 1992). Evidence on its use in general population samples has

been questioned (Boyle et al.,) but it has been used previously in a diagnostic outcome study in burn injury research (Stoddard et al., 1989).

C-PTSD-I

This interview, along with the PTS-RI is broad enough to capture the sensitive and specific ways in which children display traumatic responses (Keane, 1996).

The children's PTSD inventory was developed on the basis of DSM III PTSD criteria, and uses simple language as a reaction to what was seen as the very adult oriented nature of existing interviews. There are four subtests assessing; the nature of PTSD; unwanted re-experiencing; general effect and pre-trauma symptoms.

A study by Saigh (1989) found reliable and valid PTSD diagnosis and high interrater agreement with this instrument although the study was limited by sample size (n=30). However, it has been successfully used in its English, French and Arabic versions, making it a useful instrument across cultures. Unfortunately, there have been few studies incorporating this interview to date.

PTS-RI

This is a very commonly used 20 item scale specifically designed to assess posttraumatic stress symptoms in children and adolescents who have been exposed to a wide range of traumatic events. It is based on DSM IV criteria. The original PTS-RI was standardised on three hundred individuals who had experienced a range of different trauma and it provides a level of PTSD. There has been good agreement between DSM III PTSD diagnosis and "severe" PTS rating on the PTS-RI (Pynoos et al., 1993; Goenjian et al., 1995).

Pynoos et al., (1987) used the PTS-RI in a study on children exposed to a sniper attack on a school playground. 77% of children in the playground met

criteria for PTSD diagnosis. One week later, 10 children were re-interviewed and there was high inter-rater agreement (94%) and test-retest reliability using the PTS-RI. It correlates highly with diagnosed PTSD cases and is linked to trauma exposure (Finch and Daugherty, 1993).

It can be suggested that the fact that standardisation was very specific to trauma and that it can be used as both an interview and a self-report measure, makes this a particularly attractive instrument.

It is worth noting that there is also a specific structured clinical interview for assessing PTSD in children who have been sexually abused. The Children's Impact of Traumatic Events Scale- Revised (CITES-R) (Wolfe et al, 1991) looks at abuse specifics as well as more general elements of PTSD. It is only useful for sexual abuse related PTSD (McNally, 1996).

Although the structured clinical interview is a vital part of a comprehensive evaluation of trauma, self-report measures are very commonly used in PTSD assessment due to their practical aspects of brevity and availability and lack of clinician inference. As discussed above, the C-PTSD-I and the PTS-RI can be used as both self-report measures and the basis for structured clinical interview. The most commonly used self-report measure for assessing PTSD is the Impact of Events Scale (IES).

IES

This measures two key features of the posttraumatic response, namely Intrusion (7 out of 15 items) and Avoidance (8 out of 15 items). This is an instrument which has been widely used in adult populations and approximations between PTSD in

adults and children has been found (McNally, 1996). Internal consistencies for the intrusion and avoidance subscales have been found to be .88 and .89 respectively in adult populations, and test-retest reliability can range from .86 to .96. Yule and Williams (1990) have found the IES very useful for its trauma meaningfulness in children who survived the Herald of Free Enterprise disaster. It is also useful in accessing intrusive thoughts, something which many researchers have found difficulty detecting in children.

Pynoos et al. (1987) found that the IES did not distinguish grief reactions from PTSD in children traumatised after a playground sniper attack, so this instrument is probably best used as a supplement to an assessment utilising a structured clinical interview and a variety of self-report measures.

1.4.4 Associated features of PTSD

There are high rates of co-morbidity with PTSD (Goenjian et al., 1995). Increased fears and anxieties are common and may or may not be associated with the traumatic event (Yule, 1994). The result can be the emergence of phobias or generalised anxiety. Adolescents with symptoms of posttraumatic stress commonly report clinical levels of depression, but this may be to do with symptom overlap. These co-morbid diagnoses are assessed by the structured clinical interviews above, and are also commonly assessed using specialised instruments

- The Fear Survey Schedule for Children (FSSC; Scherer and Nakamura, 1968) and the Fear Survey Schedule for Children-Revised (FSSC-R; Ollendick et al, 1989).

These assessment measures examine a variety of fears, from fear of injury to fear of death. The FSSC's use in PTSD related fear measurement is still being established.

- The Louisville Fear Survey for Children (LFSC; Miller et al, 1972).

This is a relatively long, exhaustive list of fears, similar in idea to the FSSC, including such items as fear of public places and night fears. With the high incidence of sleep problems associated with psychic trauma in children for example, such a list would appear to be particularly useful. Reliability and validity of the LFSC have still to be determined.

Finch and Daugherty (1993) believe that although both the LFSC and the FSSC-R each have five empirical fear factors, these differ, which may mean that where one may fail to detect significant fears, the other may not. This may call into question standardisation techniques, and the accuracy of results found by either instrument.

- About the Future Scale (Saigh, 1992b).

This is a new scale designed specifically to look at the PTSD symptom of future foreshortening. Future foreshortening prevalence appears to vary with the use of different assessment measures. Schwarz and Kowalski (1991b) found that although a general question on future foreshortening revealed a high level of incidence after a school shooting (12% of children), more specific questions revealed varying results e.g. 27% did not expect to marry and only 2% believed that the future would be all bad. Trying to measure associated symptoms of PTSD such as future foreshortening with increased accuracy would be beneficial to the advancement of more rigorous diagnosis.

- Beck Depression Inventory (BDI; Beck et al., 1961)

a widely used tool for identifying depression, and is particularly useful for its brevity.

- Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds and Richmond, 1978)

is similar to the State Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973) and Children's Depression Inventory (CDI; Kovacs, 1983) in that they are all well used, common measures in trauma research, acknowledging the fact that PTSD is classified as an anxiety disorder. However, there is contradictory evidence suggesting that such measures fail to differentiate between children in the general population and those exposed to various traumatic stressors. There also appears to be a problem with confirming elevated scores on both general and specific measures in trauma exposed children. Such findings indicate a need for further research on these measures to assess their use in trauma research.

- Minnesota Multiphasic Personality Inventory (MMPI; Hathaway and McKinley, 1951).

There have been two scales specifically developed for PTSD assessment on the MMPI. Both scales have built-in validity indications, which is something no other PTSD classifying scale has. Generally, the MMPI is recognised as a very reliable instrument and the PTSD subscales have been found to have excellent reliability in adults (Angold, 1989).

It may be too combat related to be of use to non-combat populations, which would call the use of the MMPI in general child or adolescent populations into question.

Although these instruments have been developed for some time, there are only a very small number of studies which have assessed trauma and PTSD and related symptoms in children who have experienced injury, illness and hospitalisation.

1.4.5 PTSD and injury, illness and hospitalisation

Injury and illness are now regarded as possible sources of trauma rather than simply stressful experiences, as the section on Criterion A has discussed. As a result of this, a small number of research studies have documented PTSD in children with cancer, leukemia, following transplantation, and other more minor surgical procedures, and following injury such as road traffic accidents and burns.

PTSD and serious illness

In the only study on PTSD in children with liver transplantation, 78% reported some symptoms (Walker et al., 1999). Two (11%) children reported "severe" symptoms using the Post Traumatic Stress Reaction Index (PTS-RI). A similar number of children reported "mild" (56%) and "moderate" (11%) symptoms as in a previous study on children undergoing cancer treatment (Stuber et al., 1994).

Children in comparison groups had chronic asthma and had experienced routine ENT surgery/hospitalisation and also reported mild and moderate symptoms, with the least symptoms reported by the ENT group. The results indicated that children found the perceived life threat involved in their transplantation most traumatic. It was felt that intervention at the diagnosis stage could decrease the incidence of these traumatic symptoms developing. This study used the PTS-RI to assess the PTSD symptoms and also used a number of other self-report measures to examine co-morbidity. Unfortunately, the liver transplantation group consisted of only 18 children, and therefore generalisation to similar groups or

even to other liver transplantation groups is problematic. This study could have been further improved by assessing the children pre-transplantation to chart symptoms over time.

Stuber et al. have carried out a number of studies on PTSD in children with various types of cancer (Stuber et al., 1994;1995;1996; 1998). PTSD is not a common response in this group. A minority of children report symptoms of posttraumatic stress, and these children seem to perceive cancer treatment such as bone marrow transplantation as repeated trauma. In a study on older children who had received treatment for leukemia, 12.5% of children had severe posttraumatic symptoms assessed using the PTS-RI, and their responses mirrored the responses of children involved in what are termed "moderate magnitude" traumatic events such as floods for example (Stuber et al., 1996; 1998). These authors are very aware that it is impossible to ascertain whether it is the actual illness or the treatment which is the traumatic stressor, and this is ongoing research.

These cancer studies in particular, highlight the fact that as technology and medicine advance, causality and the possible number of variables involved will become more difficult to separate out.

PTSD and accidental injury

Street and Sibert (1998) carried out an audit study of accidents in fifty-five 0-16 year olds requiring medico-legal assessments. The accidents included being involved in road traffic accidents (RTA's), falls, burn injuries and attacks. Assessment was unstructured and PTSD symptoms were assessed retrospectively by the clinical psychologist. These children displayed a range of

DSM III-R PTSD symptoms. 3 children met PTSD diagnosis, and these were the older children in the group. There was no significant link between the severity of the injury and the children's reaction to trauma, suggesting that it was the personal meaning of the trauma which was most salient.

This study is valuable in that it examined accidental injury, which although very common, has practically no evidence base or clinical research. However, as previous sections have shown, there are a number of readily available standardised measures available for PTSD and related symptoms assessments, and the study could have been strengthened by the use of these.

Mizra (1998) found that 45% of 8-16 year olds involved in RTA's exhibited symptoms of posttraumatic stress using the PTSD symptom checklist based on DSM IV criteria and the PTS-RI six weeks after their injury. Using the Kiddie SADS, which is a structured clinical interview not normally used in PTSD research, 75% of these children met criteria for PTSD. These results indicate that PTSD is relatively common following RTA's, irrespective of the severity of the accident. After 6 months, 17% of these children continued to experience posttraumatic symptoms, and the majority had co-morbid depressive or anxiety disorders. This study had a number of limitations. There was no control group with for example, children involved in other types of accidents. The children who did not report posttraumatic symptoms initially were not followed up, so delayed reactions or the possible "masking" of symptoms was not accounted for.

Landolt et al. (1998) found that of 11 briefly hospitalised children expected to be at low risk of developing posttraumatic stress reactions, 60% were experiencing a number of symptoms such as re-experiencing 6-8 weeks later. The implication is that even with the most minor injury, children may be at risk for

posttraumatic reactions due to the entire injury experience. Evidence from other studies shows that children from poor or deprived families with such characteristics as poor conflict resolution are more likely to adjust badly to illness, injury and hospitalisation (Quinton and Rutter, 1976; Trad, 1988).

The problem is that without control or comparison groups, it may be impossible to delineate the effects of injury from the problems of other potentially disturbing factors such as hospitalisation (Kent, 1998, personal communication). Overcoming such problems whilst controlling all other variables is probably impossible.

PTSD and burn injuries

There remains a paucity of information surrounding PTSD in both the adult and child literature, even though the earliest reports (e.g. Watson and Johnson, 1958) are highly suggestive of such symptomatology. Pre-DSM studies such as the widely cited Andreason et al. (1971;1972) studies on burned adults report such symptoms as "traumatic neurosis", strongly implying PTSD (Courtemanche and Robinow,1989).

In spite of recent interest in PTSD in adults with burn injuries (e.g. see Patterson et al., 1993 for a comprehensive review of the literature on burned adults; Tedstone and Tarrier, 1997), and a vast increase in PTSD research in general, there continues to be a conspicuous lack of research specifically assessing PTSD in burned children and adolescents.

Stoddard et al., (1989) believe that the lack of conclusive evidence on the burn response in children is due mainly to methodological issues such as flawed data collection. Recognising the continued need for rigorous research methods and questions, they studied 30 children and adolescents aged between 7 and 19

years (mean age, 13.3 years) who had been burned a minimum of 6 months previously (mean 8.86 years). The children were in hospital for reconstructive surgery, so the burns were on average, severe burns (mean 38.43% body surface area) and many of the children had several previous hospitalisations. This may mean that this sample was not truly representative of the general burn population (Kavanagh, 1990).

Using the Diagnostic Interview for Children and Adolescents (DICA- C and -P, child and parent, versions) which is based on DSM III criteria, 53.3% of the sample were found to have full or partial lifetime posttraumatic stress disorder. These authors believed a partial diagnosis important, as the diagnostic criteria for PTSD and other childhood disorders is still evolving (Stoddard et al., 1989). Looking only at full present disorders, 6.7% had PTSD.

Interestingly, these authors found that subjects with more severe burns were those with more DSM III diagnoses, where other research finds that burn severity has no effect on post-burn adjustment (e.g. Molinaro, 1978), and yet other studies find that larger burn size is related to better adjustment (e.g Byrne et al., 1986). Children with reported pre-burn emotional problems showed significantly more diagnoses. When compared with other samples of children taken from a medical centre list, the burned children showed similar or greater incidence of psychiatric disorder. However, the authors recognised that comparisons between burned children and other child populations may be fruitless as the severely burned child's lot is unique. The results of this study, which make clear use of existing diagnostic criteria, may have been further substantiated by the use of a variety of reporting measures, to supplement the structured interview. It is of note that time since burn varied so greatly in this

study (0-17 years), it is almost impossible to conclude that any effects were secondary to the burn injury itself (Baur, 1998).

Landolt et al. (1998) studied paediatric patients divided into "low-risk" and "high-risk" groups according to their perceived risk of developing posttraumatic symptoms. 4 of the total of 34 children were burned children aged between 5 and 16 years. These children were expected to be more likely to show posttraumatic reactions due to the traumatic nature of their injury and were therefore in the high-risk group. Assessment involved a structured diagnostic interview and a revised Posttraumatic Symptom Scale (PSS), which is an adult measure. 50%(2) of these children were found to have PTSD 6-8 weeks after hospitalisation. Gender and length of hospitalisation had no significant effect on development of PTSD (Landolt et al., 1998).

This is a particularly high incidence of PTSD in a burned group with >10% TBSA, but the small sample size and lack of information on the nature of the injuries do not lend this outcome to further analysis. The lack of evidence in this area to date does not support the author's contention that these burned children belong in the "high-risk" group, although the outcome would appear to.

It can be suggested that the lack of research on PTSD in burns partly to the belief that the prevailing psychosocial focus of burns research is a more useful position to take than a diagnostic one (Gilboa et al., 1994). This position considers personality variables, environment, family situations and specific burn and injury features rather than the perhaps more straightforward diagnostic ones.

Gilboa et al. (1994), suggest that being burned leads to continuous traumatic stress in that treatment regimes which can persist for years after the initial injury, are extremely painful in themselves and as a result, POST traumatic

stress is a misleading concept. The implication is that the trauma does not end; it may change but it does not end. To reflect on an injury such as a burn and perhaps terminal illness, Gilboa et al. (1994) suggest that emerging concepts such as *continuous traumatic stress* may be more useful.

Conclusions

It is remarkable that while researchers and other medical and allied professionals imply PTSD type symptomatology in children who are or have experienced severe illness or accidental injury, forty years of evidence rarely goes beyond the descriptive. Only a few studies have directly assessed PTSD in children and adolescents using standardised measures, even though the diagnostic criteria and tools have been in place since 1980 (APA, 1980).

The sparse evidence presented above strongly suggests the need for more PTSD research in this population as a whole and in children in particular, given their devastating potential.

There may be the danger that the recent shift in interest towards a posttraumatic stress model for research in this field rather than a model of research based on adjustment and its success, means that the majority of people in these injury and illness groups are being ignored; namely those who make successful adjustment and do not suffer anything but the most acute distress. Outcome measures of experiencing trauma in childhood and adolescence are too often limited by a strict focus on posttraumatic stress disorder. In the late 90's, co-morbid psychopathology such as depression and separation anxiety have been identified in these groups, and are just as clinically relevant as posttraumatic stress disorder.

The application of a trauma model to understanding the effect of injury, illness and hospitalisation is informative. However, PTSD is not the normative response to these experiences, although posttraumatic stress symptoms are common. The work to date (above) suggests that there is still a great deal of work to be done in the prediction and prevention of distress reported by children and adolescents in these groups.

This introduction has approached psychological traumatisation in *burned* children and adolescents from a very broad perspective this far. Although the focus has been on trauma in general and PTSD in particular, PTSD is only one of the responses to injury and illness and resulting hospitalisation. Research on the effect of accidental burn injuries in children and adolescents dates back long before the "trauma" model as it is known today, existed.

1.5 The Burns Research Studies

Table 2 and table 3 below summarise ALL the research studies conducted with paediatric burn patients between 1958-2000. They refer to studies examining children's reactions to burn injuries 1958-1983 (Table 2) and 1984-2000 (Table 3). This literature review will concentrate largely on the research evidence which has appeared during the last 15 years (Table 2), for a number of reasons, which will be discussed as they arise. There are a small number of other studies which examined both children and adults, but as there is evidence that children's responses may be different from adults, these studies are not included in this review (e.g. Bowden et al., 1980; de Wet et al., 1979). Other studies are based on adults burned as children (e.g. Knudson-Cooper, 1981), but it can be

suggested that the "time since burn" variable would confound conclusions based on such data, so these have also been omitted from this review.

Table 2

Studies examining children's reactions to burn injuries 1958-1983

pb= post burn
tbsa=total body surface area

Study	Subjects	Burn	Time of study	Measures	Design&Results
Watson&Johnson (1958)	n=5 3-14yrs 2male 3female	-	-	clinical interview observation	Uncontrolled case study
Woodward(1959)	n=198 <15yrs - -	>10%tbsa 2-6yrs pb		clinical interview with parent medical records teacher report	Descriptive.Retrospective study. Comparison groups of siblings and control group n=50. 81%of mothers reported disturbed children. Most common were fears& anxieties. Nature of burn injury not related to outcome. Study mothers more disturbed than control mothers.
Long&Cope(1961)	n=19 0-17yrs 17male 2female	- -	In hospital	clinical observation& interview	Uncontrolled, descriptive case-study High incidence of family problems Significant pre-burn problems Regression, depression, guilt Emotional reactions seen to hinder recovery.
Vigiano et al. (1964)	N=10 6-18yrs - -	>15%tbsa	>1yr pb	medical records clinical interview with child and mother. Holtzman Inkblot WISC, drawings, children's aperception test, picture story test	Uncontrolled, descriptive study. 9/10 children sig. psychological disturbance
Holter(1969)	n=13 0-15yrs 10male 3female	5-42%tbsa 2o&3o accident &abuse	In hospital	clinical observation& interview with parents and children	Uncontrolled, descriptive case-studies 10/13 families found to have major psych. and social problems, believed to have influenced the injury
Martin(1970)	n=48 0-14yrs - -	-	<12mths pb	clinical observation& interview	Uncontrolled, descriptive, retrospective Protest, despair and detachment common in children, believed to be related to loss of attachment.
Quinby&Bernstein (1971)	n=7 7-13yrs 3male 4female	-	-	observation projective tests	Uncontrolled case study
Seligman et.al. (1971)	n=4 5-13yrs 1male 3female	38-53%tbsa 3rd degree	In hospital	clinical interview observation	Uncontrolled case-study
Galdston (1972)	n=100	unspecified	In hospital	clinical interview	Uncontrolled, descriptive study

	0-16yrs 68males 32females	2nd& 3rdo accidental& inflicted		with both child & parent	Stressful family circumstances common, disturbed sleep patterns, regression
Benians (1974)	n=105 - - -	-	In hospital	clinical interview and observation with parent and child	Uncontrolled, descriptive. 33.4% severely disturbed. 39% had pre-burn disturbance, felt to be related to the injury and outcome. Sig. relationship betw. nature of the burn and disturbance
Goldberg(1974)	n=22 11-15yrs -	unspecified facial-deformity	2-11yrs pb	clinical interview based on 10items	Retrospective 2 groups: burned and heart disease. Burned children less vocational aspirations. Poor social adjustment regardless of time since burn
Wright&Fulwiler (1974)	n=12 8-13yrs -	5-50% tbs	1.5-5yrs pb	PPVT Bradley Self-concept Scale, PF, DAP, CMAS	Matched controlled study. No sig. diffs betw. grps on all measures apart from projected drawing on the DAP. Mothers of burned children sig. more disturbed than control mothers.
Miller et al. (1976)	1-15yrs -	n=17	-In hospital	clinical observation parental report	Uncontrolled, descriptive study Follow-up at 1 year No sustained psychological distress past acute stage. No sig. difficulties with peers body-image or academic performance at 1year.
Molinaro(1978)	n=18 7-19years -	unspecified disfigurement	<1 semester post-burn	clinical interview	Uncontrolled, descriptive Children burned earlier in life more withdrawn. 2/3 of the sample socially withdrawn. Problems in peer relations. Nature of the burn injury not related to withdrawal.
Knudson-Cooper& Leuchtag (1982)	n=330 0-16yrs 215males 115females	-	-	parental clinical interview assessing pre-burn adjustment, family life-change events& history, details of the accident	Uncontrolled, descriptive. Family moves related to burn injury. Burned children moved approx. x3 more than gen popn. 2-5mths post move critical period.
Sawyer et al.(1983)	n=37 8-16yrs 19male 18female	>5% tbsa	>3yrs pb	clinical interview CBCL completed by child's mother	Retrospective, uncontrolled, correlational study Adolescents show sig. poorer psychosocial adjustment. Visibility of injury, mothers distress and house moves all significant in adolescent distress. Tbsa no effect.

It is clear that many of the early studies had methodological problems, such as small sample sizes (Wright and Fulwiler, 1974), large age ranges (Knudson-Cooper and Leuchtag, 1982), over-reliance on parental report (Woodward, 1959) and wholly descriptive data. The descriptive study and the case study are

important foundations for all research, and perhaps particularly for multi-disciplinary topics such as burns research, which encompass both medicine and psychology. As such, these studies, as flawed as they seem today, provided ample foundations. There was a paucity of prospective studies and studies using recognised, standardised instruments in this field, because the clinical interview, with the injured child or adolescent was the established research protocol.

Although research interest in the psychological outcome of burn injury goes back as far as the 1940's (Adler, 1943), it is only in the last 15 years that standardised assessment measures and structured clinical interviews have become the norm rather than the exception in burns research (Table 3).

Table 3

Studies examining children's reactions to burn injuries 1984-2000

Study	Subjects	Burn	Time of Study	Measures	Design and Results
Browne et al. (1985)	n=145 - - <16yrs	major& minor	<12yrs pb	Parent completed: Coping Scale Social support scale PAIS CBCL The family envir.scale	Poor behavioural adjustment in 15.7% unrelated to burn severity. No diffs betw. minor and major burns grps. Children with poor adjustment have mums with poor adjustment
Byrne et al. (1986)	n=145 97male 48female 3-12yrs	major& minor	1-8yrs pb	Parent completed: CBCL PAIS The family envir.scale	68% high social competence. Larger burn related to higher social competence. Time since burn affects adjustment.
Herndon et al. (1986)	n=12 0-12years 9male 3female	>80% tbsa >70% 30	0.08-2.8yrs p.b.	Mental status Parent: interview Louisville BC Burn Injury Quest. Activity Quest.	Retrospective. Good physical adjustment, 1/3 reported excessive fear, aggressive, somatic and neurotic problems Severe problems in areas such as self esteem and anxiety
Benians(1988)	n=22 - - -	>10% 30	In hospital	Clinical interview & observation of both child & parent	Descriptive. Parental visiting affects recovery of children with >25% tbsa burns
Beard et al.(1989)	n=6 primary-school age 4male 2female	>80% tbsa	3times 0-5yrs pb	Interview and play with child Pier-Haris Self-Esteem Inventory Self-drawing Sentence completion Parent: LBC	Retrospective, longitudinal study. Initial developmental regression and problems in all children. At 5 year follow-up, 5/6 showed average personality development Parents role in adaptation emphasised.

Stoddard et al. (1989)	n=30 7-19yrs 13male 17female	5-95% tbsa 0-17yrs pb	DICA-C(child DICA-P(parent)	Retrospective. High rates of disorder (DSM-III diagnosis) compared to other research study samples. Size of burn, disfigurement, low SES and parental emotional problems all related to disorder.
Tamowski et al. (1989)	n=68 41male 27female 2-17years	mean 18.72% tbsa 1-5yrs pb	Mothers: CBCL	Mothers mean ratings showed normal adjustment. Significant no. (13%) had deviant scores. Severity of injury & time since burn no effect on adjustment.
Blakeney et al. (1990)	n=44 29male 15female 12-17	>40% tbsa >1yr pb (mean 60%)	Clinical interview Culture fair intelligence test Family env. scale Suicide Probability Scale	21 well adjusted, 23 poorly adjusted Family values predict adjustment Adjustment improves during the first 2 years post burn.
Jessee et al. (1992)	n=32 17male 15female 5-16yrs	3-95% tbsa approx. 5yrs pb	Human Figure Drawing	No sig. differences in body image scores compared to controls (control grp=32 matched children from a local school). Body image scores sig. lower in older children. Body image scores not related to burn severity or location.
Kravitz et al. (1993)	n=82 41male 41female 2-20yrs	2-91% tbsa 1-19yrs pb	Sleep observation Parent & child questionnaires	Sig. more sleep disorders than the gen population. Nightmares & enuresis most common. Not related to injury severity or time since burn.
Mason & Hillier (1993)	n=57 <5yrs - -	- 1wk, 2mths, 6ths post discharge	The Behaviour Questionnaire The Behaviour Screening Question. Adapted BSQ	Retrospective, longitudinal study. 56% of children had disturbed behaviour at one week. At six months, 19.3% had disturbed behaviour. At 6mths, 52.6% had altered behaviour of some kind.
Abdullah et al. (1994)	n=49 28male 21female 5-18yrs	15-94% tbsa 1-7yrs pb	Piers-Harris self-concept scale Burn scar evaluation	No sig. effects for females No. of visible scars in males related to low self esteem
Kendall-Grove et al. (1998)	n=111 67male 44female 0-18yrs	1-<70% In hospital	Parent interview	29% of children over 3 had some sort of dysfunction. 36% of families dysfunctional. 50% families low SES. 8% of children previous DSM IV disorder.
LeDoux et al (1998)	n=35 29 male 6 female 9-18yrs	3-92% 1-5yrs pb	Parents: CBCL FES, IES, BDI	Retrospective, randomised study. 26/35 children "untroubled" on CBCL Significant differences between family characteristics of troubled and untroubled children.
Robert et al. (1998)	n=19 10male 9female 13-20yrs	7-85% tbsa 1-17yrs pb mean 39% tbsa	What Young People Believe and Do-R Disfigurement obs.	Appear to have age appropriate, "normal" sexual development & behaviour. Severity or location of disfigurement unrelated to sexual behaviour.
Gorga et al (1999)	n=51 0.5-6yrs 31male 20female	1-20% tbsa 1, 6 & 12mths pb mean 6% tbsa	parent report: physical status Vineland Adaptive Behaviour Scales Denver Home Screening Quest.	Retrospective, longitudinal study. Good physical & functional recovery Developmental delays inc. betw. 1mth (38%) and 6mths (44%) 48% children from suspect home environments

				Denver Development Screening Test Peabody Scales	
Staley et al(1999)	n=34 23males 11females 6-16yrs	2-85%	In hospital & visiting out- patients. Teachers rep. at 6mths.	Medical records, parent & child Interview. Teachers report	No sig. differences in school performance at 6 mths. No. of children with reported learning problems dec.
Meyers-Paal et al (2000)	n=41 Paediatric 28males 13 females	>80% tbsa >70% ft	Annually, at clinics or by post	Functional skills Denver Development screening, CBCL, FES	Age appropriate developmental skills Normal psychosocial adjustment
Kent et al(2000)	n=40 <4years 22 males 18 females	1-25% tbsa m=8.5% tbsa	<3days after inj 6mths later	CBCL, HADS, demographics	Controlled longitudinal study. Children had no psychological seq.at both T1 and T2. Mothers of burned children at risk for psych. seq.

Note: the definition of "paediatric", "child" and "adolescent" varies between studies. Due to hospital admission and burn centre criteria in USA, those up to 20 years are often included under these categories. Although there are obviously problems with this, only 2 of the above studies include participants to this age, and the majority of these participants are 18 and under, i.e. the age most usually included under the criteria "children" and/or "adolescent"

As the research literature on the psychological adjustment of burned children has grown, and as it has become more methodologically sound, with the use of standardised measures and more defined outcome measures, it is apparent that the majority of burned children and adolescents can adapt well (e.g. Tarnowski et al., 1987), regardless of the extent of their injury.

1.6 The Effect Of Burn Characteristics On Psychological Outcomes

Most of the research (Table 3) reports that total body surface area burned has no effect on outcome. Of note are two studies reporting a significant TBSA effect.

Stoddard (1989) found that children with larger burns were more likely to meet

more diagnoses using a structured psychiatric interview. Byrne et al. (1986)

found the opposite- that children with larger burns were better adjusted and had

higher social competence. It is clear that there is no direct or obvious relationship

between burn size and psychological outcome, regardless of popular (mis)conceptions

The problem is compounded by a persistent research focus on children with smaller, or more common burns (Abdullah et al., 1994). The evidence surrounding both minor and severe burns is still scarce (Blakeney et al., 1990).

It can be suggested that children with major burns would demonstrate the extreme end of adjusting to burn injuries, and that this would *not* be indicative of what we could expect from more usual burn injuries. These children are faced with physical impairment, disfigurement and reminders of their injuries for the rest of their lives, along with ongoing rehabilitative measures and scar management.

Since 1986, a team from the Shriners Burns Hospital in Galveston, Texas have been studying the longitudinal course of children with massive burn injuries, greater than or equal to 80% TBSA, and mostly full thickness (Herndon et al., 1986; Beard et al., 1989; Blakeney et al., 1993; Blakeney et al., 1998; Meyers-Paal et al., 2000) using standardised behavioural tests. This team has previously reported that more than 70% of children with these injuries survive today. In 1998, the group reported 47 children and their parents as having taken part in the systematic, standardised assessments at specific time intervals over 12 years, and a further 25 who completed postal questionnaires. The majority of these children were male, from poverty situations, and in dysfunctional families.

Adjustment was measured by behavioural problems as reported by the child, their parent and their teacher using standardised measures such as the CBCL (Achenbach, 1981). The authors found no significant relationship between time since burn and adjustment, and the children fell within the "normal" range on all of the measures used. On the whole, children perceived themselves as no different from the normative data sample. Although scores did not reach

significance, it was apparent that these children were at the lower end of the "normal" range, with decreased academic and social competence (Blakeney et al., 1998).

These results confound uninformed expectations. Although 24% of the children, 30% of their parents and 42% of their teachers report behavioural difficulties, this is equivalent to children in other settings (Heimbach 1998; Blakeney, 1998). There is no way of knowing if this is the result of their injury or of the adverse circumstances the majority of them have come from and continue to live in. The existence of psychological problems does not necessarily lead to poor adaptation and adjustment.

The most recent report on 41 of these children found good physical and functional outcome, equivalent with non-burned, normative samples (Meyers-Paal et al., 2000). It may be important to note that the findings about the children in these ongoing longitudinal studies cannot be generalised due to a current attrition rate of 43%. Although it is clear that some of the loss of participants is random, most of it is not, and this may make the study results biased to more positive outcomes.

1.6.1 Conclusions

Although total body surface area burned has rarely been found to be an influential factor in adjustment to burn injuries, even in the most severe cases, burn injury characteristics must be an important part of any study such as this. Such details are vital to an understanding of the trauma involved, and in furthering our understanding of the subjective response.

1.7 The Burned Child and their Family

"In many ways, burns are unique injuries that present novel opportunities to study child and family adaptation" (Tarnowski and Brown, 1995).

The important role of the family in the psychosocial response to children's burn injuries has long been recognised (e.g. LeDoux et al., 1998). The entire family must deal with the situation and with the personally affected child or adolescent who sustain the burn. Often, established familial ways of dealing with crisis are inadequate.

The evidence on the buffering effects of social support (e.g. Cobb, 1976) and the role of social support on adaptation and adjustment to life stress in general as well as to the burned individual in particular, can be applicable to the burned child and their family. As the child's major source of care, comfort, friendship and support, the family, and how it functions, will influence a child's adjustment (Browne et al., 1985).

Bowden and Feller (1973) recognised three responses particular to the family of the burn victim; indecisiveness, intensification of pre-existing conflicts, and guilt (p.317). These responses may be particularly influential, determining the burned child's response to treatment and hospital in general. If the family is distressed and has problems coping with the burned child, rehabilitation may be problematic (e.g. Blount et al., 1991a,b; Meyer et al., 1995). Konigova (1992) suggested that the presence and care of the family was essential in the very survival of the more severely burned individual.

The role of parental visiting in children with burns was a common topic in the literature in the 1960's and 1970's, when wards and burn units were not as

accessible as they are today. A number of studies, although with obvious methodological limitations, such as retrospective report and small sample sizes, found that parental visiting negatively influenced the duration and extent of psychological disturbance (Woodward, 1959), although Benians (1988) found that daily parental visiting was only influential in those children with >25% full thickness TBSA.

1.7.1 Family characteristics of burned children

Cohesive Families

Researchers have attempted to identify familial factors involved in adaptation following burn injuries. Blakeney et al. (1990) assessed 44 children with a mean age of 17 years and with mean TBSA of 66%, and 60% full thickness injury, one year or more after their burn.

By using a battery of structured interviews such as the Family Environment Scale, they found the family environment particularly influential in the normal adjustment reported for 50% of the group. Those children reporting family characteristics such as cohesiveness and open expression were better adjusted. Results indicated that the adaptation process occurred over time, for both the child and their family. The small sample size allowed little further speculation, except to imply that the time factor may only be significant in the first year post burn (Blakeney et al., 1990).

A study using the same measures found that *all* families of both burned children (n=36) and head injured children (n=29) were more cohesive, more controlling and had more religious values compared to the normative data (Blakeney et al., 1995). Similarly, LeDoux et al. (1998) found the majority of 9-18

year olds, 1-5 years post burn with 3-92% burn (TBSA no effect) well adjusted in comparison with the CBCL normative data. *All* of the children came from more cohesive and controlling families where there was more emphasis placed on moral and religious values than in the normative (unburned) population.

The family environment scale scores from the children with significant problem scores (n=9) were compared with the other children (n=26). They were more likely to have parents who reported less cohesive and organised families with lower achievement orientation and greater conflict.

These three related, but different studies, examined children in various age groups with differing injuries and over different time periods. The finding by all three- that the common characteristics of family cohesiveness and other adaptive qualities promoted a successful outcome- suggests a general adaptive pattern for children's burn injuries.

Severe burn injuries may bring cohesive and supportive qualities to the fore even in families where these are not characteristic. It is the nature of a traumatic injury to demand support and adaptation from the entire family (Blakeney et al., 1995). This would appear to be crucial in the individual child's adaptation to burn injuries.

"Intact" families

Using maternal CBCL (Achenbach and Edelbrock, 1983) ratings, Tarnowski et al. (1989) examined the behavioural adjustment of 68 children aged between 2 and 17 years (mean 8.11 years), with a mean 18.72% TBSA, 3.34% full thickness burn, between 1 and 5 years post burn (mean 4.06 years). Results indicated that burned children were no different from standardised samples of non-burned

children. This study covered a large age range and there was considerable time lag between assessments. The large time since burn variation also makes treating the group as a whole problematic.

Eight children (13%) had scores in the deviant range, and this was found to be statistically significant. Social withdrawal was the only reported consistent behaviour amongst this small group. Children in this deviant group were more likely to be older and to have lower SES.

While some children evidently develop behavioural problems following burn injury, this study showed that negative psychological sequelae cannot be considered the norm. Tarnowski et al. (1989) speculated that it was parental support which influenced good adjustment, given that 65% of the sample came from intact families. This may suggest some group bias, as the literature as a whole tends to find that burned children are more likely to come from disadvantaged families (i.e. "unintact"). "Intact" may not be a particularly useful indicator of parental support, and other sources of data would enable further discussion of such a potentially important variable. Garmezy (1985) for example, found children in "intact" families no more likely to be resilient and competent in stressful situations than children from supportive single parent families. It is surprising that more work has not been done in this contentious area of the nature of the contemporary family environment and its influence on the available social support for burned children. Family structure will therefore be cautiously examined in this research.

Families under stress

One of the continuing debates surrounding burn injuries and accident research in general, is whether or not certain children are more prone to getting burned than

others. In the early 1970's, there was a popularly held belief that children from families with a high incidence of stress were those most often presenting with burns. This idea dated back to the Second World War, when it was observed that 40% more children had been burned during the first four months of war than in comparable previous periods. This was thought to be due to a number of interacting stressful variables, such as a reduced parental supervision and attention, and lack of recreational activities (Wilkinson, 1944). Twenty five years later, researchers continued to find similar evidence on the influence of stress to paediatric burns.

In their study of 13 burned children aged between 0-15 years, Holter et al. (1969) found substantial evidence of psychosocial stress. Ten out of 13 families had severe psychological problems which were believed to lead to the kinds of stressful situations in which a child is more likely to get burned (the details of how the data was collated was not provided, making interpretation of these observations problematic). Ten of the mothers had psychological problems of varying degrees and 5 fathers also had emotional problems. Only 3 of the eleven marriages in the study were judged to be "stable" and both mothers in the 2 single parent families had psychological problems. Holter et al. (1969) concluded that only 3 of the cases were true accidents, and these were in stable, 2 parent families with no observed psychological problems. The implication was therefore that burned children were more likely to come from high stress family situations, and that burn injury abuse was common (by implication).

This theme was also the focus of one of the earliest studies on children's response to burn injury. Long and Cope (1961) examined 19 children aged 0-17

years with a variety of burn injuries. The children reported a preponderance of negative reactions such as anger, withdrawal, regression, fear, depression, problems of identification and guilt. These reactions were seen to actively hinder recovery. The severity of the burn injury had no effect on the severity of the psychological reaction, and it was felt that many of the children were exhibiting problem behaviour which pre-empted the burn injury itself. The large variation in variables (i.e. age range, burn size range etc.) makes interpretation of this problematic.

Kendall-Grove et al. (1998) point out that such research is now obviously dated (e.g. Long and Cope, 1961; Woodward, 1959) and employs vague outcomes such as "disturbance", but interestingly, their recent study replicates many of these earlier findings.

This retrospective study involved 111 parental reports on children aged between birth and 18 years with a mean TBSA of less than 10%. Of children aged between 4-18 years (36%), 29% were reported to have some dysfunction *before* their burn, as measured by history of abuse, psychiatric history, behavioural problems, or learning disability. None of the children under 4 were reported to have any of these problems pre-burn, but these measures were largely irrelevant to this (larger) group.

Maladjustment was reported by 36% of parents as measured by history of substance abuse, incarceration, psychiatric history or involvement with child welfare services. The authors speculate that the 15 parents on whom no data was recovered may have increased this incidence even further. This is based on the premise and speculation that parents who do not visit their children in hospital (and therefore cannot take part in research) after a burn injury are likely to be

those with some form of dysfunction (Kendall-Grove et al., 1998). Large burn centres, particularly in the USA can be hundreds of miles away from family homes, and burn care is extremely expensive. Parental visiting may be a much more complicated issue than it first appears to these authors.

Kendall-Grove et al. (1998) may have further substantiated their findings with the assessment of *post* burn adjustment. Retrospective data, particularly involving parental report on an injured child involves a great deal of potentially confounding variables. It can be suggested that in such circumstances, multiple sources of data, from for example, the child and their teachers, using standardised measures would be appropriate, though not ideal. Similarly, the largest group of children in this study, the under 4's are those children most often burned (e.g. Mason and Hillier, 1993), and without useful data on them, conclusions are impossible.

Employing pre-burn data such as this is valuable in showing the influence of pre-existing dysfunction and stressful circumstances on burn injury, particularly since the adult burn data, which is much more developed, indicates significant levels of pre-burn psychopathology (Patterson et al., 1993). It has been recognised more recently that early studies such as the Holter (1969) study, which concentrated on the idea of accident proneness, used the concept as if it were a definite behavioural disposition, when this is simply not the case. More recent research such as the Kendall-Grove (1998) study may have replaced the term "accident proneness" with "pre-burn dysfunction", but they would appear to be the same concept. The debate surrounding accident/burn prone characteristics and consideration of trends within the whole realm of accident research continues today. Although it is methodologically problematic and may go under a different

guise, it is an ongoing concern of burn injury research (e.g. Gorga, 1999) and is an area in which a great deal of work remains to be done (Matheny and Fisher, 1984).

1.7.2 Conclusions

It is not surprising that the bulk of research on children with burn injuries involves the family and family characteristics. Children are inseparable from their family context.

Early research found that burned children were more likely to come from stressful family situations with high levels of pre-burn psychopathology and that these children had poor outcomes following their burn injuries. In contrast, more recent research has found families of burned children to be more cohesive and adaptive than others, facilitating good adjustment, and that children who adjust well are more likely to come from "intact" two parent families.

The contradictions in these findings can in part be explained by changing research focus and methodology, but they also highlight the complexity of family systems and accident and burn related variables. This research will not *directly* examine family issues, but as they are so strongly implicated in the reactions of children, they will be important to consider in the interpretation of responses.

1.8 Psychosocial aspects of burn injuries

The terminology varies between studies, but essentially, psychosocial burn research is all about the quality of life for children who have been burned. Social integration is an important measure of this.

In a study of 18 children and adolescents aged between 7 and 19 years, Molinaro (1978), found the majority of children exhibiting social withdrawal. It

was not clear how long ago their injuries were sustained. Social withdrawal was defined as behaviour such as loss of social interaction with peers, even if the child could still go out in public. Only 6 children exhibited normal social behaviour. Social withdrawal was not found to be linked to either burn severity or location, although children burned at a younger age i.e. before 10 years, tended to show more social withdrawal. This is surprising, as studies usually tend to find that older children, and particularly adolescents are those most socially affected. However, the sample here was very small, and the large majority of the group were under 10 years, so adolescents were not equally represented. The sample may have been further biased in that children who adapt less well are probably not those who take part in burn studies (Molinaro, 1978). Sample bias and attrition rates, discussed elsewhere in this review, have proved to be important to take into consideration.

Recent studies have examined social competence and social integration in *severely* burned children. Although results suggest that severely burned children have similar social competence to non-burned children, there is some evidence of borderline social withdrawal as indicated in the Molinaro (1978) study (Blakeney et al., 1995).

1.8.1 School Re-entry

Part of the comprehensive burn care provided for children at America's larger pediatric burn centres are School Re-Entry Programmes (SRP's). The SRP and its success and efficacy as a measure of adaptation and social integration was examined in 34 school aged children (6-16years) with a mean TBSA 25.9%, 17.5% full thickness burn injuries (major burns) (Staley et al., 1999). Return to school is a particularly useful outcome measure of social integration, as school is

a fundamental part of "normal" everyday life for children. 81% of children were able to return to the same school, and educational outcome measures as reported by teachers, indicated no significant differences between school performance before and after the burn injury. In fact, the number of children with learning problems after the injury (27%) was less than that before the burn injury (33%), and there were less children reported to be below average than before the burn (5% post burn compared to 22% pre-burn).

While these results are extremely positive and encouraging, caution is required. School re-entry is only one aspect of adjustment to burns, and as such cannot be taken as an indicator of overall adjustment to burn injury. Tarnowski et al. (1991) warned that information on one small domain of post-burn functioning may say little of functioning on another. It may also be that teachers reporting on these children are reporting on a "honey-moon period", where the child is treated as a hero by peers and teachers alike (Doctor, 1999). Long-term follow-up studies of these children's academic performance and classroom behaviours may be helpful in providing a more comprehensive view of social integration in this population.

In the context of pre-burn stress, it is of note that 39% of this (admittedly, small) group of severely burned children reported learning problems before the burn. This may be indicative of a risk factor for these children. It should be noted however, that these children come from lower SES backgrounds and often from socially disadvantaged backgrounds, making them a higher risk group in general.

1.8.2 Conclusions

It can be seen that outcome measures vary widely between studies and can often be difficult to separate. Whereas the majority of studies look at general

behaviour as an outcome measure, other studies look at outcomes such as body-image, self-esteem, development, school performance, sexual behaviour and sleep. Such diversity reflects a growing awareness that a burn injury can touch every aspect of a child's life.

1.9 Burn Injuries and Development

1.9.1 Development: the pre-school child

Although data shows that young children, particularly those under the age of 3 are those most likely to sustain burn injuries, few studies examine the psychological outcome of these children. Developmental and cognitive limitations make measuring adjustment difficult in this group. The pre-school child is at a critical developmental stage, both physically and psychologically, and a burn injury can have a massive prospective impact on this development (Gorga et al., 1999).

Gorga et al. (1999) used parent interviews and medical record reviews of 51 burned children aged between 6 months and 6 years old (mean just less than 3 years) to assess physical, functional and developmental status at three time points: 1, 6 and 12 months post injury. Children had a mean TBSA of 6%, and 67% of children had major burns as defined by the ABA.

Results showed that 48% of the children came from "suspect" homes, that is, homes lacking activities and interactions which normally facilitate appropriate cognitive and social development as measured by the Denver Home Screening Questionnaire (Coons et al., 1981). 44% of the children had suspected developmental delays at 12 months, and there were statistically significant progressive language delays. In contrast, functional and physical outcomes were good.

Regression such as delayed language development, are well documented in the older, descriptive burn literature, but the concern lies in the fact that such delays persisted in this otherwise well group. Gorga et al. (1999) speculated that given the characteristics of their home environments, these children may have had developmental delays before the injury. The necessity of parental report on such a young group may mean that these results underestimate the problem.

This study indicates that for the very young child, pre-existing problems may be incorporated and even enhanced by a burn injury. It also highlights the importance and difficulty of a longitudinal study (Richard, 1999). There was a 79% attrition rate from this study. The children were mostly from ethnic minority groups with a low socio-economic status (SES). Results from previous burns research, where higher SES families and better adjusted children took part implies this very young burned group may be at even more risk for developmental delays than the Gorga et al. (1999) study suggests.

1.9.2 Development: Adolescence

Adolescence as a developmental stage receives a great deal of attention when looking at the effects of burn injuries. Bernstein and Cope (1976) suggested that the meaning of the burn injury for a child changes over time, although Fisher (1986) made the point that there is a paucity of convincing empirical evidence that adolescents experience the turmoil so often implicit in discussion of adolescent issues. However, adolescence is generally regarded as a major life stage, so developmental issues are important to consider when looking at both those burned in adolescence and adolescents burned in childhood.

According to Erikson's (1959) theories, adolescents struggle between role confusion and identity formation. It can be suggested that the burned and scarred

adolescent has an even greater struggle, as they need to deal with both a role and an identity that has been forced upon them and which is more often than not, derogated by peers. Burn injuries and issues of identity are closely linked to body image issues.

Jessee et al. (1992) did not find any evidence that burned adolescents had lower body image scores than a control group, but found that both burned and normal adolescents had lower body image scores than younger subjects using human figure drawings. Bernstein (1990) claims that body image is particularly important to the adolescent because the actual physicality of the body changes in a way that will never happen again, heightening bodily awareness of both the self and others. In the burned adolescent, we may expect this effect to be even more salient. Bowden et al. (1980) for example, found that children burned between 0 and 11 years had changing needs over time, although the sample group had larger burns and contained more Caucasian children and were therefore not representative of the burned population. Children who previously had no self esteem problems as measured by an adapted Self Esteem Inventory (Coopersmith, 1967) sometimes developed problems at later stages- up to 6 years after their burn injury. This adds emphasis to the authors speculation that subsequent life changes such as entry into the more independent world of the adolescent bring body image issues to the fore.

Similarly, Beard et al. (1989) discuss that although they found good adjustment in their young burned group who all began the 5 year study at primary school age, long term adjustment would be closely tied to body image concerns arising in adolescence.

It can be suggested that the emergence of adult relationships and sexual behaviour in adolescence is a particularly salient measure of adolescent adjustment. Robert et al. (1998) investigated this in a study on the impact of disfiguring burn scars on 2 or more areas of head, neck, hand and genitals in a group of nineteen 13-20 year olds at least 1 year post burn. Using a questionnaire based on sexuality beliefs and experiences entitled "What young people say and do", their findings show the burned group no different to previously questioned, non-burned adolescents. Although this study was descriptive and used a very small sample of adolescents known to have no burn related physical or psychological problems, it elicited information unique to the emerging developmental concerns of every adolescent. It would appear that concerns about the burn injury, or resultant body image concerns, if they exist, do not hinder normal sexual development.

Sawyer et al. (1983) in a study of 37 children with at least 5% burns and who had been burned at least 3 years earlier, were assessed using semi-structured interviews and the Achenbach Child Behaviour Checklist (Achenbach, 1978, 1979). Children's teachers also completed the Rutter Symptom Checklist for Teachers (Rutter, 1967). By separating the whole group into 2 separate age groups, 8-11 years and 12-16 years, the Achenbach profiles showed poorer results for all adolescents. The Rutter Symptom Checklist scores also showed increased problems with age for burned children, although the authors pointed out that this questionnaire had not been validated for children over 12. Sawyer et al. (1983) suggested that adjustment to burns varies with developmental stage, and that adolescence in particular is a time when emotional and adjustment problems prevail. Extent of burn and time since burn did not affect psychosocial adjustment

at any age. By looking at the additional variables of face and hand burns, mothers with emotional problems and family stability (number of home moves), the authors predicted that burned children who experienced these extra stressors would fare worse in adolescence than other children.

1.9.3 Conclusions

Discussing burn injuries and adjustment to burn injuries in the context of development has proved difficult. It may be the case that in trying to examine the many variables potentially involved in outcome, there has not been enough concentrated research in any one "obvious" area such as this. It is particularly difficult to separate issues which are so tightly intertwined.

The current research finds pre-school children experiencing regression and developmental delays; adolescence as a period in which problems are expected to arise (but in which the quantitative data are lacking); and the period in between as the optimal developmental period for good adjustment. This is clearly an area which remains open to ongoing analysis.

The lack of concern with developmental issues in burns research is also one in the trauma research, and therefore this research will have issues of development at it's core, examining children from early childhood up to young adulthood. Developmental theory will be applied to further understanding of psychological trauma in the burned population.

1.10 Methodological issues

Tables 2 and 3 show that there has been a huge variety in measures and methods used to study this population.

1.10.1 Methods

It is clear that one of the most pressing issues for burns research has been methodology. Doing psychological research with children raises issues concerning development, and the longitudinal course of any psychopathology. Choosing a research design therefore involves careful consideration. The longitudinal study assesses the same children at various stages. The aim is to characterise change in the study variables over time, and to determine the contributors to that change (Everitt, 1998).

Whilst the research methodologies of the past were clearly problematic, there remains remarkably few longitudinal studies using valid and reliable standardised instruments and study populations applicable to the burned population as a whole. Such longitudinal studies are vital in understanding reactions beyond the acute injury stage. This research will therefore employ a longitudinal design, similar to the most recent studies (Kent et al., 2000, Meyers-Paal et al., 2000, Staley et al., 1999).

1.10.2 Measures

It has already been discussed that the structured clinical interview is the "gold standard" for clinical assessment, and the interviews used to assess PTSD have been introduced. It is of interest that only one (DICA) of these well researched instruments has been employed on one occasion, in burns research in the past (Stoddard et al., 1994). Although the majority of the studies have employed clinical interviews, these have been unstructured. This study will also therefore use DICA as the structured clinical interview.

As the main focus of this research is on trauma, the PTS-RI will be used, along with the IES, with the purpose of furthering the use of these in the existing

trauma literature reviewed in previous sections, and also for the purpose of their trauma meaningfulness. In the section on associated factors of PTSD, various self-report measures were discussed. An instrument assessing depression and also fears and anxieties is important these are implicated in both reactions to trauma and reactions to burn injuries.

It has been previously discussed that few standardised measures have been employed in burns research. The CBCL (Child Behaviour Checklist) has been the most commonly used standardised instrument (e.g. Byrne et al., 1986; Tarnowski et al., 1989; LeDoux et al., 1998)

Child Behaviour Checklist (CBCL)

(Achenbach et al, 1987a) exists in forms for both parent, teacher and child completion, and assesses both pathological behaviour and social competence on a three point scale (Angold, 1989). The factor structure of the CBCL can vary with age and gender but second order factors of Externalising and Internalising remain stable. Test-retest stability has been found to be as high as 0.99 after one week (Achenbach and Edelbrock, 1981) and inter-parent agreement has also proved high. The CBCL has proved predictive of results on psychopathology from structured interviews, but may not be able to differentiate PTSD from other forms of psychopathology (Finch and Daugherty, 1993). This does not however remove from the usefulness of the CBCL. It is easy to administer, has good standardisation data and is accessible.

It has been recognised as measuring general behaviour which may be associated with PTSD (McNally, 1996). Instruments not specifically designed to assess PTSD but which examine particular aspects of associated behaviour

problems can be extremely useful for the means of differentiating PTSD from other diagnoses (Peterson et al., 1991). As a general behavioural measure and one recognised as useful in trauma research as well as in the burns research, it will be used in this study.

1.11 Conclusions

This introduction began with an explanation of the physical consequences of sustaining an accidental burn injury. These medical aspects are vital for a clearer understanding not only of burn care terminology, but also for an understanding of the many experiences of burned children.

There followed an introduction to trauma and to PTSD. The many ways traumatic reactions can be assessed were introduced and explained. The trauma model has recently been utilised in furthering understanding of reactions to injury, illness and hospitalisation. It is a clinically useful model but as such, only explains the reactions of a minority of children and young people. PTSD is not the normative response in children who have been burned or in children who have been involved in other accidents or who have experienced serious illness.

The research literature specifically on burns, and away from a trauma model was summarised and examined. Common themes in the literature have been psychosocial aspects, families, and the effect of development on burned children's responses. It has become clear that methodologies and measures have been neglected in the past. In attempting to examine as many factors as possible involved in the adjustment to burn injuries, the existing research remains vague on many topics and exhibits expertise on none. An in depth analysis bringing together the research on burn injuries and on trauma in children and adolescents is clearly needed.

1.12 The Research Hypothesis

That children and adolescents experience a range of reactions following burn injuries, including posttraumatic stress disorder.

1.13 The Research Aims

1. To determine the incidence of psychological problems in burned children and adolescents
2. To determine the incidence of posttraumatic psychological states in burned children and adolescents
3. To identify characteristics and factors of burn injuries which are involved in the development of post-burn psychological sequelae.
4. To identify characteristics of burned children which are involved in the development of post-burn psychological sequelae
5. To assess the influence and investigate the role of these factors and characteristics on the post burn response
6. To consider the implications for future burn care and research.

Chapter 2 : Methodology

2.0 Overview

This was a longitudinal study of psychological adjustment in burned children and adolescents aged between 3 and 18 years, as described by their parents and (where appropriate) themselves.

2.1 Sample

2.1.1 Inclusion criteria

All children and adolescents aged between 3 and 18 years who presented with burn injuries at

a) the Royal Hospital for Sick Children (RHSC) in Glasgow between October 1998 and November 1999 and

b) the Glasgow Royal Infirmary (GRI) between December 1998 and June 1999

Children were recruited at least one month after their injury.

The Royal Hospital for Sick Children and the Glasgow Royal Infirmary were chosen as the study centres as the figures for all Greater Glasgow Hospitals from the previous year (1997/98) showed that these centres were where most children and adolescents presented following burn injuries.

Table 4

Burn Injuries 0-18 years attending Greater Glasgow Hospitals 1997/1998

(first time attendees)

AGE	0-4	5-9	10-14	15-18	
No. of injuries	78	20	15	14	Total=127

(note: includes both injuries seen in Accident and Emergency and injuries admitted)

AGE (yrs)					
Greater Glasgow Hospitals	0-4	5-9	10-14	15-18	Total
Royal Infirmary	0	1	10	9	20
Stobhill Hospital	0	0	0	1	1
Victoria Infirmary	0	0	1	1	2
Royal Hospital for Sick Children	78	19	4	0	101
Western Infirmary	0	0	0	3	3

2.1.2 Exclusion criteria

Children with suspected non-accidental injuries and children with mental and/or physical handicap were excluded in order to limit possible confounding variables. These cases were detected on examination of the children's notes.

2.2 Design

This was a longitudinal design, with data collection at 2 time points.

Cross-sectional vs. longitudinal design

Two basic study designs were considered; the cross-sectional design and the longitudinal design. A longitudinal study design was preferable for a number of reasons.

- 1) There is evidence to suggest that response to trauma may change over time (e.g. awareness of delayed onset PTSD). The longitudinal study allows participants to be followed and variables measured over a period of time; in this case, six months. Similarly, in studying children and adolescents, development is an important factor to consider.
- 2) In the absence of a control group, measuring the same variables over time means that subjects in effect act as their own control group.
- 3) Fewer subjects are usually required for longitudinal studies, depending on the reliability of the dependant variables. In burns research, where small sample sizes are a recognised problem, validity and reliability can be improved by using longitudinal design.
- 4) Cross sectional study designs are prone to confusing correlation with causation, particularly when the age difference between groups is large. Causal inferences may be more valid and less likely to be confounded by cohort problems when variables are measured over time.

In opposition to this however, is the case that cross sectional studies are much less obtrusive, taking less time, and are not subject to the problems of attrition which so often befall longitudinal designs. Generally however, the subject matter and participant pool available suggested that a longitudinal study design was optimal.

2.2.1 Time 1

Time 1 data collection occurred at least one month after the burn injury (mean=1.4 years, s.d.= 1.7 yrs, range= 0-6.1 years). Both members of the child-parent dyad took part in a structured interview and completed self-report measures (see chart below).

3-5 years	
CHILD	PARENT
no report	CBCL PTS-RI

5-18 years	
CHILD	PARENT
DICA- C IES C-PTS-RI DSRS FSS	DICA-P PTS-RI CBCL

Participants were given the choice of being interviewed in their home or in the Department of Child and Adolescent Psychiatry, and the majority preferred to be interviewed at home. When possible, children and their parents were interviewed separately and directly after each other in a one-to-one situation with no one else present. Although this was not the ideal situation and resulted in some visits being very long, this was regarded as the optimum method possible with only one researcher. Ideally, the interviews would have been held simultaneously to reduce chance for discussion and time. In practice, none of the children or adolescents had the opportunity to discuss questions and answers with their parents until both the interviews were over. Interviews lasted approximately one hour. Many of the children indicated that they thought the interview was too long, which is a recognised shortcoming of the computerised version (Reich et al.,

1995). During each interview the individual not being interviewed completed their self-report measures in a different room. In the case of some of the younger children, the researcher went through the self-report measures with the child in an interview type scenario. Most of the interviews were tape recorded or videotaped after consent from the child or adolescent and their parent, for the purposes of inter-rater reliability assessment at a later stage.

Interviewing children can be difficult, and it is important to take their developmental and communication needs into consideration (Greig and Taylor, 1999). Age alone is a poor measure of development with younger children. Experience with the structured interview (DICA) indicated that younger children, particularly those aged between five and seven years, had various problems in comprehension and communication. It was particularly felt that the length of time needed to conduct the interview was often beyond the normal attention span for younger children. If it quickly became apparent that the child was having difficulty with the structured interview, it was stopped, and they only completed the more age appropriate self-report questions.

At all times, the researcher attempted to establish rapport with the child and to make the interview an enjoyable and worthwhile experience (Greig and Taylor, 1999; Barker, 1990). When it was felt that the child was losing interest or was becoming restless, they were reassured that there were not many more questions.

Parent-child dyads

The majority of parents who took part were mothers (n=52). Although it was originally envisaged that both parents would be interviewed separately, this did

not happen. The length of each interview session made interviewing an extra person impractical. Where both parents were present, they answered the questions jointly (n=3).

2.2.2 Time 2

Time 2 data collection took place approximately 6 months after the date of Time 1 data collection (mean= 6 months). Parents and children (where appropriate) were contacted in the same way as at Time 1, and exactly the same procedure took place as at Time 1. There is evidence to suggest that reliability is enhanced when procedures are the same at different time points (Silverman, 1994).

2.3 Measures

2.3.1 Outcome measures-children

The Structured Clinical Interview

The structured clinical interview is perceived by most clinicians to be the most important diagnostic tool, and has long been employed as the basis for the whole diagnostic evaluation (Finch and Daugherty, 1993).

The process usually begins with an interview with the child and/or the child's parents. The structured clinical interview may be best seen as a framework from which to obtain reliable data; as a way of joining standardised assessment with clinical skills and trained decision making, resulting in a comprehensive picture of the presenting problem (Litz et al., 1992).

The merit of the structured clinical interview (as opposed to the traditional unstructured clinical interview) is that clinician and informer variance is reduced (Finch and Daugherty, 1993). The more structured the clinical interview, the more objective the clinician must be and therefore, the more reliable the results. This

however, could also be seen as a shortcoming; the experienced clinician with a less structured interview could well glean more subjective information although problems with reliability and validity will increase. For the researcher or inexperienced clinician however, there is little doubt of the value of the structured interview (Cohen et al., 1998).

Previous research has found that 18% of adults with PTSD had other psychiatric diagnoses (McFarlane and Papay, 1992), so an interview covering many DSM IV diagnoses was considered optimal.

Choice of structured clinical interview

There are a number of structured clinical interviews available, and they are all similar, for example,

- the Diagnostic Interview Schedule for Children (DISC, Costello et al., 1982, 1984),
- the Schedule for Affective Disorders and Schizophrenia in School Age Children (K-SADS, Puig-Antich and Chambers, 1978) and
- the Diagnostic Interview for Children and Adolescents (DICA IV, Reich et al., 1997).

Each

a) has a parent and child version and

b) generates DSM III and above diagnosis for common childhood disorders.

DISC and DICA are suitable for use by lay interviewers whereas K-SADS requires previous clinical training.

Most of the previous research in this population was based on clinical interviews, or specially designed questionnaires and this is where much of the criticism was

aimed, from a methodological perspective. The only previous study using a structured interview to assess DSM criteria in children with burns used DICA (Stoddard et al., 1989), and this was therefore the interview chosen for the present study. The strengths and weaknesses of this instrument are discussed below.

Diagnostic Interview for Children and Adolescents- IV (DICA IV; Reich et al., 1997).

This is a structured interview used to assess psychopathology in children between 6 and 18 years. There are three versions: one for parents of children aged between 6 and 18 years, one for children aged between 6 and 12 years, and one for adolescents aged between 12 and 18 years. The interview is based on the standard psychiatric nomenclature for DSM IV (APA, 1994), covering the entire range of childhood psychological problems and disorders. It has been demonstrated that the previous version of this interview, DICA-R (Diagnostic Interview for Children and Adolescents-Revised), which is based on DSM III-R can be an objective tool for use by lay-interviewers if proper training is given (de la Osa et al., 1996). The most readily available version of the DICA in this country is the recently developed computerised version (Reich et al., 1995, 1997). DICA-R was initially released in 1990 and DICA IV is the most up to date version, being based on the more recent DSM IV. This is a modification of the paper and pencil version more commonly used. The paper and pencil version has been found to have good reliability and validity in both clinical and research settings with an inpatient population, and has demonstrated good agreement between children, their parents and clinicians (Welner et al., 1987). The evidence on its

use, reliability and validity in general population samples has been questioned and is still being established (Boyle et al., 1993, 1996).

The computerised version has been designed for self-administration, after early versions indicated that a computerised version provided more information, resulted in more positive patient responses and increased cost effectiveness (Stein, 1987). The nature of research studies makes a computerised, laptop compatible interview particularly appealing. The questions are generally of the yes/no/don't know variety, although some questions have room for further explanation. There are no right or wrong answers. There are 26 categories included in the child interview and 28 in the parent interview, offering over 1600 questions. The program automatically branches to the appropriate questions and sections depending on the responses entered. The one study available assessing the most recent computerised version found that children under 10 had difficulties completing the interview without help and that there was some difficulty with certain diagnostic criteria (Reich et al., 1995). As a result of this, and for the means of standardisation, the interview was used as an "interview driver" (Reich et al., 1997), and administered by the researcher.

Parent and Child Reporting using DICA- IV

Agreement between child reports and parents reports using the DICA is moderate (Herjanic and Reich, 1982; Reich et al., 1982; Welner et al., 1987).

A study by Earls et al. (1986) found that children reported significantly more diagnoses than their parents using the DICA following a severe flood disaster. They found parent-child agreement to be highest for Attention Deficit Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD), and

lowest for Substance Abuse and Anxiety Disorders. When they looked specifically at the Anxiety Disorders, they found that there was no association between parent and child reports (Earls et al., 1986). Childrens subjective experience and appraisal was a central theme in the present study and therefore child and parent reports using the same instrument were ideal.

Problems associated with DICA reporting

Ezpeleta et al. (1997) found that agreement between clinicians diagnoses and diagnoses reached by using both parent derived and child self-report DICA-R diagnosis was low to moderate. In examining specificity and sensitivity of diagnosis, these authors concluded that for research purposes, when the researcher is often a novice, use of the DICA-R was superior to any other method. A highly structured interview format reduces the need for clinical experience (Rutter and Hersov, 1985).

The study also indicated that some diagnoses are more reliable (as compared to clinician diagnoses) when provided by particular informants, for example, children are more reliable than their parents in reporting certain conditions (when compared with clinician opinion). This is in keeping with the results of other research on other highly structured interviews such as the Diagnostic Interview Schedule for Children (DISC, Costello et al., 1982, 1984; Shaffer et al., 1996).

Reich et al. (1995) in a study on the computerised version of the DICA-R found poor reliability for clustering and duration reporting for Conduct Disorder and ADHD. It is recognised that error is common in retrospective recall on such items as duration (Rutter and Hersov, 1985). A study examining the test-retest reliability of the Spanish version of the DICA-R, found that all children and

adolescents aged 7-17 years had problems with questions relating to time concepts (Granero Perez et al., 1998), even though developmental theory postulates that children of this age should be able to understand such concepts. The nature of the questions relating to time may be too abstract in the DICA-R to aid children's comprehension (Granero Perez et al., 1998).

Boyle et al. (1993) evaluated DICA-R in a general population sample. Previous studies on the validity and reliability of the DICA-R have been based on clinical and/or inpatient samples but further research in this area would appear to be necessary if DICA-R continues to be used in general research studies. It has been postulated that reliability studies on inpatient samples are inflated because of the high levels of psychiatric symptoms in these populations (Robins, 1985). Boyle et al. (1993) found that reliability varied with the respondent, type of disorder and age of the child. Children's reports on their internal state were found to be unreliable using test-retest reliability, but their reports on their external states were found to be useful. It may be that questions relating to internal states require introspection and judgement to a degree which is not characteristic of the structured interview situation (Granero Perez et al., 1998). A later study, Boyle et al. (1996) compared DICA-R with the revised Ontario Child Health Study Health Scales (OCHS-R), (a self-administered problem checklist), in the general population and found the information generated by each to be comparable. It is therefore clear that validity of the DICA-R in general population samples requires further evaluation.

Rating Scales and Self-Report Measures

Whilst the structured clinical interview is seen to be the most important diagnostic tool, psychometric tests can provide additional detail in assessment (Litz et al., 1992).

Feldman (1984) believes that rating scales and behaviour checklists etc. are of limited use to a functional behaviour analysis but notes their use in indicating possible target behaviours and their non-reliance on rater/clinician inference. For the best diagnostic results, many measures, i.e. structured interview plus some self-report or other paper and pencil inventories, over many occasions should be the method of choice to overcome both the limitations of descriptive criteria alone and the incomplete nature of psychometric results (Keane et al., 1987). In theory, this sounds very promising for the best results, but in practice, this is probably unlikely to be feasible.

Rating scales are completed by people already familiar with the child, such as the child's parents or teachers. This familiarity component can be very useful in situations of time restraint, and any extra information is useful for the diagnostic process.

Rosen (1995) advocates a multi-method approach to assessment to minimise the possibility of mis-diagnosis. Finch and Daugherty (1993) show some recognition of this when they discuss the joint problems of the "halo effect" and the "error of central tendency". These refer respectively to a tendency for raters (i.e. parents) to be unduly influenced by one particular presenting characteristic, resulting in overall report bias, and a tendency for raters to avoid the extreme points of rating scales.

Previous studies have used a variety of self-report measures in the awareness that children can provide valuable subjective responses which their parents more

objective reports may omit. These instruments tend to be those which have been particularly developed for the study or which focus on small elements of the research aims (e.g. studies interested in family effects may implement the Family Environment Scale).

Although DICA IV contains the diagnostic criteria for PTSD from DSM IV, it is acknowledged that children show a range of posttraumatic symptoms which may not always be realised by diagnostic procedures. There are a number of tools available for the specific assessment of traumatic responses in children and adolescents, and the PTS-RI and the IES were chosen for the reasons below.

Child Posttraumatic Stress Reaction Index (CPTS-RI; Frederick, Pynoos and Nader, 1992)

This is a brief 20 item scale designed to assess posttraumatic stress symptoms in children and adolescents who have been exposed to a wide range of traumatic events and is based on DSM IV criteria. Symptoms are rated on a five point Likert scale ranging from "none" (0) to "most of the time" (4). Children below 8 years may need items reworded, according to developmental level.

The index does not provide DSM diagnosis, but establishes a level of PTSD. There has been good agreement between DSM III diagnosis and "severe" PTS rating (score > 40) using an earlier version of the PTS-RI (Pynoos et al., 1993; Goenjian et al., 1995). Pynoos et al. (1987) used the PTS-RI in a study of children exposed to a sniper attack in the school playground. 77% of the children met criteria for PTSD. One week later, 10 children were re-interviewed and there was high inter-rater agreement (94%) and test-re-test reliability using the PTS-RI.

populations and has also become popular for use with child populations. Approximations between PTSD in adults and children has been found using this instrument (McNally, 1996). Internal consistencies for the intrusion and avoidance subscales have been found to be .88 and .89 respectively in adult populations, and test-retest reliability can range from .86 to .96. Yule and Williams (1990) found the IES very useful for its trauma meaningfulness in children who survived the Herald of Free Enterprise disaster. The IES is successful at detecting and accessing intrusive thoughts, particularly in younger children (Yule and Williams, 1990).

However, Pynoos et al (1987) found that the IES did not distinguish grief reactions from PTSD in children traumatised after a playground sniper attack. Findings such as this delineate the importance of the use of a broad range of measures.

Many children develop fears and anxieties after traumatic experiences (Yule, 1994) although there has not been any specific research in fears resulting from the trauma of burn injuries.

The Fear Survey Schedule for Children (FSSC; Scherer and Nakamura, 1968) and the Fear Survey Schedule for Children-Revised (FSSC-R; Ollendick, 1983; Ollendick et al., 1989).

This is a measure specifically designed to assess anxiety. It is generally regarded that such an instrument is important for differentiating normal fears from pathological anxiety (March and Albano, 1996; March 1997).

The FSSC-R is an 80 item inventory used to assess fearfulness to common stimuli in children, and particularly phobic symptoms. Items are rated on a 3 point

Likert scale “none”, “some” and “a lot”. The FSSC-R has been found to have high internal consistency and moderate test-retest reliability and correlates well with other commonly used measures of childhood anxiety (Last et al., 1998). There has been recent speculation that the age of this measure may question its validity and clinical usefulness (March, 1997). An example is item no. 73, which pertains to fear about “Russia”.

Depression is a common problem in children following trauma. Although some early studies found significant levels of depression in children with burns, improved methodology has resulted in this being debated. Few studies of children with burns examine depression specifically.

There is a high prevalence of co-morbidity between PTSD and depression in adults and in children following trauma, although there is debate as to whether this is due to symptom overlap in the classification. Some adolescent survivors of major trauma develop clinical depression and may have suicidal ideation (Yule, 1994).

The Depression Self Rating Scale (DSRS, Birleson, 1981; Asarnow and Carlson, 1985).

This scale contains 21 items relating to depressive symptoms in the last 2 weeks and is scored on a three point Likert scale from “never” (0) to “most of the time” (2). The scale was designed for use in children aged between 6 and 13 years. In inpatient populations, it has been found to have high internal consistency and factorial validity (Birleson, 1980), and scores significantly discriminate children independently diagnosed as meeting depressive and non-depressive disorders (Asarnow and Carlson, 1985). There is some evidence that

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2.3.2 Outcome measures- parents

Parents of children over 5 years answered the DICA IV to give their perspective on their children's behaviour. They also completed a small battery of self-report instruments, which were also based on their children's behaviour (this is an important distinction as some previous studies ask parents about *their* responses to their children's behaviour).

Child Behaviour Checklist (CBCL; Achenbach et al., 1987a)

The CBCL exists in forms for parent, teacher and child/adolescent completion, and assesses both pathological behaviour and social competence on a three point scale where 0 represents “not true” and 2 represents “very/often true” (Angold, 1989). The CBCL is an empirically based approach to assessment and is widely used. The factor structure of the CBCL can vary with age and gender but second

order factors of externalising and internalising remain stable. Test-retest stability has been found to be as high as 0.99 after one week (Achenbach and Edelbrock, 1981) and inter-parent agreement has also proved high. The CBCL has proved predictive of results on psychopathology from structured interviews, but may not be able to differentiate between different forms of psychopathology (Finch and Daugherty, 1993). This does not however, detract from the usefulness of the CBCL. It is easy to administer, is well standardised and is easily accessible (Angold, 1989).

Posttraumatic Stress Reaction Index (PTS-RI; Pynoos et al, 1987; Nader, 1994).

This is a version of the child PTS-RI, adapted for parents to report on their children's responses to traumatic events.

2.4 Procedures

2.4.1 Recruitment

A total of 157 potential participants were approached to take part in the study. Following informed consent guidelines, parents of children between 3 and 16 years were sent a standard recruitment letter explaining the study (Appendix 3) and a contact number, should they be interested in taking part. Adolescents over 16 are legally allowed to give their own consent and were sent a similar standard recruitment letter and contact number. After one week, they were contacted by telephone when possible. If they were not available by telephone, another letter was sent out. This is the "multiple-methods" approach to recruitment espoused by Esbensen et al. (1999) for maximum effectiveness. Means of finding children and adolescents for recruitment varied between the 2 hospitals taking part in the study.

Children under 5 years

Children's self-reports are as important as their parents reports, but children under 5 have limited communication skills, and therefore children under 5 years were not initially included in the study, even though literature searches and figures for the previous year indicated that this group was the largest. Recruitment difficulties resulted in this issue being re-considered, and it was felt that the parental self-report measures would provide some important information on the 3 to 5 years age group. Planning for this initially would have resulted in a broader range of age-appropriate measures.

The Royal Infirmary- Inpatients

Figures from 1997-1998 indicated a minority of children being seen at the Royal Infirmary, but the majority of adolescents attended the specialist Burns Unit at this hospital. The consultant in the Burns Unit forwarded names of those in the appropriate age group as and when they were admitted. Some of these adolescents were those returning for reconstructive surgery. Details were gained from hospital records.

The Royal Infirmary- Out-patient clinic

The majority of children and adolescents attending with burn injuries at this hospital were seen on only one occasion, in the Accident and Emergency department. Those requiring follow-up care attended the hospital on an out-patient basis, returning to a daily burns clinic for dressing changes when required. Names, addresses and details of their injuries were gained from their hospital records. As a result of experience in recruitment gained at RHSC, suggesting that those children with very minor injuries were not taking part, only those children and adolescents returning to the outpatient Burns Clinic were contacted (n=42).

The Royal Hospital for Sick Children

Initially, children were recruited from Accident and Emergency when they arrived for dressings. After a brief introduction from the consultant, the study was explained to the child's parent with the child present, and if they agreed, their details were taken so that they could be contacted after one month. Details were gained from hospital records.

Details on inpatients were gained daily from visits to the Ward and liaising with the ward staff. If parents of suitable children were present, the study was explained to them and consent achieved.

Due to general difficulties with these procedures at this stage, the consultant surgeon on the ward suggested changing the procedure and recruiting from the weekly burns clinic. Children seen at this clinic were out-patients returning for dressing changes, and children returning for general follow-up care such as pressure garment fittings and ongoing scar tissue management. Details on clinic attendees were collated weekly, and parents were approached at the clinic (total number approached = 115).

Consent

Following current guidelines and practice, informed consent was sought from all participants. Parents of children between 3 and 5 years were mailed 2 questionnaires with a pre-paid envelope for return together with a consent form.

Parents of children and adolescents over 5 years who agreed to take part in the study were given the option of being visited in their home or attending the Department of Child and Adolescent Psychiatry at RHSC. After ensuring that they understood the purpose of the study, parents of those participants under 16 years signed a consent form (Appendix 4) and the verbal consent of all the children was obtained. Adolescents over 16 years signed their own consent form (Appendix

4b). It was understood that both the parent and the child could stop the interview or leave the study at any time. The interview had scope for leaving out certain sections, and a majority of the parents of the younger participants requested that their child not be asked questions about drug use, alcohol and sexual abuse. One of the final questions in the interview was "Was there anything I asked you about in this interview which bothered you?", and no one responded yes to this.

2.5 Control Group

Individual differences can confound study effects. A control group serves as a comparison group, excluding only the independent variables. Few previous studies on burn injuries in either adults or children have employed a control group. Previously used control groups have been; matched "normal" children, children hospitalised for minor surgery, general population norms, siblings, children with heart disease and children attending hospital with minor injuries. A control group ameliorates the effects of individual differences and increases the reliability and validity of the research study.

Although researchers recognise that a control group is optimal from a methodological perspective, it is also recognised that it is extremely difficult to control for minor burn injuries, as so many different variables are involved and are as yet unclear (hence the need for the present study!).

"How burn patients differ from the population at large, or from specific illness or accident victims, is not known. Regional or population differences at different types of facilities are also unknown...Psychosocial research is fundamentally different from medical research...it requires larger populations and a larger number of interrelated variables which are difficult and often impossible to control" (Knudson Cooper, 1984, p. s1998-1999).

For these reasons, no control group was used. Research which uses a within subjects design tends to detect more real effects that would otherwise be obscured by subject related variance. Within subjects designs may result in more reliable results (Bordens and Abbott, 1998). Similarly, as was noted above, in measuring variables over time, participants can in effect, act as their own controls.

2.6 Ethical Approval

Ethical approval and subsequent amendments to original proposals was granted by the Research Ethics Committees of both hospitals.

2.7 Methods for scoring the Instruments

A theoretical note: Parent and Child Reports

Assessing children and their parents separately frequently results in differing and conflicting information. This is not surprising, parents and children report from two different perspectives. However, there is no doubt that children as young as 6 years can be reliable informants (Herjanic et al., 1975), and using both children and their parents as informants on childhood disorder is now common practice. It has been recognised that parents are more likely to report observable behaviour, whilst children are more likely to report internalised behaviour, but in general, there do not appear to be any consistent specific factors, for example, age and gender, which mediate symptom reporting (Edelbrock et al., 1985; Jensen et al., 1988a; Jensen et al., 1999).

As a result of the common anomalies and discrepancies between parent and child reports, this study will on the whole, examine child reports and parent reports separately.

Problems: Misleading responses

False positives- the reporting of a symptom that has not actually been experienced

False negatives- the failure to report a symptom that has been experienced.

False negatives are probably more likely to be reported than false positives for reasons of avoidance, but both responses may occur simply as the result of misunderstanding the intent of the question. Breslau (1987) suggests that children may be more likely to report false positives as they are more susceptible to suggestion not only in interview situations, but to general stimuli.

Children do not have the linguistic abilities of adults, so reporting of feelings can be problematic for reasons of articulation, expression or labelling (Finch and Daugherty, 1993). It has also been noted that often children are simply unable to express feelings. This is known as alexithymia (Apfel and Sifneos, 1979). There may be some relationship between anxiety and alexithymia (Fukunishi et al., 1994). In opposition to this however, is the likelihood that material that is of no interest to the clinician (non-pathological material) will be reported in instances where pathological material would hopefully have been elicited (Angold, 1988). The cognitive abilities of children are at once important but also difficult to take into consideration when both structured interviews and the highly structured classification systems these are based on fail to do so.

2.7.1 Scoring DICA-IV, parent and child versions

Information obtained from DICA IV is processed and scored as part of the software package on the basis of DSM IV (APA, 1994) criteria. "Scoring" is only loosely applied, as there are no raw scores or t-scores calculated, for example. "Scoring" refers to the allocation of different responses to the relevant diagnostic categories. Previous versions of DICA required the researcher or clinician to score the results, but computerised scoring, by using algorithms, is more objective (Hodges, 1993).

Results can be produced as

- Concise Diagnostic Report
- Summary of Responses
- Possible Diagnosis and Criteria.

Concise Diagnostic Report

This is a short report simply outlining which diagnoses the child has or has not met according to the parent or child report.

Summary of Responses

This summarises all the questions and responses provided during the interview.

Possible Diagnosis and Criteria

Using DSM IV criteria, this report breaks down each diagnostic category into its separate criterion measures, e.g., Criterion A, B etc., and indicates whether responses provided during the interview fulfil the criteria. This report clearly shows how a diagnosis was reached or why a diagnosis was not reached according to the responses provided during the interview. It also enables observations regarding symptoms which just meet or just fail to meet diagnosis. The summary of responses report and the possible diagnosis and criteria report are invaluable for checking accuracy and in situations where personal judgement is required to clarify results.

Partial Diagnosis

The term diagnosis, such as that provided by DSM IV “means the formal assignment of problem behaviours to specific categories drawn from a formal

classification system” (Silverman, 1994, p.293). Diagnosis is dichotomous, and therefore, it could be suggested that “partial” diagnosis is an empty concept, and indeed, finding a definition of such a term is an impossible task.

It cannot be debated however, that there are times when all the diagnostic criteria have not been met but it is obvious that the child is exhibiting symptoms, and in this case, “partial” diagnosis can be very useful, particularly for the purposes of research.

Partial PTSD is commonly referred to for example, and this “partial” diagnosis is what has been termed “Uncomplicated posttraumatic stress reaction to traumatic stress” (Blank 1993, p.238) as the recommended text for V code in DSM IV. Individuals experiencing PTSD symptoms which do not meet the full diagnostic requirements for PTSD may find these symptoms ameliorated or attenuated with time, or may experience symptoms episodically (Blank, 1993).

Preliminary DICA results indicated that many participants manifested symptoms which appeared to be important to consider, even if they did not manifest enough symptoms to fulfil full diagnostic criteria.

Deciding what exactly constitutes “partial” diagnosis is problematic. Due to the small sample size of this study, partial diagnosis refers broadly to the presence of key problem behaviours, for example,

1. Meeting the majority of criterion measures except duration
2. Meeting a significant number of criterion measures.

(following Blank, 1993)

An example of what has been termed partial diagnosis in this study for ADHD is provided in Appendix 5.

2.7.2 Scoring Impact of Events Scale (IES)

The reference point for reporting symptoms on the IES is the last week (Horowitz et al., 1979). The IES can produce

- a) a total trauma score, with responses marked 0, 1, 3, 5, with a possible total of 75.
- b) an Intrusion sub-scale score. Questions relating to Intrusion are highlighted in Appendix 6 (possible total score 40).
- c) an Avoidance sub-scale score. Questions relating to Avoidance are highlighted in Appendix 6 (possible total score 35).

Scores of >15 on either subscale or >30 total score are predictive of PTSD diagnosis (Horowitz et al., 1979).

Results on each scale can be interpreted in terms of distress

low distress=0-8

moderate distress=9-19

high distress=20<

2.7.3 Scoring the PTS-RI and the C-PTS-RI

The 5 point scale produces scores representing the rating of PTSD

<12 =doubtful

12-24=mild

25-39=moderate

>40=severe

(Frederick, Pynoos and Nader, 1992)

2.7.4 Scoring the DSRS

The 3 point scale produces scores relating to presence or absence of depression using a cut-off score of 15.

<15=no depression

>15=depressed

(Birelson, 1981)

2.4.5 Scoring the CBCL

The CBCL can be used to assess both competence items and problem items.

This study assessed only problem items. The CBCL is commonly scored using the accompanying software package (Arnold and Jacobowitz, 1986). A range of results are produced, which centre around profile types. The profile types relate to the problem scores obtained from representative samples of non-referred American children of the same age. The profile types are calculated by the program, using cluster analyses of syndrome scores. Appendix 7 shows an example of the CBCL results as produced by the scoring program.

The syndrome scores are calculated from questions based around eight syndrome scales (1) Withdrawn (2) Somatic Complaints (3) Anxious/Depressed (4) Social Problems (5) Thought Problems (6) Attention Problems (7) Delinquent Behaviour (8) Aggressive Behaviour.

The (1) Withdrawn, (2) Somatic Complaints and (3) Anxious/Depressed scales form an Internalising group of problem items, and the (7) Delinquent behaviour and (8) Aggressive behaviour scales form an Externalising group of problem items.

There is a total scale score and two types of *T* scores produced for each scale. These *T*-scores refer to the normative data the CBCL is based on. The program print out indicates if the *T* scores fall within the clinical range or the borderline clinical range (or not at all).

The CBCL can produce scores on a total of 7 profile types

- Withdrawn }
- Somatic Complaints }
- Social Problems }all ages and sexes
- Delinquent Aggressive }
- Delinquent }
- Social Problems-Attention Problems - ages 12-18 only
- Withdrawn-Anxious/Depressed-Aggressive - boys only

Intra-class correlations comparing the individual child's problem scale scores with the normative problem scale scores are computed and if the scores on the profile types are statistically significant, this is indicated on the print out. Profile types are not calculated if the total problem score is <30. No results are calculated at all if there are more than 20 missing items.

Although the CBCL produces a lot of detailed information, the present study only employed the total scale score and scores for the Internalising and Externalising sub-scales.

2.8 Data Analysis

Data analysis was designed to meet the primary aim of the present study; to provide a description of the sample and to identify possible salient hypotheses and variables for the use of future research. Data was analysed using SPSS

(Standard version, 7.5.1). Both interval and nominal data was inputted where necessary. Due to the problems with recruitment rate and the resultant small group sizes for analysis, non-parametric analysis was most frequently used (e.g. Mann-Whitney tests). Exact significance was computed where possible to allow for small, sparse, unbalanced and poorly distributed sample sizes. In situations where groups were homogeneous, did not have outliers and were of sufficient size, parametric analysis was used. The rationale for the statistical test used accompanies each section in the results section.

Chapter 3. Results

3.1 Characteristics of the Study Participants

A total of 55 children, adolescents and their parents (n=49) took part in the study. Information was collected on 31 males and 24 females. Participants ranged in age from 3-18 years (mean 7.4 years, s.d. 3.99) and sustained their injury 0-6.1 years ago (mean 1.38 years, s.d. 1.68). Their mean age at the time of their injury was 6 years (s.d. 4.1) with a range of 0.4-16.6 years.

Participants had a mean TBSA burned of 9.85% (range 1-51%, s.d. 11.2) and when hospitalised (n=44), were in hospital for a mean 17.49 days (s.d. 21.75, median 7 days).

3.1.1 Burn Related Characteristics

Any surgery involving general anaesthetic was investigated under the general term “operations”. The maximum number of operations undergone was 15 with a mean of 1.67 (s.d.=3.4). The tables and charts below summarise this information.

Table 5 Participants burn related characteristics

n=55	mean	s.d.	min	max
age (yrs) (t1)	7.405	3.987	3	18
age at injury (yrs)	6.025	4.131	0.4	16.6
time since burn (yrs)	1.378	1.682	0	6.1
TBSA (%)	9.845	11.251	1	51
days in hospital	17.49	21.75	0	90
operations- grafts etc.	1.67	3.39	0	15

Forty six children and adolescents were recruited from the Royal Hospital for Sick Children and 8 from Glasgow Royal Infirmary. One child who had recently returned from USA was referred to the study by the surgeon at the Burns Unit at the GRI, but was not actually a patient at either of the 2 hospitals.

Table 6 Hospital attended by participant (n=55)

hospital		Frequency	Percent
Valid	rhsc	46	83.6
	gri	8	14.5
	other	1	1.8
	Total	55	100.0
Total		55	100.0

note: gri= Glasgow Royal Infirmary, rhsc=Royal Hospital for Sick Children

Exploratory statistical analysis showed that the data on the participants from the 2 different hospitals was not normally distributed and had unequal variances. In order to examine the data for differences between the 2 groups of participants, Mann-Whitney tests were carried out. Results showed that there was a significant difference in the age of the participants between the two hospitals both at the time of the first assessment ($z = -.29$ (exact) $p=0.002$ for a 2-tailed test) and at the time of their injury ($z = -3.092$, (exact) $p=0.001$ for a 2-tailed test) Children at the GRI were approximately 6 years older than children from the RHSC at both time points. This was an anticipated finding due to the nature of the hospitals. The Royal Hospital for Sick Children is a pediatric centre and the Royal Infirmary is an adult centre.

Table 7 Burn related characteristics of the participants from the 2 hospitals

		RHSC N=46	GRI N=8	pvalue
Days In	Mean	16.02	24.25	n.s.
	Median	7.5	1.5	
	s.d.	19.01	35.14	
	min.	0	0	
	max.	90	90	
Age now	mean	6.4	12.8	0.002
	s.d.	2.9	5.4	
	min.	3	15.7	
	max.	15.7	18	
	Mean	5.15	11.5	
Age burn	s.d.	3.2	4.8	0.003
	min.	0.4	3	
	max.	12.7	16.6	
	Mean	0.96	5.4	
	s.d.	1.76	6.95	
Ops	min.	0	0	n.s.
	max.	8	15	
	mean	7.8	18.6	
	s.d.	7.5	20.54	
	Median	6.5	10	
TBSA	min.	1	1	n.s.
	max.	37	51	
	Mean	1.28	1.34	
	s.d.	0.18	1.25	
	min.	0	6.1	
TSB	max.	0.1	2.9	n.s.

note: TSB = time since burn, n.s.= non significant

Boxplots (Figure 1, Figure 2) clearly show these significant differences

Figure 1 Boxplot showing the differences between children's age at time of injury between RHSC and GRI

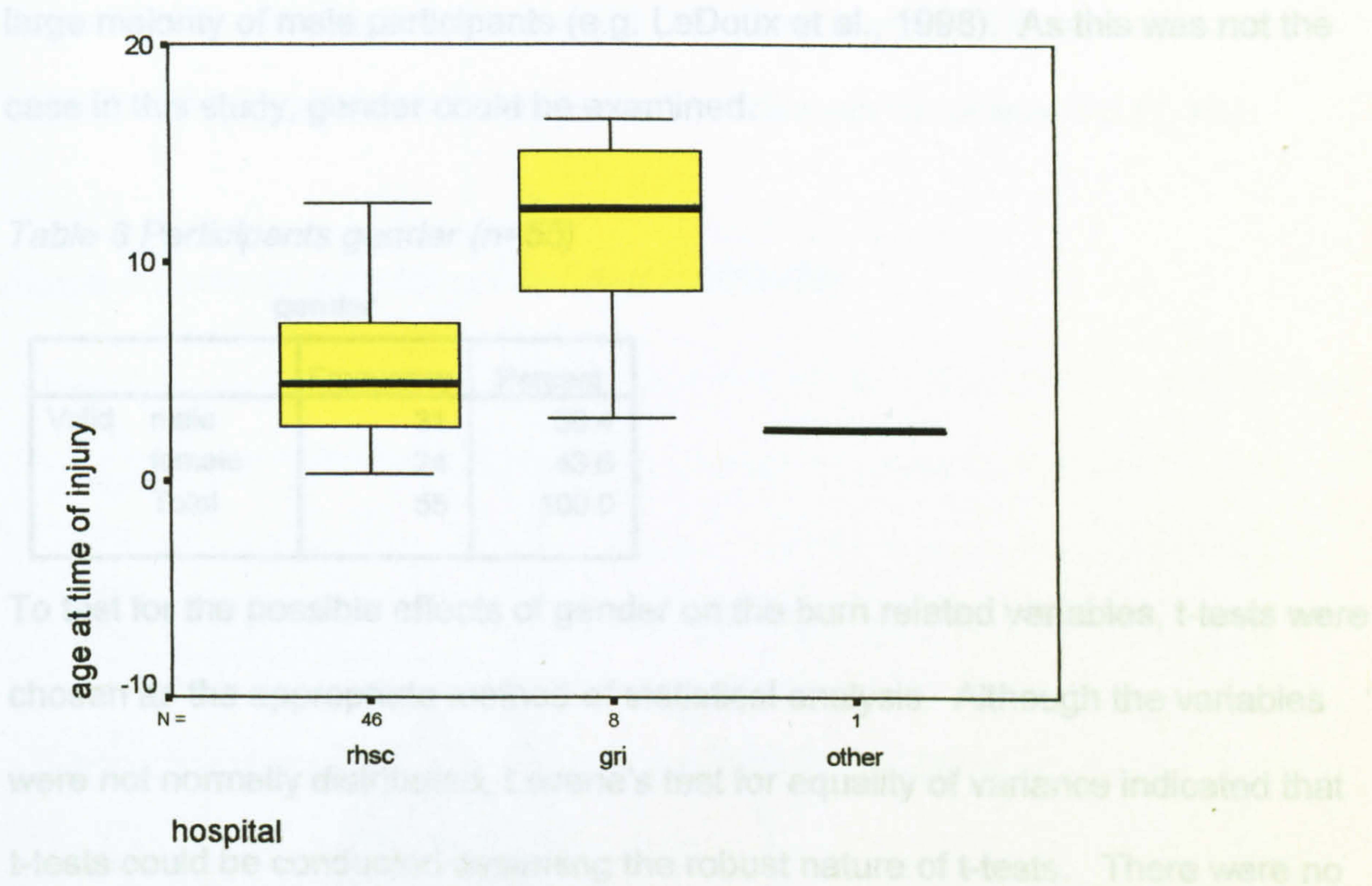
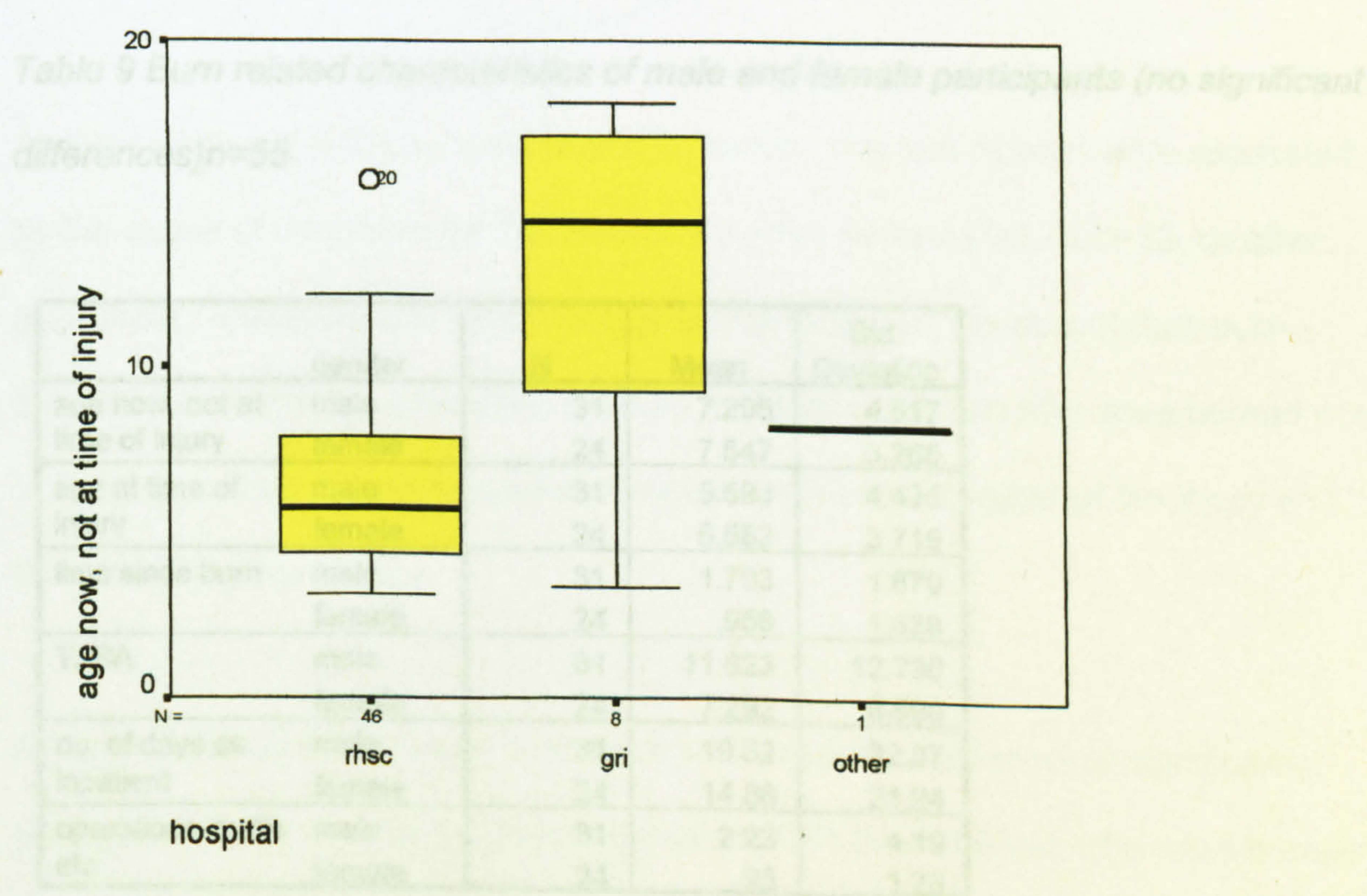


Figure 2 Boxplot showing the differences between children's age at the time of the first assessment between RHSC and GRI



Gender

Most burns research does not examine the effects of gender as there is usually a large majority of male participants (e.g. LeDoux et al., 1998). As this was not the case in this study, gender could be examined.

Table 8 Participants gender (n=55)

gender		Frequency	Percent
Valid	male	31	56.4
	female	24	43.6
	Total	55	100.0

To test for the possible effects of gender on the burn related variables, t-tests were chosen as the appropriate method of statistical analysis. Although the variables were not normally distributed, Levene’s test for equality of variance indicated that t-tests could be conducted assuming the robust nature of t-tests. There were no significant differences in the burn related variables of male and female participants.

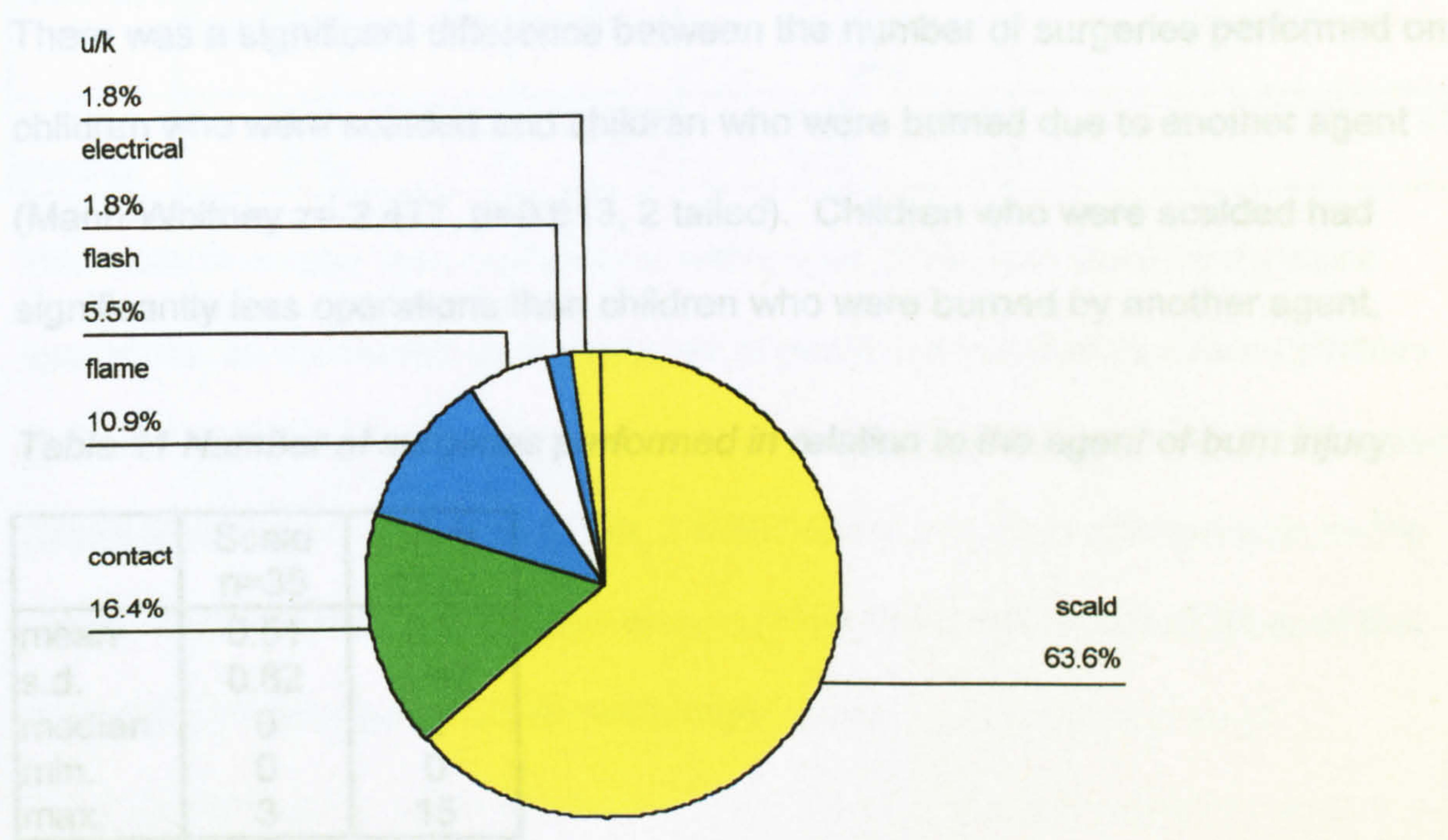
Table 9 Burn related characteristics of male and female participants (no significant differences)n=55

gender		N	Mean	Std. Deviation
age now, not at time of injury	male	31	7.295	4.517
	female	24	7.547	3.265
age at time of injury	male	31	5.593	4.435
	female	24	6.582	3.719
time since burn	male	31	1.703	1.670
	female	24	.958	1.638
TBSA	male	31	11.823	12.730
	female	24	7.292	8.590
no. of days as inpatient	male	31	19.52	22.27
	female	24	14.88	21.24
operations-grafts etc	male	31	2.23	4.19
	female	24	.96	1.78

Cause of burn injury

Most burn injuries were due to scalds (63.6%). Other agents of injury were contact burns (16.4%), flame burns (10.9%), flash burns (5.5%) and electrical burns (1.8%). One boy had been burned in unknown circumstances (1.8%).

Figure 3 Cause of burn injury Pie-Chart (100%=55)



As the majority of injuries were caused by scalds, the participants were separated by the cause of their burn for the means of further analysis (scald $n=35$, or other agent= 20). There was no significant difference between the size of their burn injury in those children who were scalded and those children who were burned due to another cause. There was no association between the agent of the injury and the size of the burn injury.

Table 12 No. of participants in 2 TBSA burn groups

A Mann-Whitney test showed that children who were scalded were significantly younger at the time of taking part in the study (T1) than children who were burned by another cause ($z=-1.977$, $p=0.048$, 2 tailed), but there was no significant age difference between the groups at the time of their injury.

Table 10 Age (yrs)at T1 for children grouped by the agent of burn injury (scald vs. other)

age	Scald n=35	Other n=20
mean	6.4	9.1
s.d.	2.8	5.1
median	5.5	7.6
min.	3	3.1
max.	12.4	18

There was a significant difference between the number of surgeries performed on children who were scalded and children who were burned due to another agent (Mann-Whitney $z=-2.477$, $p=0.013$, 2 tailed). Children who were scalded had significantly less operations than children who were burned by another agent.

Table 11 Number of surgeries performed in relation to the agent of burn injury

	Scald n=35	Other n=20
mean	0.51	3.7
s.d.	0.82	4.97
median	0	2
min.	0	0
max.	3	15

Size of the Burn Injury

43.6% of the burn injuries were minor (in size), involving <5% TBSA burned. The size of the burn injury varied widely, between 1 and 51% total body surface area. To make this data more useful for the means of analysis, 2 categories were created based on burn size greater than or less than 5% TBSA.

Table 12 No. of participants in 2 TBSA burn groups

TBSAGRP			
		n	Percent
Valid	<5%	24	43.6
	>=5%	31	56.4
	Total	55	100.0

Kolmogorov-Smirnov tests for normality and Levene's tests for equal variances both indicated that the data on TBSA using these categories could only be subjected to non-parametric analysis, and that exact tests of significance would be preferable.

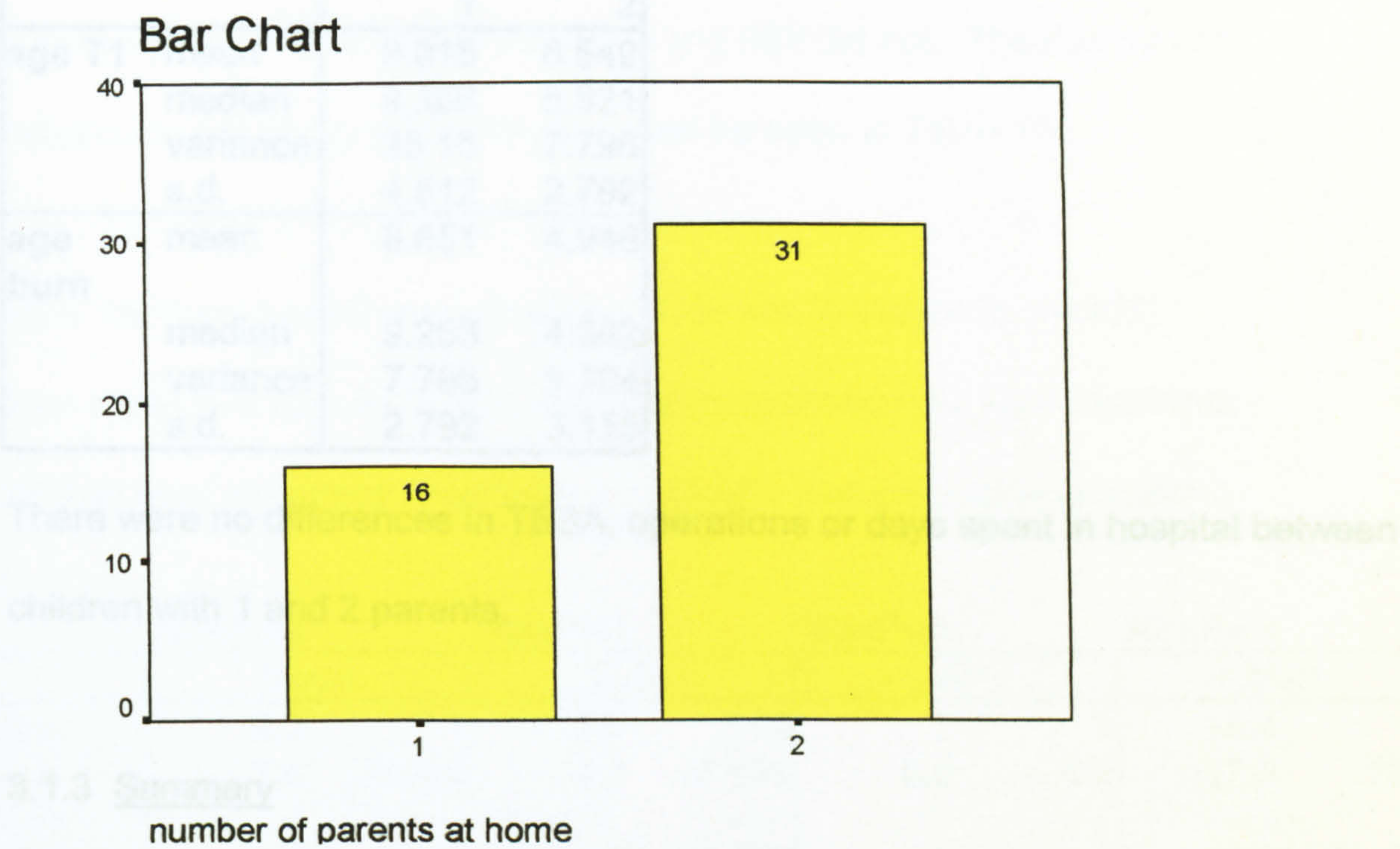
Table 13 Burn size in relation to other burn related variables

	<div><=5%</div> Age T1	<div>>5%</div> Age T1	Age Inj.	<div>>5%</div> Age Inj.	Ops, etc.	<div>>5%</div> Ops, etc.	Days In	<div>>5%</div> Days In
mean	7.1	7.6	6.2	5.8	0.54	2.55	2.79	28.87
median	6.5	5.7	5.5	4.3	0	1	1	27

This table illustrates how participants with larger TBSA had significantly more operations, as measured by the number of general anaesthetics (Mann-Whitney $z=-2.337$, $p=0.019$, two tailed exact test) and spent significantly longer in hospital (Mann-Whitney $z= -5.431$, $p=0.000$, 2 tailed exact test) than children with $\leq 5\%$ TBSA. Children with minor burns were no different in age either at T1 or at the time of their injury from children with larger burns.

3.1.2 Family Characteristics of Burned Children

Figure 4 Number of parental figures in the home of burned children (n=47)



56.4% of children came from homes where 2 parental figures were present and 29.1% of the children came from homes where one parent was present. Information was not available on 14.5% (n=8) of children as it was not recorded in their case-notes and this information was gathered retrospectively.

Children with 2 parents were significantly older both at the time of their injury and at T1 than children with only one parent (Mann Whitney, $z=-2.761$, $p=0.006$, 2 tailed exact significance, and $z=-2.268$, $p=0.023$, 2 tailed exact significance respectively)

Participant	Instrument	n
parent	DXA-P	25
	CBCL	50
	FTS-R1	51
child	DXA-C	22
	IES	25
	DSRS	25
	IES	25
	C-PTS-R1	25

Table 14 Age at injury and at T1 for children with one and 2 parental figures (n=47)

		parents	
		1	2
age T1	mean	9.818	6.549
	median	9.366	5.821
	variance	23.15	7.796
	s.d.	4.812	2.792
age burn	mean	8.651	4.946
	median	9.253	4.342
	variance	7.796	9.704
	s.d.	2.792	3.115

There were no differences in TBSA, operations or days spent in hospital between children with 1 and 2 parents.

3.1.3 Summary

Participants were 55 children (56.4% male) attending 2 inner city hospitals, ranging in age from 3-18 years (mean 7.4 years, s.d. 3.99 years). The majority of children (56.4%) came from homes where 2 parental figures were present. Not all participants were hospitalised for their injuries. Those who were hospitalised spent on average 17.49 days in hospital (s.d. 21.75 days). Total body surface area burned was mean 9.85% (range 1-51%, s.d. 11.2%). The most common cause of injury was scalds (63.6%) and the average number of surgeries required was 1.67 (s.d. 3.4, range 0-15).

The chart below summarises how many children and how many of their parents took part in completing each part of the assessment.

Participant	Instrument	n=
parent	DICA-P	25
	CBCL	50
	PTS-RI	51
child	DICA-C	22
	IES	25
	DSRS	25
	FSS	25
	C-PTS-RI	25

3.2 Characteristics of the Non-Participants

There were a total of 157 possible participants. Fifty five children and/or their parents agreed to take part in the study and 102 did not. The descriptive statistics on the non-participant group can be seen in Table 15.

Table 15 Burn related characteristics of the non-participants (n=157)

note: number of days in¹ hospital includes only those who were inpatients (55.9%) ops² describes only those (n=28) who had surgical intervention

	NonPart		NonPart		NonPart		NonPart	
	Mean		S.D.		Min		Max	
age	9.3	7.4	4.7	3.99	3	3	18.4	18
age burn	7.6	6.025	5.3	4.131	0.2	0.4	17.8	16.6
TSB	1.6	1.378	2.6	1.682	0	0	12.5	6.1
TBSA	7.9	9.845	10	11.25	0	1	50	51
No days in ¹	21.77	17.49	26.15	21.75	1	0	131	90
ops ²	3.5	1.67	4.6	3.39	1	0	20	15

The mean age of children who did not take part in the study was 9.3 years (s.d. 4.7), and they had an average age of 7.6 years (s.d. 5.3, range 0-17.8 years) when they were burned. Study non-participants were burned mean 1.6 years ago (maximum 12.5 years ago) and had an average 7.9% total body surface area burned.

55.9% of the non-participants stayed in hospital at the time of their injury and 44.1% did not.

The mean no. of days spent in hospital by the non-participants was 12.17 (s.d 22.3) days and the median was 1 day. The mean number of days spent in hospital following their injury for those who were inpatients was 21.77 (s.d. 26.15) and the median was 13 days.

72.5% of the non-participants had no surgical intervention for their burns. The 28 (20%) who did, had a mean 3.5 (s.d. 4.57) operations under general anaesthetic (minimum 1, maximum 20).

Were the participant group and the non-participant group similar?

Table 16 Results of Mann-Whitney tests for burn related variables between participants and non-participants

**significant difference between the 2 groups beyond the 0.05 level*

	Age	Age Burn	TSB	Days	Ops	TBSA
Z	-2.206	-1.49	-0.098	-1.51	-1.95	-0.412
Asymp. Sig	0.027	0.136	0.922	0.13	0.05	0.16
Exact				**0.13	**0.05	

Mann-Whitney tests on burn related variables for participants and non-participants revealed statistically significant differences between age at the time of recruitment (z =-2.206, p= .027, 2 tailed) and number of surgical interventions (z= -1.95, p=.05, 2 tailed). Table 15 shows that the non-participant group had significantly more surgical interventions (mean 1.83) than the participants and that they were significantly older (on average 1.9 years older).

Hospital Attended

The majority of non-participants had attended RHSC (67.6%) and 32.4% had attended GRI.

Table 17 Potential participants by the hospitals they attended

Count		hospital		Total
		rhsc	gri	
Study Group	tookpart	46	9	55
	non-participant	69	33	102
Total		115	42	157

Although there was no significant difference between the number of days spent in hospital between the participants and the non-participants, participants were significantly more likely to have been an inpatient; 80% of the participant group were inpatients compared to 55.9% of the non-participant group (Chi=7.684, 1 d.f., p=0.009, based on the exact distribution).

Table 18 In/out patient status of participants and non-participants.

		did they stay?		Total
		yes	no	
Study Group	tookpart	43	12	55
	non-participant	57	45	102
Total		100	57	157

Gender

68.6% of the sample of non-participants were male and 31.4 % were female.

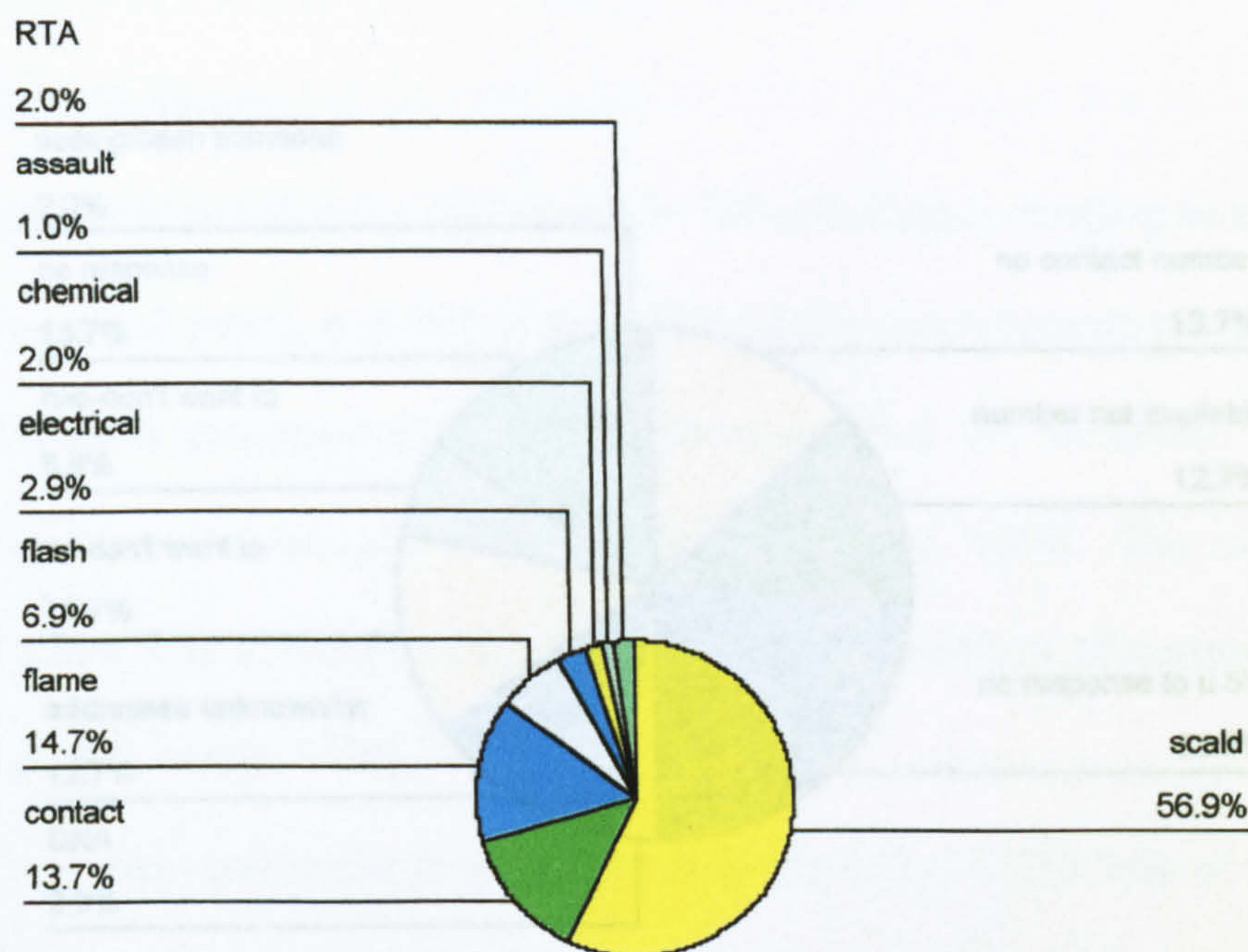
Table 19 Gender and study participation

Count		gender		Total
		male	female	
Study Group	tookpart	31	24	55
	non-participant	70	32	102
Total		101	56	157

Chi-square analysis revealed no significant association between gender and participation (chi value=2.342, 1 df, exact p= 0.162, n.s.).

Cause of Injury

Figure 5 Pie-chart of cause of injury in the non-participant group (100%=102)



The main cause of burn injury in the study non-participants was scald injuries (56.9%), followed by flame burns (14.7%) and contact burns (13.7%). Chemical burns and burn injuries due to assault (1%) or road traffic accidents (2%) were unique to the non-participant group.

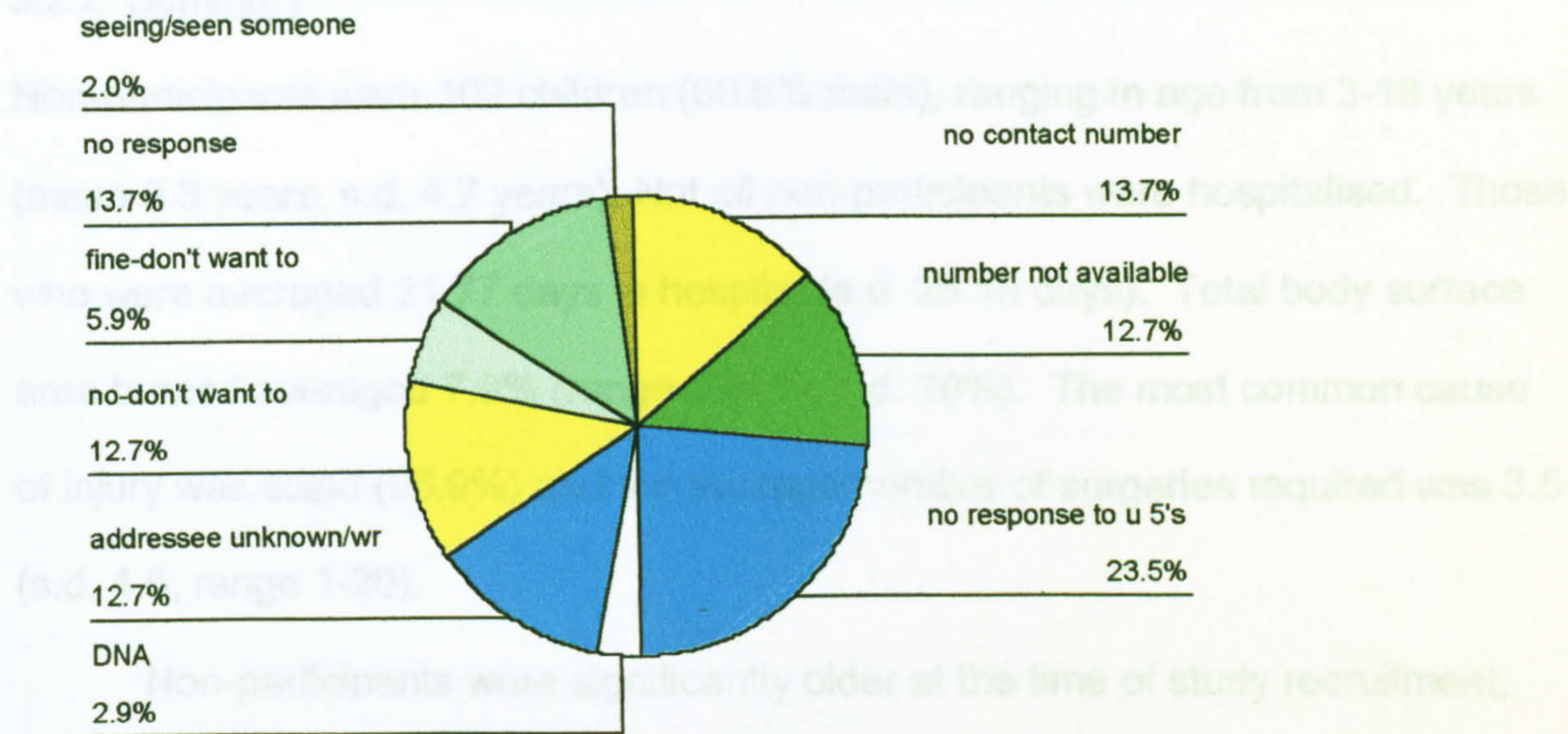
Cramers V correlational analysis (for two-way contingency tables involving variables with more than 2 categories) showed no significant relationship between study participation and cause of injury (value = 0.19, exact significance 0.751).

Table 20 Cause of injury and study participation

	STUDY GROUP	
	tookpart	non-participant
scald	35	57
contact	9	14
flame	6	15
flash	3	7
electric	1	3
chemical	2	2
u/k	2	1
assault	0	1
RTA	0	2

3.2.1 Reasons for non-participation

Figure 6 Pie-chart of reasons for non-participation (100%=102)



The main reason for non-participation was non-response to the postal questionnaires which were sent out to parents of the under five's age group (23.5%). Other reasons for non-participation included; no contact number on their hospital records so that parents could not be contacted after the initial letter went out (13.7%), the number provided on their hospital records was incorrect or not available (12.7%), or there was no response to that number on a number of different occasions (13.7%). 12.7% were not able to be traced and original letters were returned. None of these individuals could be traced by telephone, and two provided numbers which were business numbers. 12.7% simply did not want to take part, 5.9% did not want to take part because they said that their child (or the individual if over 16 years of age) was very well and they saw no benefit in taking part, even once it was explained that well children were of as much interest as children whose parents thought they were not coping well. 2% explained that they had already seen a mental health professional and did not wish to "bring it all up again". 2.9% of the non-participants made arrangements to take part in the study,

or at first meeting agreed to take part, and then did not arrive for appointments or avoided all other contact.

3.2.2 Summary

Non-participants were 102 children (68.6% male), ranging in age from 3-18 years (mean 9.3 years, s.d. 4.7 years). Not all non-participants were hospitalised. Those who were averaged 21.77 days in hospital (s.d. 26.15 days). Total body surface area burned averaged 7.9% (range 0-50%, s.d. 10%). The most common cause of injury was scald (56.9%) and the average number of surgeries required was 3.5 (s.d. 4.6, range 1-20).

Non-participants were significantly older at the time of study recruitment, were significantly less likely to have been an inpatient, and had significantly more surgical procedures than participants. There were no other significant differences between the groups.

3.4 General behaviour following burn injury - DICA IV

There were two measures of general behaviour following burn injury used in this study- the DICA IV and the CBCL. Both assess general behavioural problems and DICA IV provides DSM IV diagnosis. DICA provides lifetime diagnosis unless otherwise specified (e.g. ADHD-present is specific, whilst enuresis is a lifetime diagnosis).

3.3.1 Diagnostic Interview (DICA IV) results

Table 21 DICA IV diagnosis in the study participants

DIAGNOSIS	CHILD REPORT		PARENT REPORT	
	cases=22 full%	partial%	cases=25 full%	partial%
ADHD PRESENT	-	40.9	4	28
ADHD PAST	-	-	-	4
CONDUCT DISORDER	-	9.1	-	8
DYSTHYMIC DISORDER	4.5	-	4	4
ANOREXIA	-	-	-	-
Bulimia	-	-	-	-
ENCOPRESIS	-	-	4	4
ENURESIS	-	9.1	16.0	-
GENERALISED ANXIETY DISORDER	13.6	22.7	-	16
MANIC SYNDROME	-	4.5	-	4
MDD PRESENT	9.1	9.1	16	4
MDD PAST	13.6	-	8	20
OCD	4.5	4.5	4	-
ODD	13.6	18.2	8	28
PANIC DISORDER	-	9.1	-	4
SPECIFIC/SOCIAL PHOBIAS	4.5	59.1	16	36
PSYCHOTIC SYMPTOMS	-	4.5	-	4
PTSD	9.1	45.5	8	32
SEPERATION ANXIETY DISORDER	-	27.3	24	-
SOMATISATION DISORDER	-	-	-	-
STREET DRUGS DEPENDENCE	-	-	-	-
STREET DRUGS ABUSE	-	-	-	-
MARIJUANA DEPENDENCE	-	-	-	-
MARIJUANA ABUSE	-	4.5	-	-
Alcohol DEPENDENCE	-	-	-	-
ALCOHOL ABUSE	-	9.1	-	-
TOTAL NO. OF DIAGNOSES	16	60	22	54
MEAN DIAGNOSES	0.72	2.77	0.88	2.16

ABBREVIATIONS:

ADHD- Attention Deficit Hyperactivity Disorder
OCD- Obsessive Compulsive Disorder
ODD- Oppositional Defiant Disorder
PTSD- Posttraumatic Stress Disorder

Both parents and children endorsed symptoms of specific and/or social phobias most frequently (59.1% and 36% respectively).

Table 21 shows that 22 children reported a total of 16 full and 60 partial diagnoses. Fifteen children (68.2%) did not report enough symptoms to meet ANY full diagnosis. Seven children reported the 16 full diagnoses. Children had between 1 (4 children) and 7 (1 child) full diagnoses

Table 22 No. of full diagnoses by children's reports (n=22)

DICA child report- no. of full diagnoses

		Frequency	Valid Percent
Valid	0	15	68.2
	1	4	18.2
	2	1	4.5
	3	1	4.5
	7	1	4.5
	Total	22	100.0

The most reported full diagnoses by children were Generalised Anxiety Disorder, Major Depressive Disorder (past) and Oppositional Defiant Disorder (13.6%).

Table 23 No. of partial diagnoses met by children's reports (n=22)

DICA child report- no. of partial diagnoses

		Frequency	Valid Percent
Valid	1	6	27.3
	2	3	13.6
	3	7	31.8
	4	4	18.2
	5	1	4.5
	6	1	4.5
	Total	22	100.0

All of the children reported symptoms of at least one partial diagnosis and some children had both partial and full diagnoses. Children met criteria for between 1 and 6 partial diagnosis. Seven (31.8%) children met criteria for 3 partial diagnosis.

The most reported partial diagnoses were Specific/Social Phobias (59.1%), PTSD (45.5%) and ADHD present (40.9%).

Parents reported 14 (56%) of their children to have no full diagnosis. Eleven children (44%) therefore shared 22 full diagnoses. Most of these children (n=7) only had one full diagnosis.

Table 24 No. of full diagnoses met by parents reports (n=25)

DICA parent report- no. of full diagnoses		Frequency
Valid	0	14
	1	7
	2	1
	3	1
	4	1
	6	1
	Total	25

Parents endorsed Separation Anxiety Disorder most often (24% of cases) and endorsed Enuresis, Major Depressive Disorder (present) and Specific/Social Phobias in 16% of children.

Parents reports resulted in 6 children (24%) failing to meet the criteria for any partial diagnosis. Nineteen (76%) children were diagnosed with a total of 54 partial diagnoses. Children with a partial diagnosis had between one (7children) and 7 (1 child) partial diagnoses

Table 25 No. of partial diagnoses met by parents reports (n=25).

DICA parent report -total partial diagnoses

		Frequency	Valid Percent
Valid	0	6	24.0
	1	6	24.0
	2	4	16.0
	3	3	12.0
	4	3	12.0
	5	1	4.0
	6	1	4.0
	7	1	4.0
Total		25	100.0

The most reported partial diagnoses by parents were Specific and/or Social Phobias (36%), PTSD (32%) and Oppositional Defiant Disorder and ADHD (present) (28%).

Only 3 children did not meet any diagnosis either by their own or by their parents reports. Children with no diagnosis were significantly younger at the time of their injury ($t= 2.512$, 26 d.f., $p= 0.019$, 2 tailed) and it had been a significantly longer time since they had been burned ($t=-2.127$, 26 d.f., $p=0.043$, 2 tailed). It is very difficult to interpret these results further due to the very small sample size ($n=3$ vs.19); there is low statistical power and therefore this significant difference may not be stable in a larger population (Bordens and Abbott, 1988).

Summary

Children could have any number of partial or full diagnoses by their own or by their parents reports. Children and parents were more likely to report some symptoms of disorder rather than the full disorder. In general, children did not report enough symptoms to meet any full DSM IV diagnosis. This is in keeping with the general hypothesis- burned individuals do not generally show behavioural problems of a magnitude to meet diagnostic criteria for a psychiatric disorder. The most reported diagnosis was Specific/Social Phobias. Both parents and children reported some

symptoms of this (enough to meet partial diagnosis) most often. Children had on average, 2 partial DSM IV diagnoses.

3.3.2 Was there agreement between Parent and Child Reports using DICA IV?

To examine whether there was a relationship between parent and child reports, correlation analysis was conducted on all the DICA diagnostic categories.

With a value of $r=0.741$ and a two tailed p value of 0.000, there was a significant correlation between parent and child reports of full DICA IV diagnosis above the 1% level. Further analysis revealed however, that there was not any linear relationship between the variables and therefore the value of the Pearson correlation cannot say anything about the relationship between full diagnosis as endorsed by parents and/or children (Appendix 8). There was no significant relationship between parent and child reports of partial diagnosis.

Table 26 shows the results of Fishers Exact Tests for parent and child reports for each of the possible diagnosis using DICA IV. Fishers Exact Test was the preferred test due to small sample size and small expected cell sizes (Dellucchi, 1983). As this test analyses associations, *only those diagnoses endorsed by both parents and children were included in this analysis* (ADHD past, anorexia, bulimia, encopresis, somatisation disorder, street drugs dependence/abuse, marijuana dependence/abuse, alcohol dependence/abuse are all therefore, missing from this table.

There was a significant relationship between parent and child reports of Generalised Anxiety Disorder, Conduct Disorder, Simple and Social Phobias and Posttraumatic Stress Disorder.

Table 26 Relationships between parent and child diagnosis on DICA IV

<u>Possible Diagnosis</u>	<u>Fishers Exact Test</u>	
ADHD present	n.s.	
Conduct Disorder	p=0.000**	
Dysthymic Disorder	n.s.	
Enuresis	n.s.	
Encopresis	n.s.	
Generalised Anxiety Disorder	p=.031**	
Manic Syndrome	n.s.	
MDD present	n.s.	**significant beyond the 1% level
MDD past	n.s.	
OCD	n.s.	
ODD	n.s.	
Simple/Social Phobias	p=0.000**	
PTSD	p=0.005**	
Psychotic Symptoms	n.s.	
Separation Anxiety Disorder	n.s.	

Summary

Parent and child reports were not significantly associated, with the exception of reports of GAD, Conduct Disorder, Simple/Social Phobias and PTSD, and this is in keeping with the findings of previous research, and proves the general research hypothesis.

3.4 Trauma as assessed by the DICA-IV

Table 21 shows that by their own reports, 9.12% of the children fulfilled all of the diagnostic criteria for PTSD diagnosis. A further 45.5% reported criteria fitting a partial diagnosis. This is in comparison with parents reporting 8% of children fulfilling the criteria for full PTSD diagnosis and 32% fulfilling criteria for partial diagnosis. Table 31 below clearly shows the incidence of agreement between parent's and children's reports

Table 27 Parent-Child Agreement by DICA-IV PTSD Diagnosis

Note: - denotes neither partial or full diagnosis being met

(Table includes only those children meeting any PTSD diagnosis from parent or child report n=15/28).

Case	Child report	Parent Report	Agree?
8	partial	partial	yes
9	missing	partial	-
10	full	full	yes
12	partial	missing	-
14	partial	-	no
16	partial	partial	yes
18	partial	-	no
20	-	partial	no
21	partial	-	no
23	partial	partial	yes
27	partial	full	no
41	partial	partial	yes
45	partial	partial	yes
52	full	missing	-
53	missing	partial	-

It has been recognised that few research studies examine symptom profiles in childhood PTSD (McNally, 1993). Following Stoddard (1989) and Fukunishi (1999), the diagnostic criteria for DSM IV diagnosis of PTSD are broken down in Table 32 by the number of endorsements each item received.

It can be seen that 77.3% of children and 72%of parents reported Criterion A, that is

A. The person has been exposed to a traumatic event in which both of the following have been present:

- 1. the person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity to oneself or others.**
 - 2. the persons responses involved intense fear, helplessness, or horror.**
- Note: in, but children it may be expressed by disorganised or agitated behaviour.**

(American Psychiatric Association, 1994, Diagnostic and Statistical Manual of Mental Disorders (4th Ed.). Washington DC: American Psychiatric Association.)

It is of note that on two occasions, children reported traumatic situations which were not related to getting burned. One child reported being involved in a collision with a car and another child reported a swimming pool accident. In these situations, DICA IV asks “If there has been more than one terrible thing that happened to you, what was the worst”. When asking the DICA IV questions pertaining to Criterion A, it was not assumed that the child thought the burn event traumatic. If however, they replied “no” to the question “Have you ever had something really awful happen to you, for example, have you ever been seriously hurt or badly injured”, then they were asked whether they thought that the time when they got burned fitted those criteria.

68.2% of children met Criterion B (Re-experiencing) according to their own report, and the most frequently endorsed item by both the children and their parents was intrusive memories(59.1% and 36% respectively). The second most commonly endorsed item in Criterion B was flashbacks (n=9), and this was the second *least* reported symptom by parents(n=5). Criterion B items were endorsed a total of 42 times (mean 1.9) by children and 34 times (mean1.77) by parents.

The most endorsed item in Criterion C (Avoidance and Emotional Numbing) was “avoidance of thoughts” (54.5% of children and 40% of parents). Children were least likely to report future-foreshortening(1 child, 4.5%) whereas parents were least likely to report feelings of estrangement and restricted range of affect

(none reported). Children reported a total of 39 avoidant items (mean 1.77) and parents reported 20 items (mean 0.8).

Criterion D, symptoms of increased arousal, was met by only 5 children, and by 6 parental reports. Both parents and children endorsed increased irritability most frequently (36.4% of children and 32% of adults). The mean number of Criterion D symptoms reported by children was 0.91 and by their parents was 1.04.

These results show that the general hypothesis is true. Some children do meet criteria for PTSD following burn injury. However, it is symptoms of posttraumatic stress which are the most common reaction rather than the full PTSD syndrome.

Table 28 Incidence of DSM IV PTSD criteria reported by parents and children as measured using DICA IV (n=28)

Diagnosis by reporter(child or parent)	Participants (n=28)			
	Child(n=22)		Parent(n=25)	
	N	%	N	%
DICA DSM-IV PTSD diagnosis (full)	2	9.1	2	8.0
(partial)	10	45.5	8	32.0
Criterion A	17	77.3	18	72.0
Criterion B	15	68.2	13	52.0
Criterion C	6	27.3	2	8.0
Criterion D	5	22.7	6	28.0
Criterion E	10	45.4	8	32.0
Criterion F	7	31.8	4	16.0
Criterion B-Re-experiencing symptoms				
1.Intrusive memories/ Traumatic play	13	59.1	9	36.0
2.Recurrent distressing dreams	7	31.8	4	16.0
3.Flashbacks	9	40.9	5	20.0
4.Intense distress at similar event	7	31.8	8	32.0
5. Physiological reactions to event	6	27.3	8	32.0
6.At least 1 symptom (met Criterion B)	15	68.2	13	52.0
Criterion C-Avoidance and emotional numbing symptoms				
1.Avoidance of thoughts	12	54.5	10	40.0
2.Avoidance of event-related activities	7	31.8	5	20.0
3.Problems with memories about the event	7	31.8	3	12.0
4.Diminished interest in usual activities/loss of dev. Skills	3	13.6	2	8.0
5Feelings of estrangement	4	18.2	-	-
6.Restricted range of effect	5	22.7	-	-
7.Future-foreshortening	1	4.5	1	4.0
8.At least 3 symptoms (met Criterion C)	6	27.3	2	8.0
Criterion D- Symptoms of increased arousal				
1.Difficulty sleeping	4	18.2	5	20.0
2.Increased irritability/anger	8	36.4	8	32.0
3.Difficulty concentrating	2	9.1	4	16.0
4.Hypervigilance	3	13.6	4	16.0
5.Increased startle response	3	13.6	5	20.0
6.At least 2 symptoms (met criterion D)	5	22.7	6	24.0
	Child	Parent		
	Mean			
Criterion B symptoms	1.9	1.36		
Criterion C symptoms	1.77	0.8		
Criterion D symptoms	0.91	1.04		

This table describes the symptoms profile in ALL of the children (n=22 self-reports and 25 parent reports), irrespective of whether they met any PTSD diagnosis.

Summary

Both children and parents reported re-experiencing symptoms (Criterion B) most often. Children reported symptoms of increased arousal (Criterion D) least often and parents reported symptoms of avoidance and emotional numbing least often (Criterion C), indicating the subjective nature of the posttraumatic response.

3.4.1 Parent and Child reports of PTSD using DICA IV- combined

There were a number of cases where only one informant provided information, but for the data provided by both informants, the “OR” method (Bird et al., 1992) for grouping both sets of responses was used. This generated a result based on a combination of both reports, so that a symptom was regarded as present if one informant acknowledged it as such. Previous research acknowledges that this method may serve to increase prevalence rates of disorder, but it has not been found to be significantly different from the prevalence rates found by using any other method (Bird et al., 1992) and appears to be the optimum method for ensuring that all the useful information is taken into consideration (Jensen et al., 1999).

The “OR” method was used to collate the PTSD assessment results, as there was a significant relationship between parent and child reports of PTSD ($p=0.005$, Table 27).

On this basis, 4 children (14.3%) met the criteria for full PTSD diagnosis and 12 (42.8%) fulfilled partial diagnosis criteria out of the whole sample of 28 children.

It is of note that the DICA IV PTSD sub-scale asks questions regarding the presence or absence of symptoms *ever*, and as with most of the other available scales, does not include a current or lifetime rating (Nader, 1997). The implication is that these figures for PTSD diagnosis refer to both current and lifetime PTSD.

Table 29 The incidence of DSM IV PTSD criteria in the total group (n=28)

DICA DSM-IV PTSD diagnosis		
(full)	4	14.3%
(partial)	11	42.8%
None	13	46.4%
Crit. A	22	78.6%
Crit. B	19	67.8%
Crit. C	6	21.4%
Crit. D	12	42.8%
Crit. E	12	42.8%
Crit. F	8	28.6%

When the children's and parents reports were combined, re-experiencing symptoms (Criterion B) were the most commonly reported symptoms, and avoidance and emotional numbing (Criterion C) were the least reported symptoms.

3.4.2 PTSD Diagnosis by DICA IV and burn related variables

To test for relationships between burn related variables and PTSD diagnosis, Cramers V tests of correlation (for bigger than 2x2 tables using categorical variables) were carried out. There was a significant association between the cause of the burn injury and any PTSD diagnosis (full, partial or none) (Cramers V=0.639, p= 0.005, exact significance).

No significant relationships were found between presence of scald injury, gender and whether the participant had been admitted to hospital and PTSD diagnosis.

Following examination of the suitability of the data for statistical analysis (Appendix 9), Kruskal-Wallis analysis for examining the differences between 3 independent groups was carried out to test for differences between those participants meeting full, partial and no PTSD diagnosis, number of days spent in hospital, and number of operations performed

Table 30 Differences between burn related variables according to their PTSD diagnosis (df =2)

	Chi	significance
Ops	8.94	0.009 ** (exact)
Days In	11.45	0.003 **

Results showed that the three groups differed significantly in the number of days they had spent in hospital when they were first injured and the number of surgeries they had undergone.

Mann-Whitney tests revealed that there were no significant differences between the children with full and partial PTSD diagnosis, but there were differences between those children with *any* PTSD i.e. full OR partial, diagnosis and no diagnosis. Children with *any* PTSD diagnosis had significantly more operations and stayed in hospital significantly longer than those children with no PTSD diagnosis (Appendix 10). As the research literature indicated, burn related variables therefore affect the burn response.

Table 31 Significant differences between those participants with full or partial PTSD diagnosis (n=15) and those without any PTSD diagnosis (n=13)

	z	significance
ops	-2.604	0.008 **
Days In	-2.742	0.006 **

One way ANOVA was used to test for differences between the groups on the remaining variables (Appendix 11). There were significant differences in TBSA (F= 4.921, p= 0.008) between the groups. Unplanned comparison tests (a posteriori comparisons) revealed that those children with full PTSD diagnosis had significantly more total body surface area (TBSA) burned than those children with no PTSD diagnosis. This result may be difficult to interpret in view of the very small sample size and the lack of statistical power. There were no other significant differences between the PTSD groups on the burn related variables of age, age at the time of injury and time since burn (Appendix 11).

3.4.3 DICA IV PTSD Diagnosis and other outcome measures

Although none of the other trauma measures make a PTSD diagnosis, they do assess associated trauma symptomatology. Cramers V correlations revealed no significant association between DICA PTSD diagnosis and posttraumatic stress assessed by the other trauma measures (IES, PTS-RI, C-PTS-RI, Appendix 12).

There was no significant association between DICA PTSD diagnosis and Depression as measured by the DSRS. There was an association between general behavioural problems as measured by the CBCL (scored “clinical”, “borderline”, “missing” or “none”) and any PTSD diagnosis (Cramers V=.512, p=0.035, exact significance). Children with no PTSD diagnosis were more likely to have no problem behaviour as measured by the CBCL.

There was a significant difference in internalising behaviour as assessed by the CBCL between children meeting no, partial and full PTSD diagnosis ($F=5.47, p=0.012$). A posteriori comparisons showed that children with full PTSD diagnosis had significantly higher internalising scores on the CBCL than the children with partial PTSD diagnosis (Appendix 13). Lack of statistical power may make interpretation of these results difficult, as they are not as robust or generalisable as they could ideally be (Hallahan and Rosenthal, 1995).

No other significant differences were found between the groups on the other assessment measures (IES, IES intrusion/avoidance subscales, CBCL, CBCL internalising, DSRS, PTS-RI, C-PTS-RI; Appendix 14).

3.5 General Behaviour Following Burn Injury- CBCL

5 parents did not complete the CBCL. The CBCL results are therefore based on 50 children out of the 55 children who took part in the whole study.

Table 32 CBCL descriptive statistics (n=50)

	mean	median	s.d.
CBCL	50.86	53	10.92
Externalising	50.04	51	11.68
Internalising	51.86	53	11.55

Following the example of Meyer et al. (1994) and LeDoux et al. (1998) the CBCL total problem score for current problem behaviours enabled the group to be divided into those children with “clinical” behavioural problems (n = 6, 12%), “borderline” behavioural problems (n=8, 16%) and “no” problems (n= 36, 72%) (by the computer scoring program).

Table 33 Children’s problem behaviour grouped by CBCL scores

	cases	%
Clinical	6	12
Border	8	16
No	36	72

note:5 cases missing. “No” includes 1 case which had to be discounted due to too many missing items.

3.5.1 CBCL sub-scales- Internalising and Externalising

Table 34 Incidence of clinical, borderline or CBCL total score (Total T) and externalising (external T)and internalising (internal T) sub-scales

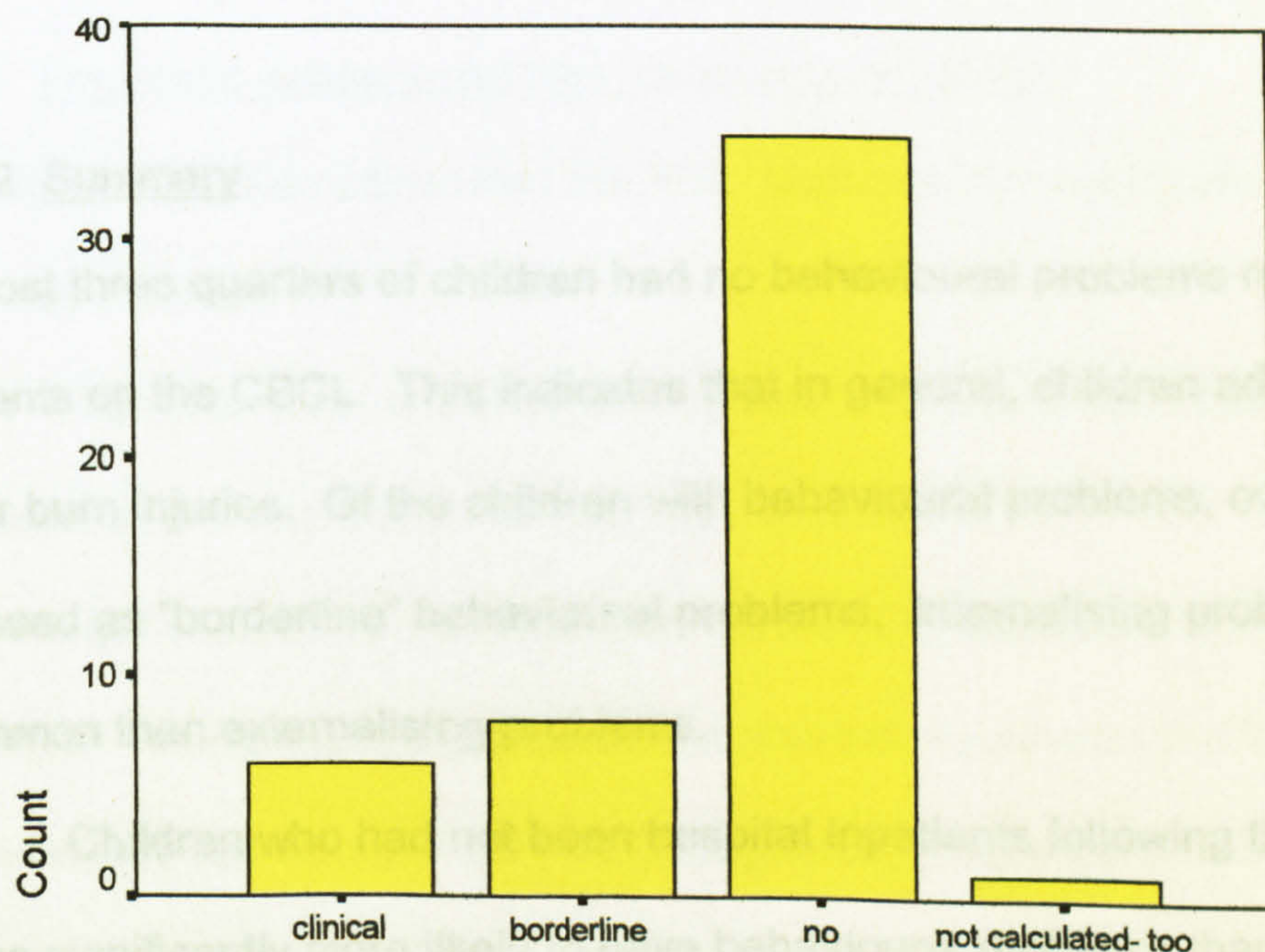
	Total T		Internal T		External T	
	freq	%	freq	%	freq	%
Clinical	6	10.9	8	14.5	4	7.3
Border	8	14.5	2	3.6	4	7.3
no	35	63.6	39	70.9	41	74.5

(n=1 missing due to too many items missing, n=5 missing due to not being completed)

Parents reported a total of 14 out of 49 (28.6%) children to have either clinical or borderline behavioural problems on the CBCL. Internalising behavioural problems were reported more often than externalising behavioural problems. Ten children (20.4%) had borderline or clinical internalising problems and 8 (16.3%) children borderline or clinical externalising problems as defined by the CBCL.

One child's t-score could not be analysed due to the high number of missing answers. This case was retained in preliminary analysis because it may have been informative missing data. The CBCL program will not calculate cases where there are more than 20 missing items.

Figure 7 Bar Chart of general Behaviour on the CBCL note: not calculated= too many items missing



Total T-significant?

Examination of the distribution and variance in each group ensured appropriate analysis (Appendix 15).

Although there was no significant difference between children with normal, borderline and clinical behaviour and the number of days spent in hospital, there

was a significant association between behaviour as measured by the CBCL and whether the child was an inpatient in hospital (Cramers V= 0.579, p=0.057, exact significance)(Appendix 15b).

Table 35 Number of children who did and did not stay in hospital (n=49) and the % of these children with clinical or borderline behavioural problems

Stay	n	% Clinical	% Borderline
yes	39	7.7	17.9
no	10	30	10

The table indicates that children who did not stay in hospital were more likely to have clinical behavioural problems than borderline behavioural problems and more behavioural problems in total than those children who did stay in hospital.

There were no other significant differences between children with clinical, borderline and normal behaviour on any of the burn related variables.

3.5.2 Summary

Almost three quarters of children had no behavioural problems reported by their parents on the CBCL. This indicates that in general, children adjust well following their burn injuries. Of the children with behavioural problems, over half were classed as “borderline” behavioural problems. Internalising problems were more common than externalising problems.

Children who had not been hospital inpatients following their burn injuries were significantly more likely to have behavioural problems than children whose burn injuries did require hospital admission. This shows that burn related and personal characteristics of children influence their response to injury.

3.6 Trauma in Burned Children- Self-Report measures

Table 36 Descriptive statistics for self-report trauma measures

	IES n=25	IES- intrusion n=25	IES- avoidan ce n=25	CPTS- RI n=25	PTS-RI n=51
MEAN	14.25	5	8.75	15.28	15.08
S.D.	15.8	7.35	9.12	10.83	13.77
MEDIAN	10	2.5	6.5	13	12

This table shows that on average, children scored below the cut-off point on the IES (30) or IES sub-scales (15). The average score on the PTS-RI and the C-PTS-RI was in the category “mild” posttraumatic stress (scores between 12 and 24). Three out of 25 children (12%) reported moderate/severe posttraumatic symptoms on the C-PTS-RI and parents reported 11 out of 51(21.6%) of children to have moderate/severe posttraumatic symptoms on the PTS-RI.

3.4.1 Traumatic stress symptoms measured by the IES

Twenty five children completed the IES. Methods for scoring the IES are in Methods Section.

The mean total score on the IES was 14.25 (s.d. 15.8, median 10). The minimum score was 0 and the maximum was 58.

Four children scored above 30 on the IES, and these children can be regarded as displaying significant posttraumatic symptoms (16.6%) (these are not the four children who met full PTSD diagnosis). There were no significant differences between children reporting significant symptoms on the IES on any of the burn related variables or on any of the outcome measures.

The IES assesses the core symptoms of PTSD; intrusion and avoidance.

Avoidance

The mean score on the avoidance sub-scale was 8.75 (s.d. 9.1) and the median score was 6.5. Scores ranged from 0-29. Eight (33.3%) children scored 15 or above on the avoidance sub-scale. Fifteen is the cut-off point for both the Intrusion and Avoidance sub-scales. Scores above this level are indicative of clinically significant distress. To examine the differences between children who scored above the cut-off point in the avoidance sub-scale with those who did not, the data was first screened for its suitability. Although the samples were not normally distributed, Levene's tests of variance indicated that t-tests could be used in the majority of cases, assuming the fairly robust nature of t-tests if there is homogeneity of variance. Where t-tests were not appropriate, i.e., when Levenes test showed non-homogeneity of variance, or when preliminary analysis indicated the presence of outliers, Mann-Whitney tests were used.

Avoidant behaviour and burn related variables

Significant differences were found between children meeting PTSD diagnosis on DICA IV and burn related variables of TBSA, days spent in hospital and number of surgeries performed. As the IES assesses the key symptoms of PTSD, namely avoidance and intrusion, analysis of these symptoms in relation to burn related variables was conducted.

Independent t-tests showed that children with avoidant behaviour were significantly older both at the time of their injury ($t=2.343$, 23 d.f., $p=0.028$) and at the time of their participation in the study ($t=2.478$, 23 d.f., $p=0.021$).

Table 37 Age of children who met cut-off point on the IES avoidance sub-scale and children who did not (cut-off=15)n=25

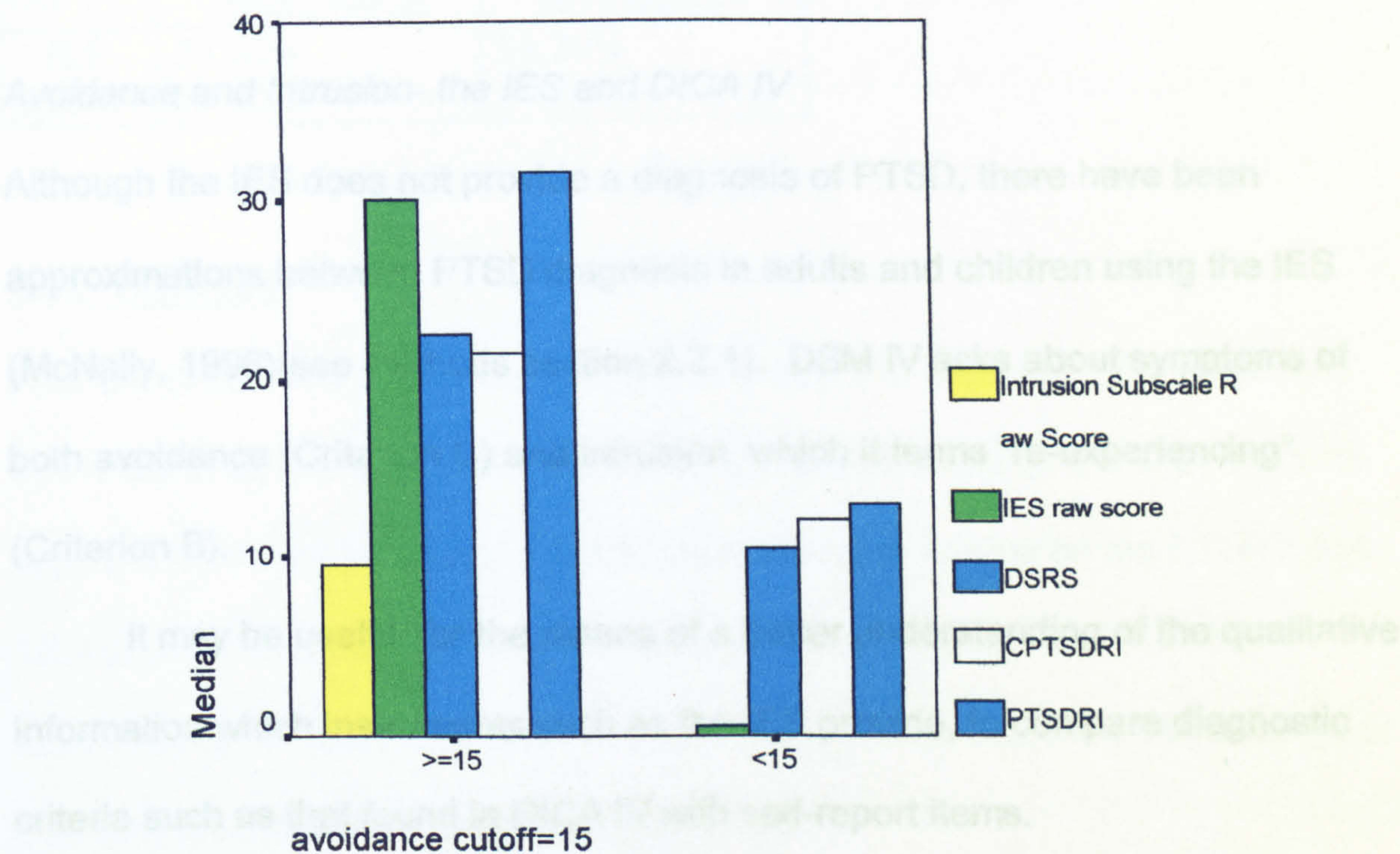
	avoidance cutoff=15	N	Mean	Std. Deviation
age now, not at time of injury	>=15	8	12.288	4.246
	<15	17	8.418	3.345
age at time of injury	>=15	8	10.796	4.170
	<15	17	6.835	3.839

There were no other significant differences on burn related variables between the children reporting avoidant behaviour and those who did not.

Avoidant behaviour and other outcome measures

Mann-Whitney tests showed that children with avoidant behaviour (i.e. meeting the cut off score on the avoidance sub-scale) had significantly higher scores on the DSRS ($z=-2.147$, $p=0.031$, 2 d.f.), on the IES Intrusion sub-scale ($z=-3.837$, $p=0.000$), the C-PTS-RI (Mann-Whitney $z=-2.271$, $p=0.022$, 2 tailed), the IES as a whole (Mann-Whitney $z=-4.028$, $p=0.000$, 2 tailed) and the PTS-RI (Mann-Whitney $z=-2.209$, $p=0.025$, 2 tailed).

Figure 8. Bar-chart of scores on all the self-report measures between children meeting cut-off point on the IES avoidance sub-scale (n= 8/25)



note: Intrusion sub-scale raw score for <15 grp=0, and is therefore not represented by a bar)

There were no significant differences between children reporting significant avoidant behaviour on any of the general behavioural variables (CBCL, CBCL Internalising sub-scale, CBCL Externalising sub-scale, DICA full or partial diagnoses)

Intrusion

Three children (12%) scored high enough on the intrusion sub-scale to meet the cut-off point of 15. These children were regarded as displaying intrusive behaviour, symptomatic of trauma. Children's scores on the Intrusion sub-scale were not normally distributed. The mean score was 5 (s.d. 7.35), well below the

cut-off score for intrusive behaviour, and scores ranged from 0 to 29. Further analysis was not conducted due to very small groups (n=3 vs. 19).

Avoidance and Intrusion- the IES and DICA IV

Although the IES does not provide a diagnosis of PTSD, there have been approximations between PTSD diagnosis in adults and children using the IES (McNally, 1996)(see methods section 2.2.1). DSM IV asks about symptoms of both avoidance (Criterion C) and intrusion, which it terms “re-experiencing” (Criterion B).

It may be useful, for the means of a better understanding of the qualitative information which instruments such as the IES provide, to compare diagnostic criteria such as that found in DICA IV with self-report items.

To meet Criterion B (re-experiencing/intrusion) using DSM IV (and therefore DICA IV), at least one symptom must be endorsed, and 68.2% of children endorsed this item. If the same rules are applied to the IES, 14 out of 24 (58.3%) children endorsed at least one intrusion item.

Approximating between IES avoidance and DSM-IV symptoms of avoidance is slightly more problematic. To meet Criterion C (Avoidance), at least three symptoms must be endorsed. To meet the avoidance cut-off point on the IES, a score of 15 must be obtained, and the minimum way this can be done is by scoring “often” on three items. As a result, the reporting of IES avoidance behaviours (33.3%) can be considered a conservative figure to be compared approximately with the avoidance criterion C on the DSM IV (reported as 27.3%).

Table 38 Symptoms of avoidance and intrusion reported on DICA-IV PTSD module and on the IES when similar rules are applied across instruments

	AVOIDANCE	INTRUSION
IES	33.30%	58.30%
DICA-IV	27.30%	68.20%

3.6.2 Summary

Four out of 28 (14%) children met DSM IV present or lifetime PTSD diagnosis, and 4 out of 25 (16%) children reported significant trauma on the IES. Parents reported 21.6% of children to have moderate/severe trauma on the PTS-RI and 12% of children reported these problems on the C-PTS-RI. It is possible therefore, either that these trauma measures do not measure the same things or that they differ in their trauma meaningfulness.

Children with full or partial PTSD (present or lifetime), had significantly more operations and were in hospital significantly longer than children with no PTSD diagnosis. Children with full PTSD had larger burns than children with no PTSD. The characteristics of a burn appear therefore to influence PTSD to some extent.

Children with significant avoidant behaviour, i.e. those children scoring above the cut off point on the IES avoidance subscale, were significantly older at the time of their injury and at T1, and had significantly higher depression ratings, intrusion sub-scale, PTS-RI and C-PTS-RI scores.

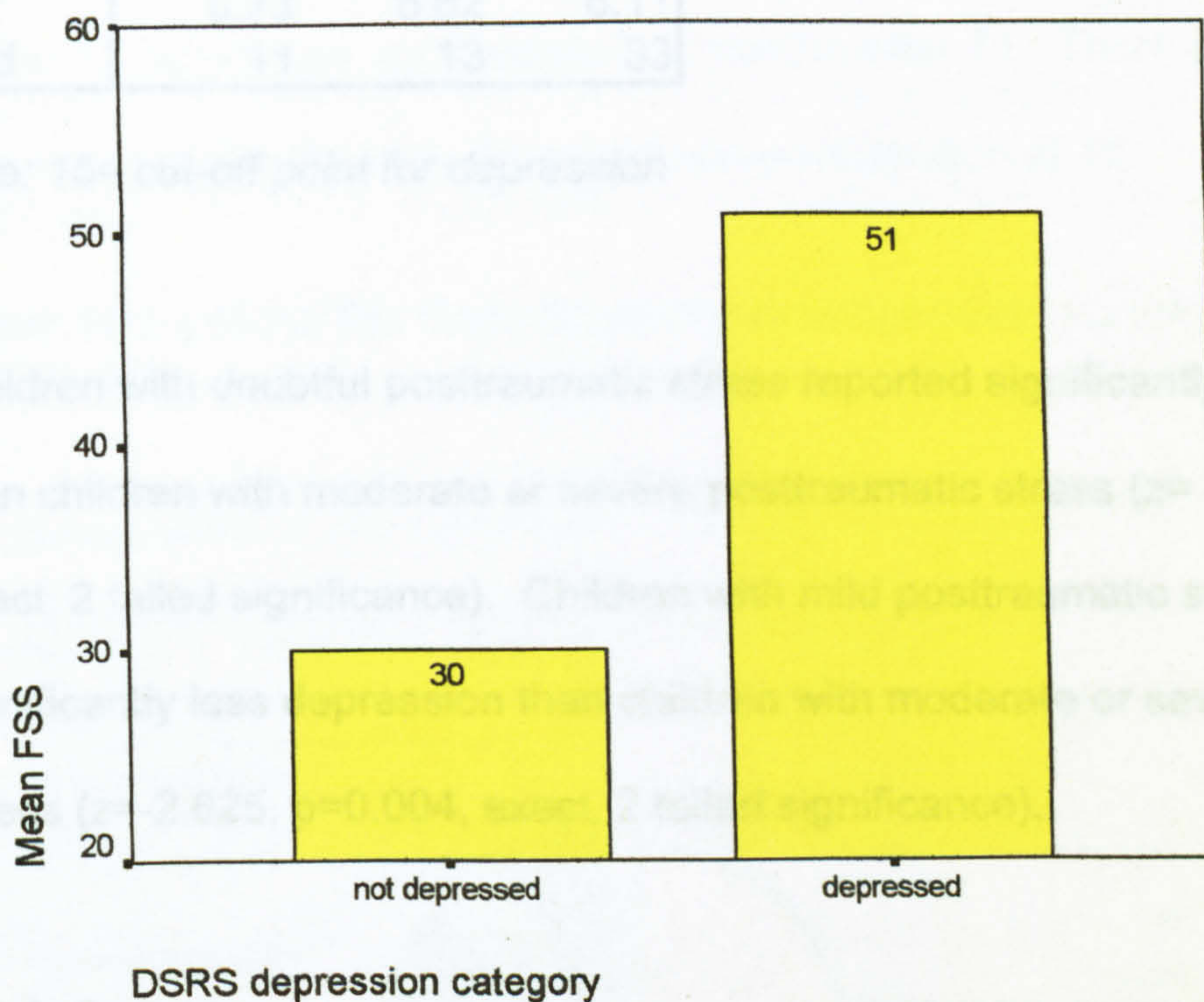
3.7 Depression in Burned Children

Twenty five children completed the DSRS. The mean score on the Depression Self Rating Scale was 15.72 , s.d. 9.45 (just over the cut-off score of 15). The median score was 14 and the range was between 2 and 41. 52% (n=13) of the children were not depressed and 48% (n=12) of the children were depressed. There was no significant association between depression assessed by the DICA IV (Major Depressive Disorder, present) and depression assessed by the DSRS (Cramers V value=0.456, exact p= 0.87). Two children met diagnosis for Major Depressive Disorder and 2 met partial diagnosis using the DICA IV. There was no significant difference between depressed and non-depressed children on any of the burn related variables.

There was no significant difference between depressed and non-depressed children on the general behaviour measures of the CBCL or DICA IV.

Depressed children reported significantly more fears than non-depressed children ($t=-2.878$, 23 d.f., $p= 0.008$, 2 tailed) on the FSS.

Figure 9 Barchart showing that depressed children (n=12) had significantly higher scores on the FSS than non-depressed (n=13) children.



3.7.1 Depression and posttraumatic stress

Depression is a common problem in children experiencing posttraumatic stress. Analysis was conducted to investigate whether depression and posttraumatic stress were associated in this population of burned children.

There were no significant differences between children who were depressed and children who were not depressed on the IES or the PTS-RI.

Children with depression were significantly more likely to have any DICA IV PTSD diagnosis, i.e. full OR partial (Chi=0.467, 1 d.f., exact p=0.043, 2 sided).

There was a significant difference in the depression rating scores of children with doubtful and mild posttraumatic stress as measured by the C-PTS-RI and children with moderate and severe posttraumatic stress (when children with moderate and severe posttraumatic stress were grouped together (n=3); (Kruskal-Wallis Chi=7.785, 2 d.f., p=0.02).

Table 39 DSRS scores in children with various C-PTS-Rl ratings (n=25).

	d'ful	mild	mod/sev
mean	11.75	13.23	34.33
s.d.	5.73	6.62	6.11
med	11	13	33

note: 15= cut-off point for depression

Children with doubtful posttraumatic stress reported significantly less depression than children with moderate or severe posttraumatic stress ($z = -2.449$, $p = 0.012$, exact, 2 tailed significance). Children with mild posttraumatic stress reported significantly less depression than children with moderate or severe posttraumatic stress ($z = -2.625$, $p = 0.004$, exact, 2 tailed significance).

3.5.2 Summary

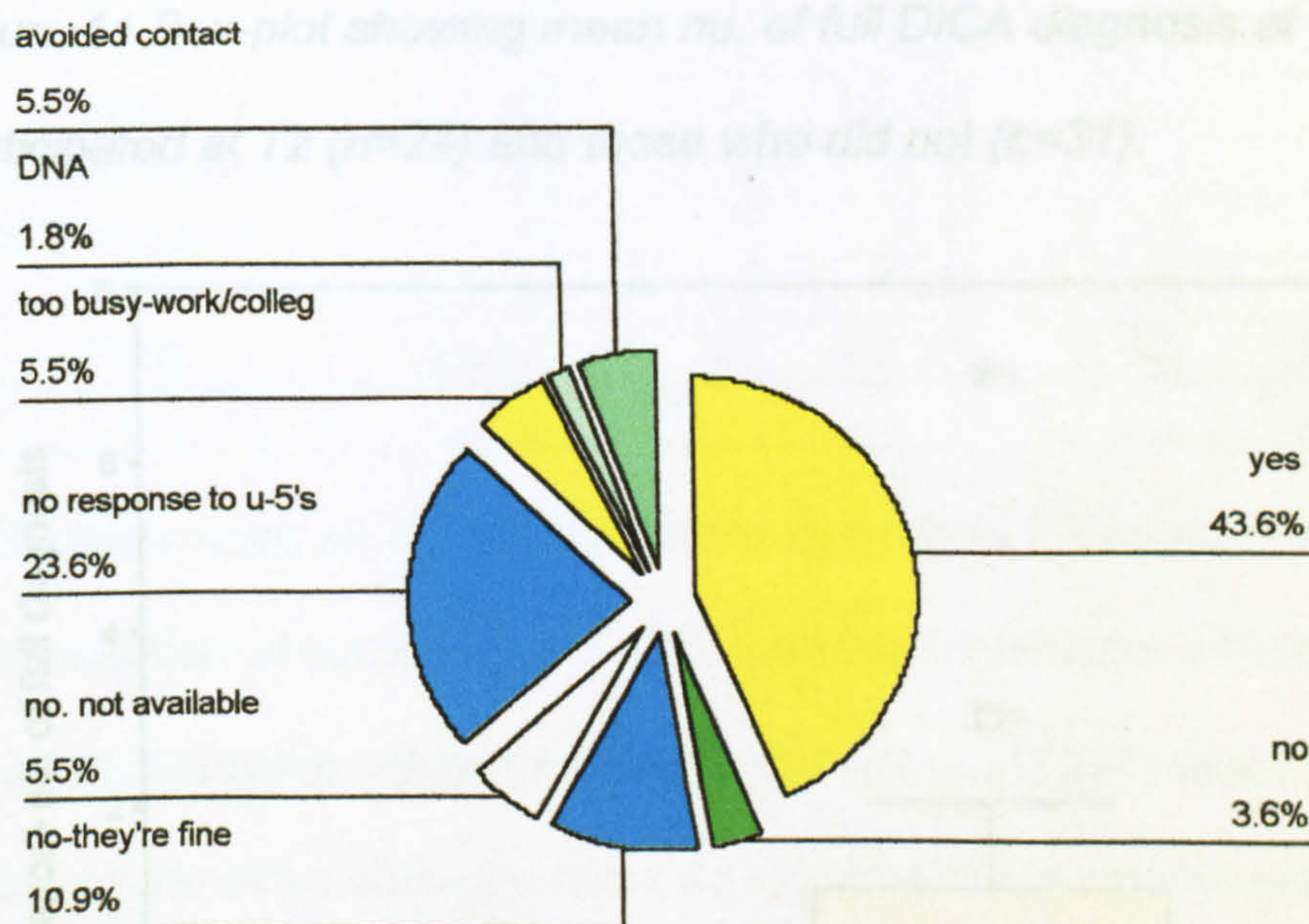
The characteristics of the children e.g. age, and of their burn injuries such as size and time since burn are unrelated to post-burn depression.

Children with depression do not differ significantly in general behavioural outcome to children without depression. Children with depression report significantly more fears, more symptoms of posttraumatic stress, and are significantly more likely to have a PTSD diagnosis. Children report more depressive symptoms using the DSRS than using the DICA IV Major Depressive Disorder criteria. These results indicate that the general hypothesis is true, that is, that children display a number of responses following burn injury.

3.8 Study participants at six-month follow-up

Twenty four children (40%) out of the original 55 children and/or their parents took part at T2, which was approximately 6 months after T1. There were a variety of reasons given for the high degree of non-participation at T2.

Figure 10 Exploded Pie Chart illustrating reasons for-non-participation at T2 (100%=31)



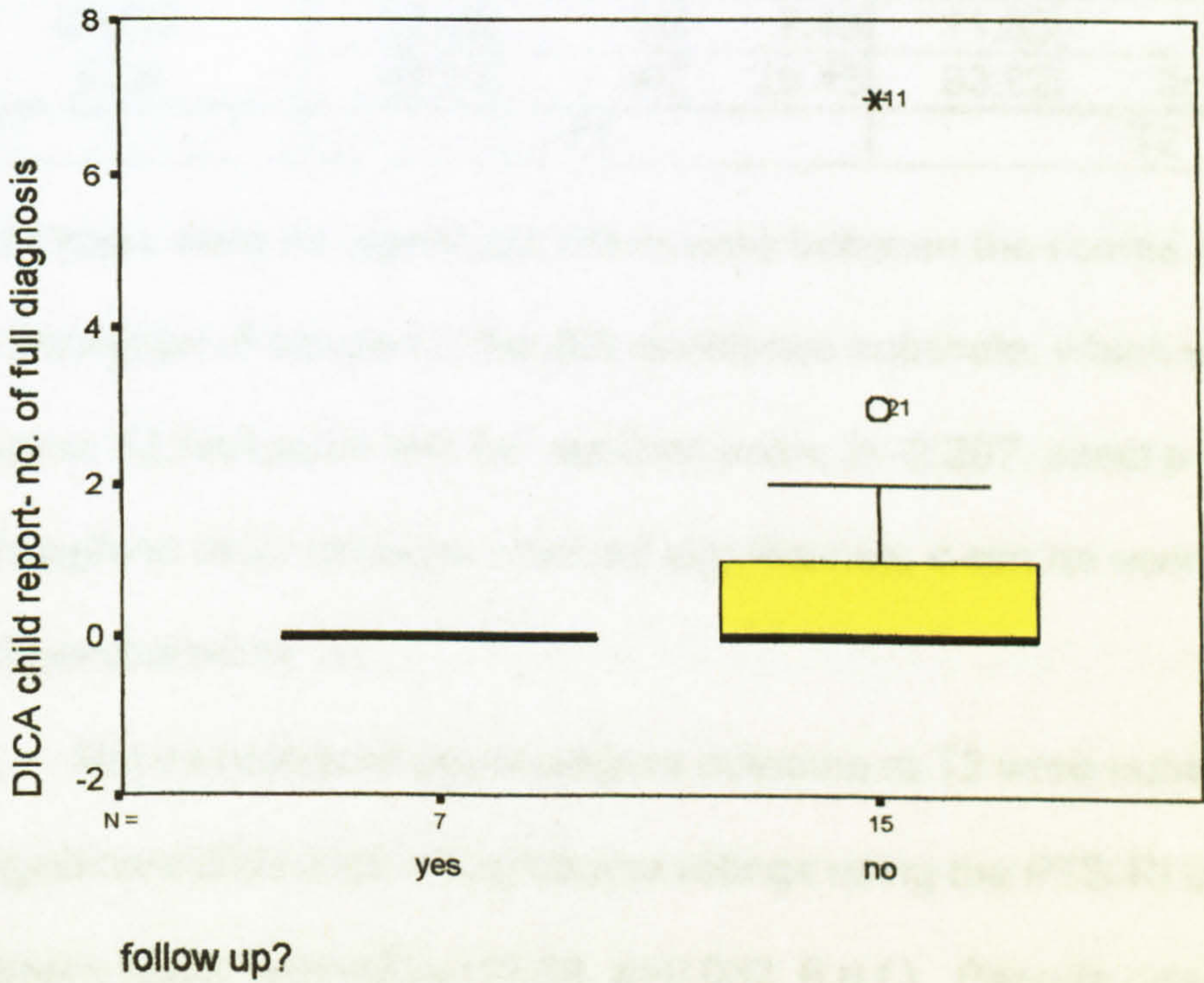
The mean age at T2 was 7.79 years, s.d. 3.62, and the median age was 6.51 years. It was on average 1.737 years since these children were burned (s.d. 1.51 years). Twelve females and 12 males took part at T2.

As 6 month follow-up rate was so low, statistical tests were carried out to examine whether there were any significant differences between the personal or burn related characteristics of the children who participated at T2 and those who did not. There were no significant differences between the groups on any of these variables.

Mann-Whitney tests and t-tests were carried out to examine if there were any differences on the psychological variables between those who took part at T2

and those who did not. Children who did not take part at T2 were significantly more likely to have had a full psychiatric diagnosis at T1 than children who did take part at T2 (Mann-Whitney $Z=-2.097$, exact $p=0.051$, 2 tailed) (Figure 11). There were no other significant differences between participants and non-participants at T2. The implication of this was that the results of the group at T2 could be tentatively generalised to the group as a whole.

Figure 11 Box-plot showing mean no. of full DICA diagnosis at T1 for those who participated at T2 ($n=24$) and those who did not ($n=31$).



3.8.1 Psychological outcome at T2

Table 40 Differences in the mean and median scores on all of the psychological outcome measures between T1 and T2.

	mean	median	s.d.	mean	median	s.d.
CBCL	50.55	52	10.84	50.09	50	12.66
CBCL	48.55	50.5	9.58	50.13	50	11.33
Internalising						
CBCL	50	52.5	9.91	49.87	49	12.05
Externalising						
C-PTS-RI	11.58	12	6.46	10	8	10.1
PTS-RI	14.95	13	10.8	10.95	10	7.6
IES	10.36	3	12.38	5.25	0	10.04
IES Avoidance	6.36	1	8.4	2.5	8	10.1
IES Intrusion	4	2	4.8	2.75	0	5.3
DSRS	13.45	14	7.43	11.83	11	8.63
FSS	44.27	43	20.45	33.92	34.5	22.24
	T1			T2		

**p=0.03

At T2 there were no significant differences between the scores at T1 and T2 with the exception of scores on the IES avoidance subscale, which were significantly lower at T2 (Wilcoxon test for matched pairs, $z=-2.207$, exact $p=0.031$, 2 tailed). Although no other changes reached significance, it can be seen that most scores had decreased by T2.

Not all ratings of psychological outcome at T2 were numerical. There was a significant difference in the trauma ratings using the PTS-RI between T1 and T2 (Fishers Exact Test value=10.54, $p=0.032$, 6 d.f.). Parents rated their children as experiencing more trauma at T1 than at T2.

Table 41 PTS-RI ratings of trauma at T1 and T2 (%) n=22

	T1	T2
d/ful	40.9	68.2
mild	36.4	22.7
mod	18.2	9.1
severe	4.5	0

There was a significant difference in the number of children with reported problem behaviours on the CBCL between T1 and T2 (Cramers V value=0.696, p=0.02, corrected for exact significance). There were significantly less borderline behavioural problems at T2, and the number of children with clinical behavioural problems also decreased..

Table 42 CBCL significant scores at T1 (n=50) and T2 (n=22)

	T1	T2
clinical	6	4
borderline	8	0
no	36	18

3.8.2 Summary and Limitations

Although preliminary analysis of the raw data showed that there was no significant difference between children who took part at T1 and T2 (with one possibly important exception), statistical power at T2 was poor due to the very small follow-up rate at T2. With low statistical power, there is a high possibility of failing to find a significant relationship when there is one (Type 2 error), and of finding a significant relationship when there is not one (Type 1 error). The power of this study to detect any difference over time is low, and for this reason, no further analysis was conducted.

Chapter 4: Discussion

4.1 Overview

The results show that children aged 3-18 years with a mean age of 7 years generally adapt well after sustaining what were generally minor burn injuries. Children under 6 years had reports provided by their parents using a general behavioural measure, the CBCL, and a trauma measure, the PTS-RI. Children over six years took part in a comprehensive assessment using a clinical interview (DICA) to assess general psychopathology, trauma measures (PTS-RI and IES) and instruments assessing fears (FSS) and depressive symptoms (DSRS). Parents of these older children also took part in the clinical interview and completed the CBCL and PTS-RI.

Posttraumatic stress *disorder* was not common in this group; 4 children had met the criteria at some point since their injury. Posttraumatic *symptoms* were very common, and intrusive symptoms such as "thinking it was happening again" were experienced by over half of the children and adolescents.

A quarter of the children had borderline or clinical behavioural problems although it is unclear as to whether these were present before the burn injury was sustained. Over half of the over 5's reported symptoms of depression which were above the cut-off on the depression scale (DSRS).

Specific features of burn injuries such as the size of the burn wound and the type of treatment required influenced the psychological responses of the injured participants. Similarly, characteristics of the children and adolescents such as their age proved to be salient factors.

Longitudinal follow-up was problematic due to low study completion rates, which unfortunately implicated the study design. The results at this time cautiously indicated generally improved behaviour at this time. The hypothesis was proven; children and adolescents experience a range of reactions following burn injuries, including PTSD.

4.2 Introduction

The aim of this research was to identify characteristics of burned children, their injuries and their responses, in order to provide a better understanding of psychological adjustment in children following burn injuries. The study was designed to address the short-comings of previous research and has found many interesting results, of which only some can be discussed in detail here.

The results of this study support the recent literature. In general, only a minority of children in this study were negatively affected by their injury. This chapter will discuss the results in terms of the research aims, outlining the problems which were encountered and finally working towards a psychologically meaningful conclusion.

4.2 Characteristics of paediatric burn injuries and their management

Children who took part in this study had injuries which were largely representative of the population as a whole. The majority of all the children asked to participate in the study had sustained scald injuries.

It is well established that younger children are more prone to scald injuries than any other kind of burn injury (e.g. Kent, 2000). Children with scald injuries in the present study were significantly younger at T1 than children with other burn injuries and had significantly less operations than children with other kinds of burn

injuries. There are two possible explanations for this. First, these significantly younger children may require further surgeries when they are older, for example, for release of scar contracture and increased joint movement, or for raised scar tissue, evening out this difference.

Secondly, children with scald injuries may have had less severe burns (although their burn size was not significantly different from those children with burns sustained by other means).

Limitations to the analysis of burn severity

As explained in the introduction, burn injuries are clinically assessed for both *size* and *depth*. It is the *depth* of the burn which is important for assessing the severity of an injury (see Appendix 1). For example, a 5% full thickness burn will definitely result in life-long scarring and will require grafting. A 5% superficial burn, even on the smallest child, will not. This study only considered burn *size*. This was mainly due to using hospital case-notes as a source of information on the children's injuries. Burn assessment is subjective, even though standard burn charts are used, and there is considerable variation in clinical practice. As a result, retrospective assessment from medical notes was very difficult.

It is more likely that larger burns will require more medical care, and this was the case in the present study; the majority of children with >5% TBSA burns spent significantly longer in hospital and required more burn care under general anaesthetic. The method of this study however, limits the medical meaning of these results. This lack of analysis of burn severity is a shortcoming of the present study, and future research should take burn severity, rather than only burn size into consideration for a truer analysis of burn related variables.

4.2.1 Hospitalisation- Inpatients and out-patients

This study examined hospitalisation and its effect from three different angles;

- a) whether a child was an in or an out patient following their injury,
- b) if they stayed in hospital, for how long, and
- c) how many surgical procedures they required during their treatment.

The majority of children in this sample were inpatients in hospital (39 out of 49) following their injury. There was no significant difference between children treated as inpatients and children treated as outpatients on any of the behavioural outcome measures with the exception of general behaviour as measured by the CBCL. On the basis of previous research, it may have been logically assumed that hospitalisation would have had a negative effect on outcome and adjustment to burn injury. It has been estimated that up to a third of all children who are hospitalised have long term behavioural problems related to the experience (Prins, 1994). In this study, this was clearly not the case; children who were *outpatients* had significantly more borderline and clinical behavioural problems than children who were inpatients. 40% of the children who were outpatients had significant behavioural problems compared to 25.6% of the children who had been inpatients, although this was not consistent across all measures. "Borderline" problems may be of particular interest to future research: it may be interesting to ascertain the kind of behaviour that lies somewhere between "normal" and "clinical", and to investigate if this is the kind of behaviour which characterises the child who is adjusting to a burn injury.

Minor Burns

Further investigation showed that as would be expected, children who were not inpatients had significantly smaller burns with an average of 1.7% TBSA compared to an average of 11.87% TBSA in the inpatient group. In other words, children who were not inpatients were presenting at hospital with very minor injuries, which may only have needed one dressing. These children had significantly more problem behaviours.

It is possible that part of the problem in this out-patient group was a direct result of the burn injury. There are only two studies which look at psychological adjustment to burn injuries in adults in non-admitted patients (Tedstone and Tarrier, 1997; Tedstone et al., 1998), and none at all in children. The Tedstone et al. (1997;1998) studies found that adults with burns of <1% (i.e. those who were outpatients) experienced significant distress and psychological morbidity. Possible reasons for this were not discussed. Previous research has identified a "small burn- big problem group" in adults (Blumenfeld and Reddish, 1987), but the small burns in question were much larger than in the present study, and there is no reason to suggest that findings from adult studies are applicable to children. A study employing larger groups of both in and out patients may be useful and will further clarify the present results. There is further discussion of the psychological sequelae of minor injuries later in this chapter.

Positive Hospitalisation Experiences

There is of course, the possibility that hospitalisation was a source of psychological benefit in the sample of in-patient children. It is illuminating to find only one article which has examined the possibility of this (Vernon and Schulman, 1964), and its age makes it impossible to apply the findings to the experience of hospitalisation for children today. However, instead of finding that hospitalisation

was of benefit, these authors concluded that BOTH benefit and upset were common to hospitalised children, and that the possibility of benefit is often overlooked. The findings in this study cautiously suggest that this is an area for further research.

Psychosocial stress in the out-patients

It can also be suggested that instead of measuring behavioural sequelae of the burn injury, the CBCL results in the out-patient group may be indicative of pre-existing behavioural problems. Usually, very minor injuries are the types of injuries which more able, more informed, or more experienced parents would treat themselves at home. It may therefore be the case that children who presented with these particularly minor injuries *and* agreed to take part in the study are in fact a group of children from family situations where coping with even the most minor stress is a problem. It is of note that the CBCL is an instrument completed by parents, and in this case, by mothers. The level of stress experienced by the child's primary caretaker i.e the mother, has been shown to be an important predictor of the child's problems, and similarly, the mother experiencing more stress in her own life is more likely to report problem behaviour in her child. Similarly, if the child is member of a family who do not cope well with daily stressors and "everyday hassles" such as minor injuries, something like a minor burn may become a risk factor (Wertlieb et al., 1987).

It is well documented in the adult literature that pre-existing psychopathology is common in those presenting with burn injuries (see Patterson et al., 1993 for a full review). In children this is a complicated issue. In this study, the mean age of the subjects at the time of their burn injury was six years. Retrospective data is

plagued by confounding variables at the best of times, and retrospective data provided by a parent, on the behavioural functioning of children, between 0.1 and six years following a burn injury, even more so. With no measure of pre-burn behavioural problems, the large variation in time since burn, the lack of a control group and the lack of any relationship between being an inpatient and ANY other outcome measure or burn related variable, conclusions are difficult to make.

4.2.2 Hospitalisation and posttraumatic stress

The number of days spent in hospital and the number of operations performed differentiated those children with any PTSD diagnosis and those children with no PTSD diagnosis. These variables were not a significant factor in any other aspect of psychological functioning following burn injury and they did not differentiate children with full PTSD from those children with partial PTSD. The implication is that these variables influence *symptoms* of posttraumatic stress rather than PTSD per se.

Number of days spent in hospital is not usually a significant factor in outcome following burn injury (Landolt et al., 1998), and Butler, Rizzi and Handwerger (1995) found treatment variables such as number of surgeries required to have no significant effect on posttraumatic stress in paediatric cancer patients.

Some medical situations in themselves can cause posttraumatic stress, and the very experience of hospitalisation can exacerbate or influence reactions to traumatic experiences, particularly in children (Wintgens et al., 1997; Landolt et al., 1999).

The experience of hospitalisation for a burn injury is unique. Whereas “treatment” is usually regarded as pain relieving, treatment for a burn injury

involves an initial intensification of pain, with the removal of dead skin, and the removal of healthy skin for the purposes of grafting. Even conservative treatments involve dressing the wound regularly, and when the open wound is closed, dressings must continue, to help maintain skin elasticity. For very minor injuries, there is no scarring, but in the case of deeper burns, the resulting scar tissue itself can become a focus for further treatment including operations. It is not surprising that the treatment of burn injuries can result in "continuous traumatic stress" (Gilboa, 1994), and although there was no evidence of this in the present study, the sample was under-representative of children who had more operations, and results may therefore be conservative.

Limitations

Hospitalisation experiences may have only influenced the *acute* traumatic response. DICA asks questions phrased "have you ever", whilst the other trauma measures ask about "in the last week" (IES) and "do you feel" (i.e. now) (PTS-RI). As variables linked to hospitalisation were only significant with regards to outcomes on DICA PTSD, hospitalisation may only affect acute trauma responses.

It is also important to consider the fact that variables such as length of hospital stay and number of surgeries performed do not take qualitative factors such as personal experiences, attributions and the "assumptive world" (Jannoff-Bulman, 1992) into account, and can therefore be meaningless in the "real world" and in understanding the trauma response beyond a very basic level.

4.3 Psychosocial stress and adaptation to burn injuries

The majority of children (56.4%) in the present study came from homes where two parental figures were present. These children were significantly older at the time of their injury and at T1 than children from single parent families. There were no significant differences between children with one and two parents on any of the outcome measures.

Previous research has found that burned children are more likely to come from families in generally stressful situations, with high incidences of parental maladjustment, low income and unemployment (e.g. Kendall-Grove et al., 1998). Unfortunately, as this study did not employ a control group of unburned children, and as data on parents was only collected on successful recruitment to the study, it is impossible to ascertain whether the participants are representative of or different from the general population on this variable.

There are however, possible psychosocial implications. The fact that children from one parent families were significantly more likely to get burned at an earlier age suggests that children from one parent families may be more at risk for accidents. This may be due to a lower level of supervision, or due to more stressful family environments, where one parents attention has to be stretched to situations where traditionally, two parents were involved (e.g. such as bath-time, or at meal times). The fact that children from one parent families were no different from children with two parents on any outcome measures, suggests that, as has been previously found, the families of children with burn injuries respond in similar ways, regardless of their size, facilitating successful adjustment (Blakeney et al., 1995). Tarnowski et al. (1989) speculated that the generally good outcome in their study was due to the majority of the children being in "intact" family situations, but the marginal majority of two parent families and the generally good

outcome in the present study suggests that adaptation, as far as families are concerned, is much more to do with support from any parent or parental figure rather than from two parents per se. It is also of note that this study differentiates “parents” from “parental figures”. This was due to the interest in psychosocial support to the child rather than the demographic variable of number of parents in the strict sense of the word. The contemporary family structure is changing, and it is important to consider this with regard to the existing literature on psychosocial support and the importance of the family in the adjustment to childhood trauma and injury.

4.3.1 Psychosocial stress influenced non-participation?

The reasons for non-participation in this study were varied, but 39.1% of the reasons were due to factors very possibly linked to psychosocial stress. These were “number not available” (the telephone had been disconnected), “addressee unknown” (the family had moved house or had given an incorrect address), and “no contact number”, (the family had no telephone or did not leave a contact number). There were a number of instances where telephone numbers, such as the number of a neighbour or of a local business were given as contact numbers. Discussion with nursing staff revealed that this was a wide-scale problem, and they speculated that this was because families “didn't want to be found”. There was considerable suspicion over involvement with social services from many of the families who were contacted, and this may have been linked to previous experiences.

Frequent home moves did appear to be common, and have previously been implicated in poor adjustment following burn injury (Knudson Cooper and

Leuchtag, 1982). It is impossible to consider such a variable in a population who do not take part in research unless the data is collected on arrival at the hospital.

Although non-participation is a common problem in any study, and particularly in burn populations, (e.g. Gorga, 1999), the present findings suggest that non-participation can be informative, in the same way as research often considers "informative dropout" (Diggle and Kenward, 1994). The reasons for non-participation in this study are highly suggestive of an "at risk" group, with financial difficulties, poor housing, high social and familial stress and involvement with social services. The implication for the present study may be that children who took part were not in fact, socially representative of the burned population as a whole. Unfortunately, this was not measured in the study, so at this stage, this can only be anecdotal observation and speculation. There is no doubt that future research should continue to strive, as much as is methodologically possible, for a more complete understanding of non-participant groups.

4.4 PTSD in children with burns

How does this study compare with previous studies?

14.3% (n=4) of the children in this study met DSM IV criteria for PTSD diagnosis, and 42.8% (n=11) of children met criteria for partial diagnosis. In total, over half (57.1%) of the children displayed posttraumatic symptoms at some point since their burn injury. This approximates the findings of the only other systematic, standardised research on PTSD in burned children; Stoddard et al. (1989) who reported 53.3% (n=16) of children aged 7-19 years to have full or partial, DSM III PTSD diagnosis at some time since their injury. It is probable that if DSM IV criteria were applied to the Stoddard sample today, the incidence would actually be higher (Powers et al., 1994).

The near replication of findings in the present study implies that previous concerns over the Stoddard et al., (1989) study can be answered in some way. Baur (1998) debated the usefulness of the Stoddard et al. study as it was felt that too much time had passed since the initial burn injury (mean 8.86 years, s.d. 4.33) but the present study found that time since burn (mean= 1.378 years, s.d. 1.7) was not a significant factor in the posttraumatic response or in any measure of behavioural outcome following burn injury. This is in keeping with previous research on burn injuries. Kavanagh's (1990) concerns however, that the sample were not representative of the general population of burned children, as their burns were on average, large TBSA, may prove to be true. Children meeting criteria for full PTSD diagnosis in the present study had significantly larger TBSA burned than children with no PTSD (i.e. full OR partial) diagnosis. Children in the present study had a mean 9.8% TBSA burned compared to mean 38.43% TBSA burned in the Stoddard et al., (1989) study. Stoddard et al. reported a significant difference between the number of DICA diagnosis and TBSA, but did not investigate the effect of TBSA on PTSD outcome.

DICA IV PTSD- a problem

The fact that DICA asks questions about symptoms "ever" means that it is likely that the current figures for PTSD and in particular, for partial PTSD, are elevated. It was illuminating to see that 4 children (16%) also scored above the cut-off point on the IES, which asks questions about "in the last week", and that 2 of these children had a partial PTSD diagnosis and 2 had no PTSD diagnosis at all. The implication is that it is possible that all the cases of PTSD were past.

It is unfortunate that this lifetime diagnosis, instead of a more useful "present" or "partial" diagnosis was not detected until after a substantial number of

interviews had taken place. This is a serious limitation to the findings of the present study. Future studies should attempt to use a form of questioning which clarifies the wording for the PTSD sub-scale for DICA-IV. There is a more complete discussion of the limitations to the use of DICA IV later in this chapter.

4.4.1 Re-experiencing and Intrusion

Re-experiencing is the defining feature of PTSD symptoms. Intrusive thoughts are a characteristic of everyday thought, but the intrusive memories associated with PTSD are clearer, more persistent, involve high levels of emotional arousal and may be experienced in fragments rather than as whole memories. There is substantial evidence that high levels of intrusion following trauma is a risk factor for later psychopathology in adults (Brewin, 1998).

On the DSM IV symptom profile, re-experiencing symptoms were reported by two thirds of parents and children using DICA IV criteria. Using the IES, which has eight items pertaining to intrusion and re-experiencing, over half of the children reported at least one re-experiencing symptom in the previous week. Significant intrusive symptoms were predictive of higher trauma ratings on the C-PTS-R1 and on the IES, and children reporting significant intrusive symptoms on the IES were also likely to report the other defining feature of PTSD; avoidance, even though previous research has found the relationship between these two symptoms less than straightforward (Joseph et al., 1995). It is clear that this group of burned children showed symptoms consistent with other traumatic experiences and PTSD research.

Flashbacks

Flashbacks are characterised by their sudden, often incomplete recall, and strange sensory experience. They can often not be deliberately retrieved. This may be due to dissociation and may be accompanied by emotional numbing (van der Kolk and Fisler, 1995). Flashbacks have been reported to occur in between 0 (Terr, 1979) and 100% (Malmquist, 1986) of trauma cases. Whilst most authors acknowledge that children do not frequently or commonly report flashbacks (Lyons, 1987; Yule, Perrin and Smith, 1998), many burned children, particularly in the acute stage, experience flashbacks and nightmares (Stoddard, Chedekel and Shakun, 1996), and 40.9% of children in the present sample did. It is not surprising that parents rarely reported flashbacks, as these are particularly personal, internal events which may be difficult to verbalise.

The reported flashbacks may be explained by the injury environment, although there was no significant relationship between intrusion and burn related variables (such as whether they were scalded etc.). The majority of burn injuries occurred in the home. When children were asked questions about flashbacks, they often referred to situations where for example, smaller accidents had happened, such as a pot of water boiling over on the cooker, and reported feeling that "it was happening all over again" and feeling distress. The frequency of flashbacks in these children could be related to the nature of their injury environment. What was usually a harmless, very familiar, situation such as taking a shower or reaching for something in the kitchen, became, on one traumatic occasion, a situation which caused them injury and pain. These children were then re-exposed to the trauma environment on a daily basis. It is therefore not wholly surprising that flashbacks on at least one occasion were not uncommon.

There may be also be a cultural explanation for this. Children may be able to report flashbacks more easily than they may once have done due to the increased visual and verbal depiction of PTSD on television and in the media in general. Most of the popular soap-operas have now had story-lines concerning trauma and have shown symptoms of PTSD such as "flashbacks". Cultural factors are recognised as important to the traumatic response (deSilva, 1998), and the increased media profile may go some way towards confounding PTSD research in the future. There is no doubt that at least some of the children were exposed to such possible factors but it remains impossible at this stage to guess their influence.

4.4.2 Avoidance

Children are less likely to report avoidant symptoms than intrusive, re-experiencing, symptoms. Just over a quarter of children met criteria for avoidance using DICA IV, DSM IV criteria, although most children reported one symptom.

Using the IES, one third of the children reported significant avoidant behaviour in the previous week, although the mean avoidance score was much lower than has been found with other traumatised children (Yule and Canterbury, 1994). Parents reported avoidant symptoms in their children least out of all the PTSD symptoms using DICA IV. Avoidance may be a difficult symptom for a parent to give reliable information on, as the items on emotional numbing are internal states which may be difficult to verbalise, even for traumatised adults (Yule, 1994).

Avoidance and the IES

Children reported more avoidant symptoms on the IES than on re-worded DSM IV criteria (even though DICA refers to life time experience of avoidant symptoms, whilst the IES refers to the past week). This supports previous research which has shown the IES to be particularly good at assessing trauma meaningfulness in children (Yule and Udwin, 1991; Vernberg et al., 1996). There is no doubt that items such as "feelings of estrangement", "restricted range of affect" and "future-foreshortening" are difficult concepts to understand, even if they are being experienced. It may be that the items on the IES pertaining to avoidance are much easier to understand e.g. "I was aware that I had a lot of feelings about it, but I didn't deal with them".

Previous research has found the relationship between avoidance and psychological outcome to be complex (McFarlane, 1992a; Joseph et al., 1994); avoidant behaviour is not always directly related to poor outcome. In the present study, it was. Children reporting avoidance on the IES reported significantly higher scores on the intrusion sub-scale and were assessed as having more trauma on the IES as a whole. Children reporting avoidant behaviour had higher trauma ratings on the C-PTS-RI and on the PTS-RI, and were more depressed.

4.4.3 PTSD and burns- some conclusions and recommendations

It is clear that posttraumatic *symptoms* following burn injuries are common. 16% of children met diagnosis for PTSD, a similar number scored above the cut-off point on the IES, and 21.6% of children were assessed as moderately/severely traumatised on the PTS-RI, but there was no correlation between these measures. These findings support recent theorising in the adult burns literature that posttraumatic stress *disorder* is relatively rare in patients with burns. Addressing

and researching burn injuries as a psychologically traumatic experience as opposed to simply examining the physical aspects of the injury for example, is at an early stage. Focusing on any particular aspect such as prevalence may therefore be misguided (Gilboa, 1999), and will serve to prematurely limit the many important issues which people who live with burn injuries have to cope with.

It is clear from the present study that the response to a burn injury is complex, and as such, may not be amenable to a diagnostic evaluation for a truly meaningful and useful understanding (Street and Sibert, 1998; Yule, 2000). At this stage, pilot studies such as the present study, which seek to identify potential research priorities may be more useful than diagnostic outcome studies or studies which focus on any one particular theme, although these studies remain popular.

4.5 Problems and limitations to this study

Although it has been an aim to highlight the methodological limitations inherent in burns research in general, and as this thesis has progressed, in this study in particular, some limitations require further discussion.

4.5.1 The DICA IV

DICA IV was chosen for this study for various reasons, which were outlined in the methods section. Briefly; it could be used for research purposes with no prior training, it was computerised, and it was used in the only previous similar research design (Stoddard et al., 1989). As discussed in the methodology (Chapter 2, 2.2.1), problems with DICA IV are well documented, but are regarded as minor.

Although it can only be speculation, the poor follow-up rate in this study may have been due in part to some of the problems which were encountered with DICA.

Length of the interview

DICA has over 1600 questions. Although this makes for an extremely structured interview, covering all the categories of childhood disorder, it also makes for an interview which can last for 2 hours, depending on the child or indeed the adult. Many children and their parents found this problematic, and many children clearly found the interview process boring, despite all the efforts of the interviewer. If the interview lasted more than 45 minutes, all children, regardless of age, tended to have problems with attention. On a practical level, if both a parent and child were being interviewed, home visits could last as long as five hours, which was obviously inconvenient for the family.

Types of questions

DICA IV was not designed to be culture specific, and has been used successfully in Spanish samples. In the present sample however, there were cultural and language problems with some of the questions, and although these could usually be corrected by the interviewer as the interview was being used as an "interview driver", some questions were problematic. Children often giggled at questions, and parents voiced concern at some of the lines of questioning. For example, the questions pertaining to "gangs" includes a question "Are there any gangs in your neighbourhood?". This might usefully be changed to "Are there any gangs where you live?", for a U.K. population. Obviously, the meaning of the term "gang" varies between American inner cities and Scottish housing estates.

Similarly, some questions were unsuitable, even for the older children, such as those relating to carrying weapons and alcohol use. If a child answered the question "have you ever had a drink of alcohol" with "yes", this would trigger a period of up to 10 minutes of extensive questions about alcohol consumption. Moderate drinking in European teenagers is not generally regarded as a problem behaviour, and is probably viewed as a "rite of passage". Children and teenagers could become quite exasperated about questions concerned with alcohol addiction when their experience of alcohol was limited to drinking with their parents on special occasions! Although there is scope for leaving out sections of questions, leaving out particular questions is impossible. Failing to ask specific triggered questions would have questioned the internal validity of the study.

DICA IV is certainly a useful tool, but if it is to be used successfully in British samples, it may need to be more culturally attuned. The author is not aware of any other published British or Irish studies which have employed DICA IV, and this may be why.

Diagnostic categories

It is unfortunate that the PTSD section in DICA IV asks about "lifetime" PTSD and does not permit an Acute Stress Disorder diagnosis, or even a "present" diagnosis without the interviewer working this out from the "summary of responses" which DICA IV provides. This detracts from the usefulness of DICA IV as a research tool which minimises inferences, and requires the interviewer to be trained in psychiatric diagnosis, and has limited the findings of this study. The increased interest in PTSD as a diagnostic category means that future versions of DICA IV should take present, lifetime and acute responses into account.

ADHD was probably over-diagnosed in the present study, with just under half the sample reporting enough symptoms for a "partial" diagnosis. Although this may in part be to do with such children being more accident prone, and therefore more likely to be burned and take part in the study, the "summary of responses" suggests that it is in the nature of the questioning that the problems lie. A sizeable minority endorsed lots of questions such as "Do you make a lot of mistakes in your school work" and "Do you find it really hard to sit still when you're doing your homework?" but would not report this interfering with how they got along with their parents or teachers, resulting in a "partial" diagnosis. Previous research has reported over-identification of oppositional defiant disorder and overanxious disorder using DICA (Boyle et al., 1993), and the large numbers of children with ADHD symptoms in this sample may be due to similar problems. Problems may also include the continuing lack of validity in normal population samples (Boyle et al., 1996), and it is important that such research is ongoing.

4.5.2 Lack of a comparison group

The lack of a control group and the young age of this sample mean that it is impossible to say whether the outcome of these children was due to burn related factors or whether they are indicative of pre-burn psychopathology or behavioural problems. Although using a control group is one of the pre-cursors of good research methods, finding a suitable control group is problematic (see introduction), and may only be really useful once pertinent research priorities have been defined.

4.6 Characteristics of the children

4.6.1 Depressive symptoms

Using the DSRS, more than half the children over six years reported symptoms of depression. In contrast, only two out of twenty two children met criteria for depression using DICA IV. A logical explanation is that the DSRS may be overly sensitive to depressive symptoms in a population such as this, or that DICA IV is not sensitive enough. These are not issues which have been raised elsewhere, as most studies only employ one measure of depression, and this is probably a fruitful area for future research.

Symptoms of depression are common in adults who have been burned, with rates estimated at between 23-61% (Patterson et al.,1993). Unfortunately, this is an area which remains under investigated in children who have been burned, and the problem is further confounded by a general anecdotal culture which implies high prevalence rates.

Depressive symptoms are common in children with posttraumatic stress disorder, and can sometimes develop into clinical depression. The relationship found between PTSD and depressive symptoms in the present study suggests that burned children may be at a similar risk.

Although depressive symptoms were common and related to other behavioural outcomes in the present study, they were unplanned for, and as such, do not unfortunately lend more to a lengthier discussion at this stage.

4.6.2 Cognitive and developmental issues

The nature of the sample and the small group sizes in many analyses makes developmental issues very difficult to examine. However, there were some interesting findings. In this study, age had very little to do with children's understanding of their burn injury or the trauma they had experienced, and this is in keeping with the growing body of developmental research. This study found

that where there were any significant age differences (i.e. on the IES avoidance sub-scale), older children had more problematic outcomes than younger children (although "older" is relative). A caveat is that older children were under-represented in the present study. This implies that these results may not be applicable to the general population, and may underestimate problem behaviours.

Age and the IES

Children who scored above the cutoff point on the IES avoidance sub-scale were significantly older at the time of their first assessment, with a mean age of 12 years. Children who scored above the cutoff point on the IES avoidance sub-scale were also significantly older at the time of their injury, with a mean age of 10 years. It is important to interpret these findings remembering that only children over 6 years completed the IES.

From a developmental perspective, age is not a reliable predictor of intellectual, cognitive, social or emotional development. However, with no other means of examining development, it is a commonly used general yardstick.

Present theory

In attempting to explain the developmental and cognitive issues involved in adjusting to a burn injury, there are many problems to overcome. Most importantly, few burns research studies have attempted to understand the meaning of their results in terms of psychological theory, and continue to be almost exclusively descriptive.

The nature of burn injuries is also a problem. Burn injuries are now recognised as distinct traumatic events, and therefore theory on trauma is applicable to a greater understanding of adjustment to such an injury. Burn

injuries are also however, distinct physical events, and therefore, theory on injury and illness are also applicable in understanding adjustment.

From a developmental point of view however, these two positions are not always complimentary. Traditionally, from an illness perspective, "It is widely recognised that pre-school children's...reactions to illness are more severe" (Hergenrather, 1991). There also remains a widely held, largely unsubstantiated, belief that younger children adjust badly to hospitalisation (e.g. Quinton and Rutter, 1976). This is based on popular Piagetian theory; the child is at risk for developing psychological sequelae because they have limited capacity for understanding their illness and the experience of hospitalisation, until concrete operational thought develops between the ages of 7 and 11 years (Bibace and Walsh, 1981). These beliefs prevail even though more recent research indicates that children between the ages of 3 and 10 years have a basic but plausible understanding of hospitals and what goes on there (Eiser, Eiser and Jones, 1990).

From a trauma perspective however, younger children may have a better outcome following a traumatic experience because their lack of cognitive development *protects* them (Yule, Perrin and Smith, 1999), although research in this field is still at an early stage (Yule et al., 2000).

Burns research has rarely been concerned with the influence of development on psychological outcome, with studies reporting that age either has no effect or that older children are more at risk.

It is clear that burn injuries are not "illnesses" in the more usual sense of the word; even the most minor burns are associated with severe pain, they affect

the entire population; they can cause life-long scarring and/or disfigurement; and involve painful treatment (see 4.2.2).

Similarly, burns are not "trauma" in the more usual sense of the word (this has been reflected in the debate surrounding burn injuries and Criterion A); there may be several "traumas" involved, depending on the nature of the burn and the surgery required (Gilboa, 1994;1999). It is therefore obvious that a theory about the influence of development on children's adjustment to burns must embrace *both* theory on children's understanding of illness and theory on children's understanding of trauma.

Towards a new theory of children's understanding of burn injuries

Recent work in the areas of health psychology, paediatric psychology and developmental psychology suggests that Piagetian stage theory, on which theories of children's understanding of BOTH illness and trauma are based, are misleading, and that children have a greater understanding and conceptualisation of illness, injury and trauma than they are given credit for (Rushforth, 1999; Hergenrather and Rabinowitz, 1991; Eiser, 1991; Bird and Podmore, 1990).

The few significant age differences in the present study do not directly support the previous research on children's understanding of illness or trauma. Overall, the findings show that where there were significant age differences, older children adapted least well. However, age was rarely of significance. The present findings show that response to injury is complex and largely unpredictable, and explanation obviously lies beyond "a unitary cognitive mechanism" (Eiser, 1989).

Understanding a burn injury from the perspective that it is a health related trauma is obviously more in keeping with flexible theories of development such as Carey's (1985) theory of a gradual "novice to expert shift" or Vygotsky's (1962) "zone of proximal development" theory than a rigid stage theory, with set stages for conceptual change. It is clear that children, like adults, derive a personal meaning from a burn injury, and that this appraisal is what affects outcome.

The children in the present study reacted to their injuries in many different and perhaps surprising ways, most often regardless of their age and expected developmental level. This is in keeping with the current theoretical stance of health related psychology; i.e. children understand much more than they may be expected to. "Understanding" in the context of a burn injury seems to be both a protective factor *and* a risk factor, as is the case in other trauma research (Yule et al., 2000). The minor injuries in the present study appear to have been understood for what they were; that is, minor, with very few long term functional or physical consequences. Even the children who were burned as the result of personal misdemeanours (these were the children with the more severe burns) e.g. fire starting, displayed a mature understanding and realistic appraisal of their injuries, their changed bodies, and the meaning of their accidents and their actions to their own and their families lives. It may be the case that because very minor burn injuries are so common, children have learned how to deal with them from a very early age, so that when a more serious burn injury is experienced, they can apply existing schemata or coping mechanisms relatively successfully.

The results of this study are far from conclusive, and are marred by the under-representation of older children and adolescents and small sample sizes in most of the analyses. Development and cognition are obvious but difficult areas of research in a still emerging and primarily medical domain such as this. For the

research psychologist however, it is clear that there are many as yet uncharted territories in this area.

4.7 Implications

The sixth research aim was to consider the implications for future burn care and research. Whilst these have been highlighted and discussed as they have arisen, it is useful at this point to collect them together.

Methodological implications

- methodological rigour should not be at the expense of participant friendly methods
- multi-centre recruitment is optimal as participant numbers are difficult to recruit and maintain
- long term follow up of this group will prove to be difficult

Conceptual and theoretical implications

- Concentration on PTSD diagnosis per se may be misguided
- Symptoms of posttraumatic stress vary and it is important to assess children's subjective responses
- Our understanding of children and adolescents responses following burn injuries requires the integration of theory on injury, illness, trauma and development
- Depressive symptoms as well as increased fears and anxieties following burn injury may be more clinically relevant areas for future research with this group

Clinical Implications

- Burned children and adolescents can present with a wide range of psychological problems following burn injury
- PTSD is not a common diagnosis in these children
- Information sheets outlining normal responses may be useful for burned individuals and their families
- Questionnaires at follow-up clinics may be useful for identifying those children and young people experiencing difficulties
- Individuals with larger injuries may need more support

4.8 Conclusions

This study has found that many children experience psychological trauma of some extent following burn injury, but that posttraumatic stress disorder is rare in children with minor burn injuries. Symptoms of posttraumatic stress are common, and as such, may constitute a “normal” response. Using different trauma measures is valuable in showing that response to burn injury is probably very much to do with the personal meaning of the incident to the child, and that details such as the wording of trauma related questions are important to consider.

Further understanding of traumatic symptoms such as intrusion appears to be a fruitful area for a better understanding of children's trauma responses in general.

There was some evidence that families, irrespective of their size, react in similar ways to their injured child, facilitating a good outcome. However, children in this study may not be socially representative of the burn population as a whole, and children from families with high psychosocial stress may therefore be under-represented and outcomes less positive overall. Psychosocial stress remains an important area for future research in this area.

The medical aspects and characteristics of burn injuries and their treatment are impossible to separate from the personal characteristics and psychological outcomes of children and adolescents who have been burned. Issues surrounding burn extent, severity and hospitalisation were all involved in the responses of children in this study. Future research should attempt to further an understanding of such variables and the meaning children take from their injury experiences. Multi-disciplinary research, bringing together traditional medicine and contemporary psychology would best further this cause. This research has identified salient topics and specific research priorities for the future.

If it can be ascertained that some problems such as depressive symptoms and symptoms of avoidance are common, a better understanding of the abnormal reactions to burn injury can be achieved and possibly targeted at the treatment source, along with the more traditional medical treatment. Many parents and older children expressed their gratitude after taking part in this study, and regarded taking part in this research as a part of their full burn care. Some participants explained that any previous concerns were dissipated by the interview process and the fact that such work was going on. Burn care, for those affected even in the most minor way, should go beyond medical considerations. Focusing on the negative aspects of burn injuries and expecting burn injured children to have poor psychological outcomes based on what remains largely anecdotal evidence is simply buying into the concept of the burn “victim”. The children who took part in this study could certainly not be regarded as “victims” and often showed remarkable resilience and a mature understanding. There is no doubt that most children experienced some problems, and that a minority of children experienced adverse psychological sequelae and that these reactions should be studied and these children’s problems addressed, but it is also

important that the normal responses to burn injuries are addressed and understood.

Unfortunately, it is very difficult to draw any firm conclusions from this research, for many reasons which should now be clear. Almost 20 years ago, Wisely stated

“research should be designed to determine if there exists a meaningful, definable, sufficiently sensitive and specific profile of the burned child”
(Wisely, 1983, p. 64).

Although salient topics have emerged, this study has shown that much work remains to be done.

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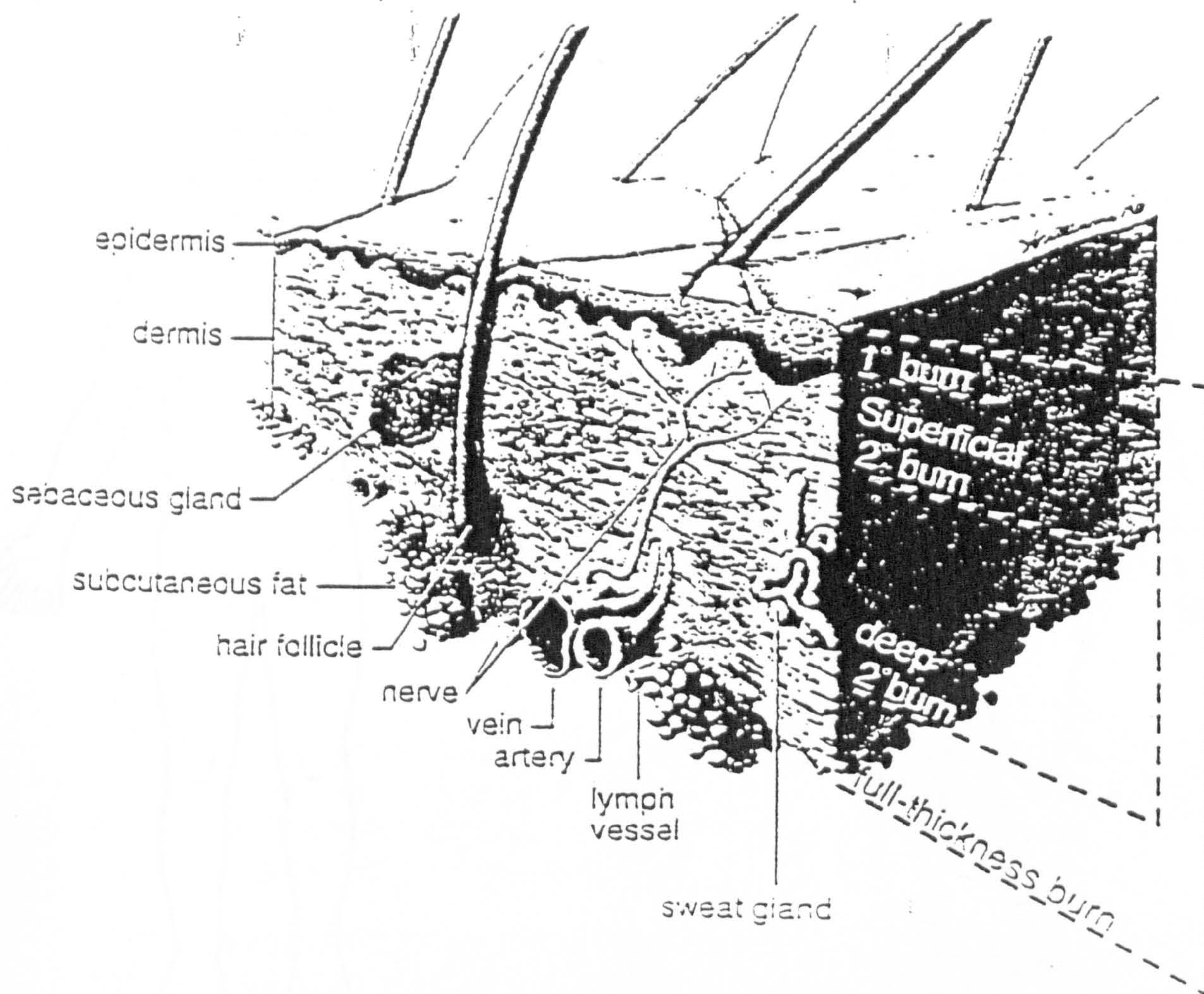
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Appendix 1

Diagram of the Skin

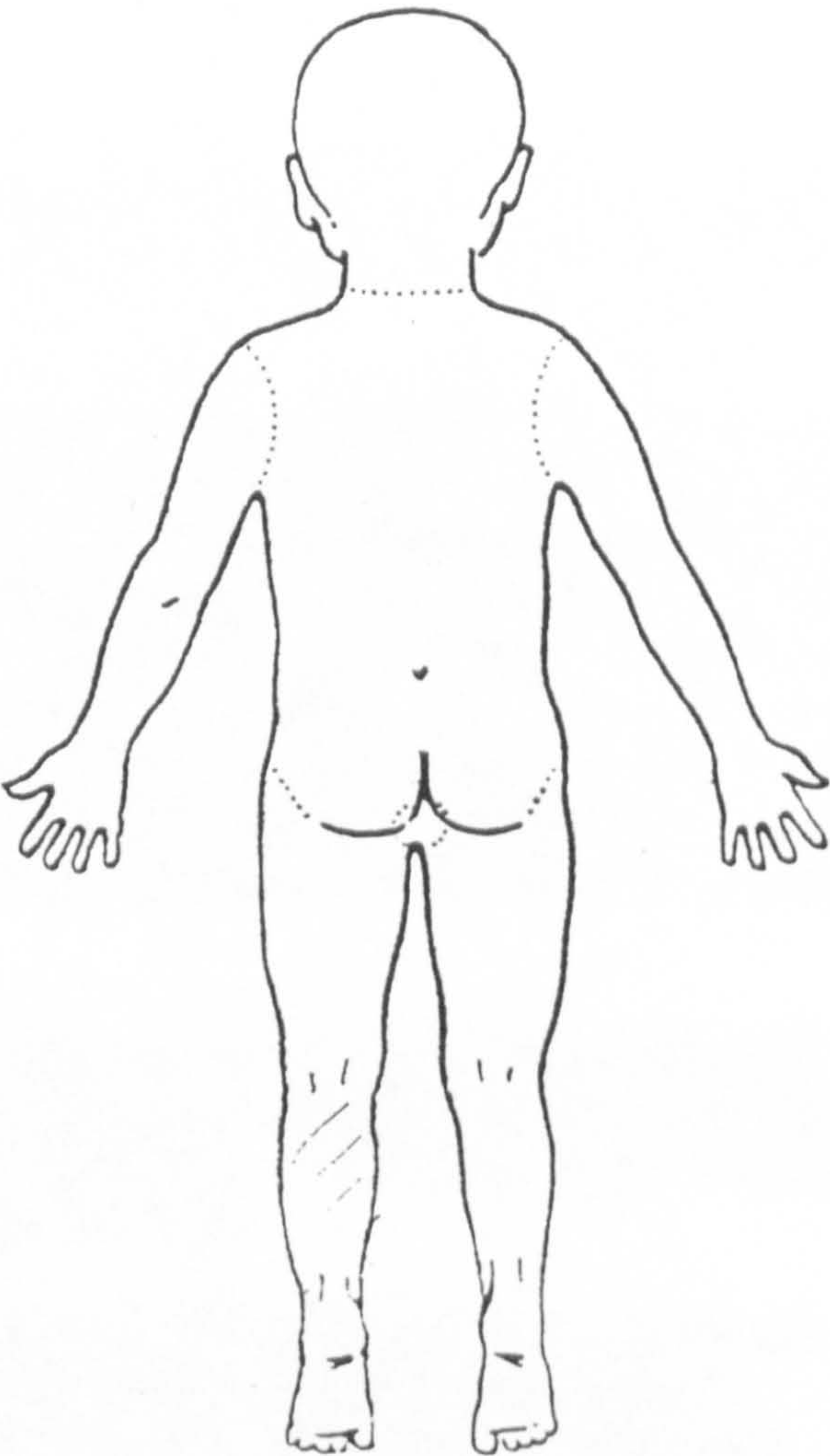
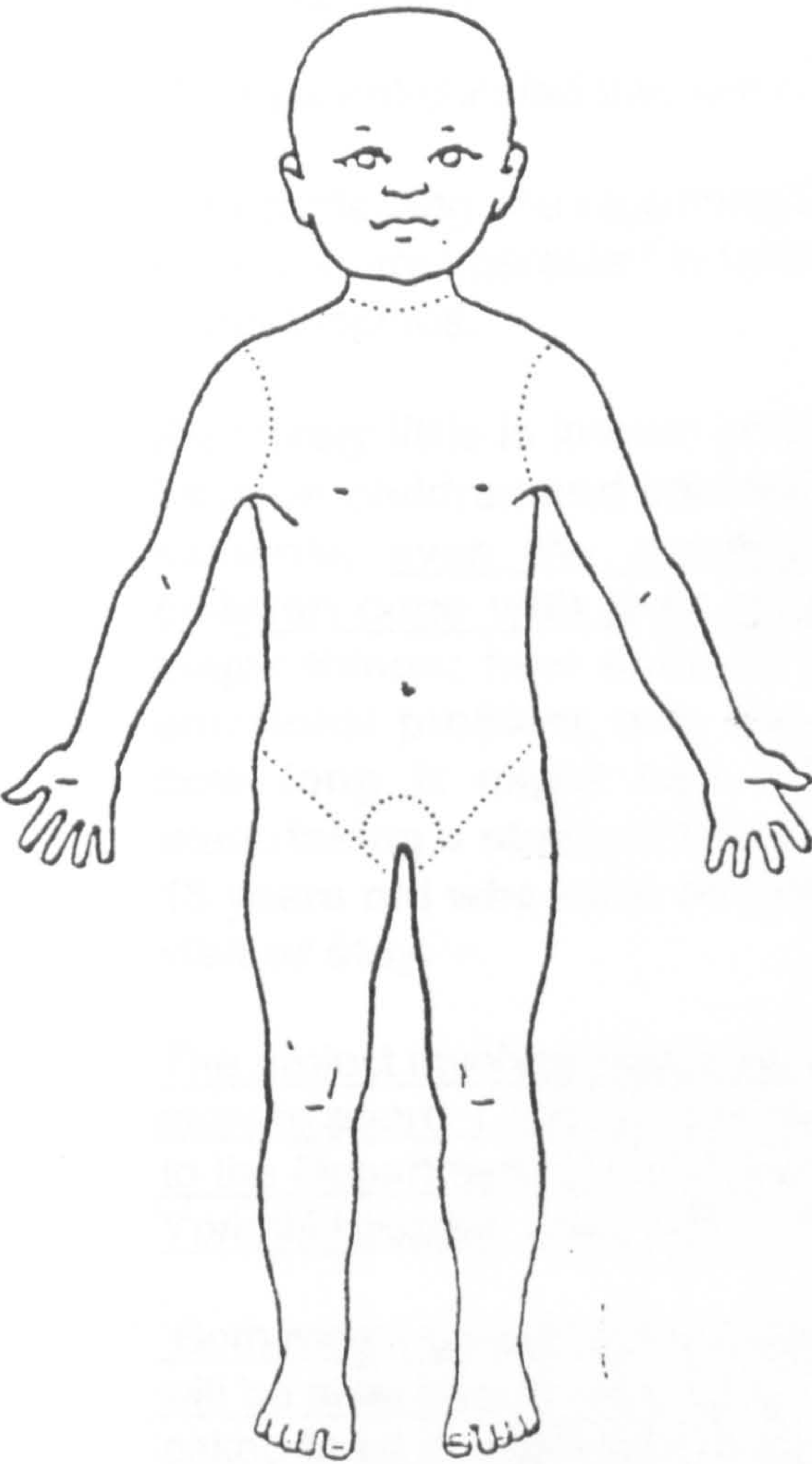


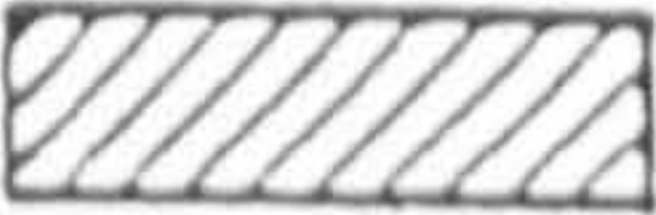
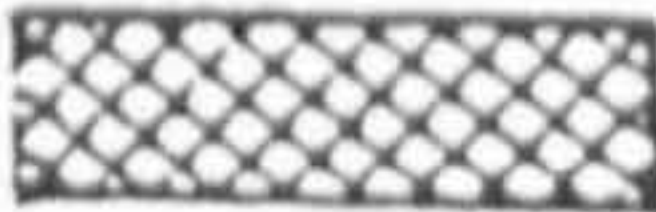
Appendix 2

Children's Standard Burn Chart

FRONT

BACK



DATE	MARK CHART AS FOLLOWS:—	Superficial Skin Injury (Excluding Erythema)	
		Deep or full thickness Skin Injury	

APPROXIMATE "L" AREA OF SKIN IN RELATION TO AGE
(Enter estimated area of Cutaneous Burns)

REGION	INFANT AND TODDLER Age 0 - 2 years		YOUNG CHILD Age 2 - 8 years		OLDER CHILD Age 8 - 13 years		ADOLESCENT Age over 13 years	
HEAD AND NECK	19		15		11		9	
RIGHT UPPER LIMB	5		7		8		9	
LEFT UPPER LIMB	5		7		8		9	
TRUNK ANTERIOR	25		20		20		18	
TRUNK POSTERIOR	25		20		20		18	
RIGHT LOWER LIMB	10		15		16		18	
LEFT LOWER LIMB	10		15		16		18	
PERINEUM	1		1		1		1	
TOTAL	100		100		100		139	

Appendix 3

Recruitment Letter

(Their address)

Dear parent/child/adolescent (named),

I am contacting you regarding the burn injury which your child/you sustained and hope you are interested in taking part in a study on the emotional consequences of burn injuries.

Relatively little is known about the emotional effects which burn injuries may have on children and adolescents, irrespective of the degree of the burn. For example, even the smallest burn can be very traumatic, and different children cope with their injuries in different ways. I am interested in two major things; how children cope with their burn injury, and if there is an emotional problem, why this may be, what form the problem may take and how long it might last. To find out more about these things, I am undertaking a study of burned children and adolescents aged between 3 and 18 years old who have sustained a burn injury which has required a hospital visit or stay.

The project involves spending some time with you (and X) on two occasions six months apart. I can come to your home to see you, or ideally, you can come here to the Department of Child and Adolescent Psychiatry, which is just at the back of Yorkhill hospital, and I will pay your travel expenses.

Both meetings will be arranged at times suitable to everyone, and the meetings will be arranged by telephone. During each meeting, both you and X will be asked to fill in questionnaires and answer questions about general information and to talk about the burn injury.

You will be given a full explanation about the project and then you (and X) will be asked to give your permission in writing, for your involvement. Taking part in this project is voluntary, and you are under no obligation to do so. If you do choose to take part, you can withdraw from the project at any time.

Although your help may not directly benefit you/X, it will add to what is already known about the often considerable problems faced by children and their families after a burn injury, so that more help can be given in future.

Your GP will be informed that you (and X) have been involved in this study, and if there are any problems, I will inform you.

I hope this note gives you enough information, but if you have any questions, I would be pleased to answer them. You can contact me by phoning 0141 201 0223 Or by leaving a message on 07801 734024.

Sincerely,

Appendix 4

Consent Forms

University of Glasgow
Department of Child and Adolescent Psychiatry

Child Consent Form

Psychological traumatisation in burned children and adolescents

The above project has been explained to me and I have received an information sheet giving both details about what the project involves and a contact name and telephone number. I understand that either my doctor or the hospital consultant will be notified that I and my parent or parents are taking part in the project.

As taking part in the project is on a voluntary basis, I understand that if I choose not to take part in the project or to drop out of this project, this will not affect any health care which I am currently receiving, or may receive in the future.

Deborah McQuaid

CHILD/ADOLESCENT_____

INVESTIGATOR_____

WITNESS_____

DATE_____

University of Glasgow
Department of Child and Adolescent Psychiatry

Parent Consent Form

Psychological traumatisation in burned children and adolescents

The above project has been explained to me and I have received an information sheet giving both details about what the project involves and a contact name and telephone number. I understand that either my doctor or the hospital consultant will be notified that I and my child are taking part in the project.

As taking part in the project is on a voluntary basis, I understand that if I or my child choose not to take part in the project or to drop out of this project, this will not affect any health care which I or my child are currently receiving, or may receive in the future.

Deborah McQuaid

CHILD'S NAME _____

PARENT _____

INVESTIGATOR _____

WITNESS _____

DATE _____

Appendix 5

Sample partial ADHD diagnosis

Attention-Deficit/Hyperactivity Disorder, Present

STACEY has NOT met the criteria for Attention-Deficit/Hyperactivity Disorder, Present, as per the DSM-IV

Criterion A has been met: Either (1) or (2) is present.

(1) Six (or more) symptoms of inattention are present to a degree that is maladaptive and inconsistent with developmental level, as indicated by STACEY reporting that:

- ...it is hard for her to do her schoolwork or homework slowly and carefully.
- ...she makes a lot of mistakes in her schoolwork or homework because she rushes through it without checking.
- ...she daydreams a lot or thinks about other things when she is supposed to be working trying to work.
- ...her parents or teachers tell her that she never listens to them.
- ...having trouble in school because even after the teacher explains the lesson, she is still not sure what to do.
- ...at home, she forgets to do things, or forgets exactly what her parents have asked her to do.
- ...she is often missing some of the things she needs to do schoolwork, or to play a game.
- ...it is hard to find things in her room because everything is piled up on the floor or on top of things.
- ...she tries really hard to get out of doing schoolwork or homework.
- ...any little things taking her mind of what she is doing.

(2) Six (or more) symptoms of hyperactivity-impulsivity are NOT present to a degree that is maladaptive or inconsistent with developmental level, as reported by the child.

The clustering and duration criteria of criterion A have NOT been met, as reported by the child.

Criterion B has been met: Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years, as indicated by STACEY reporting that:

- ...she was 7 years or younger the first time she had the above problems.

Criterion C has NOT been met: Some impairment from the symptoms is NOT present in two or more settings, as reported by the child.

Criterion D has NOT been met: There is NOT clear evidence of clinically significant impairment in academic or occupational functioning, as reported by the child.

The child has NOT met the above DSM-IV criteria for Attention-Deficit/Hyperactivity Disorder, Present according to her report.

Appendix 6

The IES

Avoidance = A

Intrusion = I

Not at all Rarely Sometimes Often

1. (I) I thought about it when

I didn't mean to

2. (A) I avoided letting myself

get upset when I thought about it

or was reminded of it

3. (A) I tried to remove it from

memory

4. (I) I had trouble falling asleep

or staying asleep because of thoughts

about it that came into my head

5. (I) I had waves of strong feeling

about it

6. (I) I had dreams about it

7. (A) I stayed away from reminders

of it

8. (I) I felt as if it hadn't happened

or it wasn't real.

9. (A) I tried not to talk about it

10. (I) Pictures about it popped into

my mind

11. (I) Other things kept making me

think about it

12. (A) I was aware that I still had a
lot of feelings about it but I didn't deal
with them
13. (A) I tried not to think about it
14. (I) Any reminder brought back feelings
about it
15. (A) My feelings about it were rather
numb

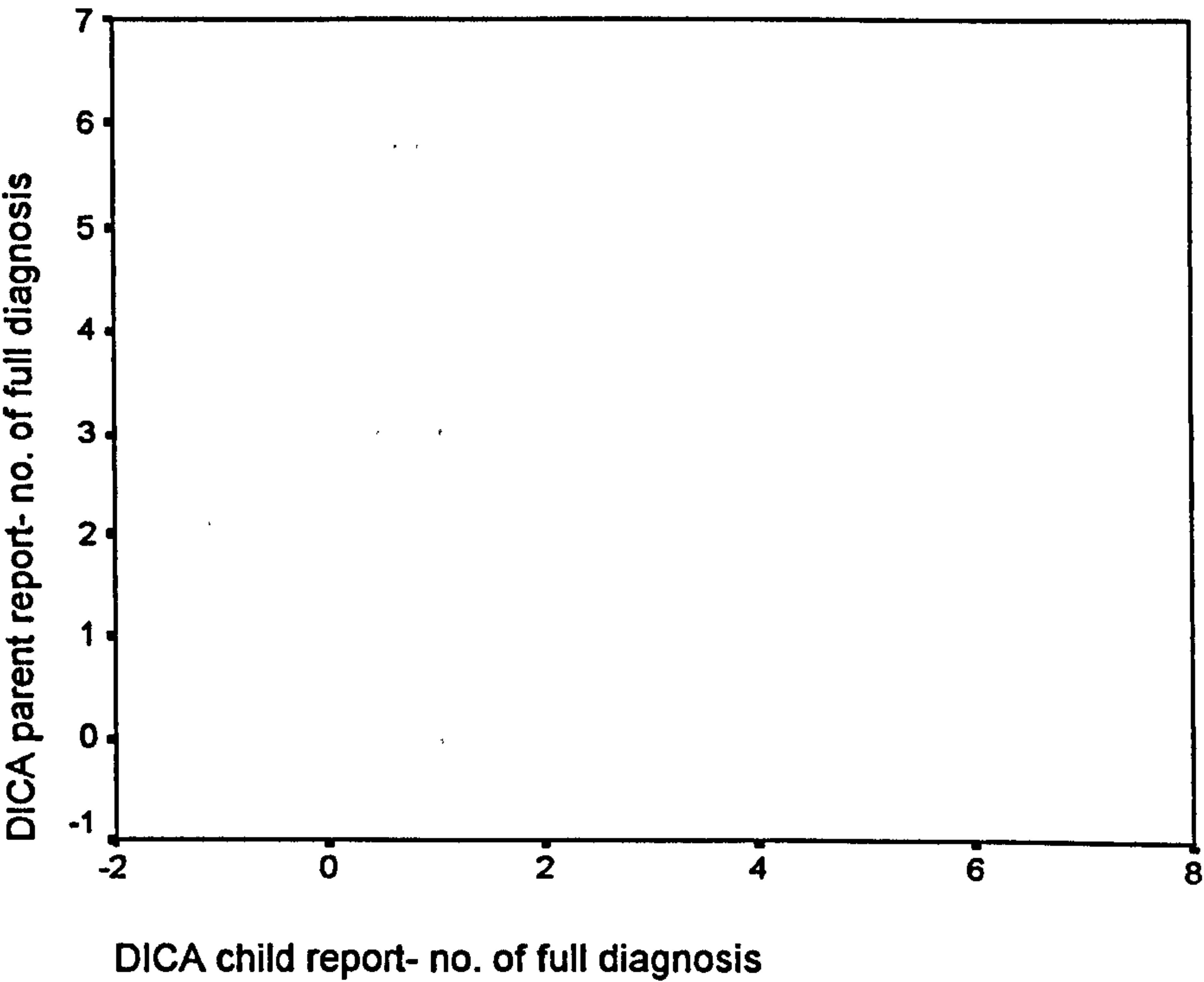
Appendix 7

Sample CBCL Results

Internalizing				CBCL Profile - Girls 4-11				Externalizing		T Score
0	-	17	27	15	11	21	24	19	-	ID=No ID
1	-	17	26	15	11	21	24	19	-	IN:EmpPkScr.cn
1	-	16	25	14	12	20	23	18	-95	Girl AGE: 1
1	-	15	24	13	12	19	22	17	-	DATE FILLED
1	-	14	23	12	10	18	21	16	-	No Date
1	-	13	22	11	9	17	20	15	-90	BY: Mocher
1	-	12	21	10	8	16	19	14	-	CARDS 02.03
1	-	11	20	9	7	15	18	13	-	AGENCY
1	-	10	19	8	6	14	17	12	-35	
1	-	9	18	7	5	13	16	11	-	# ITEMS
1	-	8	17	6	4	12	15	10	-30	TOTSCORE
1	-	7	16	5	3	11	14	9	-	TOT T
1	-	6	15	4	2	10	13	8	-	INTERNAL
1	-	5	14	3	1	9	12	7	-3	INT T
1	-	4	13	2	0	8	11	6	-	EXTERNAL
1	-	3	12	1	0	7	10	5	-	EXT T
1	-	2	11	0	0	6	9	4	-70	-- Clinical
1	-	1	10	0	0	5	8	3	-	- Borderline
1	-	0	9	0	0	4	7	2	-	
1	-	0	8	0	0	3	6	1	-65	OTHER PROS
1	-	0	7	0	0	2	5	0	-	- 3. AccOpps
1	-	0	6	0	0	1	4	0	-	- 6. 3M Out
1	-	0	5	0	0	0	3	0	-60	- 15. CruelAr
1	-	0	4	0	0	0	2	0	-	- 18. HarmSe.
1	-	0	3	0	0	0	1	0	-	- 24. NocSac
1	-	0	2	0	0	0	0	0	-55	- 28. SacNon.
1	-	0	1	0	0	0	0	0	-	- 29. Fears
1	-	0	0	0	0	0	0	0	-	- 10. FearSci
1	-	0	0	0	0	0	0	0	-50	- 16. Accider
1	-	0	0	0	0	0	0	0	-	- 44. BiceNa
1	-	0	0	0	0	0	0	0	-	- 47. Nighm
1	-	0	0	0	0	0	0	0	-	- 49. Consci
1	-	0	0	0	0	0	0	0	-	- 51. Overes
1	-	0	0	0	0	0	0	0	-	- 56b. Conner
1	-	0	0	0	0	0	0	0	-	- 58. PickSci
1	-	0	0	0	0	0	0	0	-	- 59. SexPrt
1	-	0	0	0	0	0	0	0	-	- 60. SexPrt
1	-	0	0	0	0	0	0	0	-	- 70. SexPrt
1	-	0	0	0	0	0	0	0	-	- 74. SleepL
1	-	0	0	0	0	0	0	0	-	- 77. SleepL
1	-	0	0	0	0	0	0	0	-	- 78. SleepL
1	-	0	0	0	0	0	0	0	-	- 79. SleepL
1	-	0	0	0	0	0	0	0	-	- 80. SleepL
1	-	0	0	0	0	0	0	0	-	- 81. SleepL
1	-	0	0	0	0	0	0	0	-	- 82. SleepL
1	-	0	0	0	0	0	0	0	-	- 83. SleepL
1	-	0	0	0	0	0	0	0	-	- 84. SleepL
1	-	0	0	0	0	0	0	0	-	- 85. SleepL
1	-	0	0	0	0	0	0	0	-	- 86. SleepL
1	-	0	0	0	0	0	0	0	-	- 87. SleepL
1	-	0	0	0	0	0	0	0	-	- 88. SleepL
1	-	0	0	0	0	0	0	0	-	- 89. SleepL
1	-	0	0	0	0	0	0	0	-	- 90. SleepL
1	-	0	0	0	0	0	0	0	-	- 91. SleepL
1	-	0	0	0	0	0	0	0	-	- 92. SleepL
1	-	0	0	0	0	0	0	0	-	- 93. SleepL
1	-	0	0	0	0	0	0	0	-	- 94. SleepL
1	-	0	0	0	0	0	0	0	-	- 95. SleepL
1	-	0	0	0	0	0	0	0	-	- 96. SleepL
1	-	0	0	0	0	0	0	0	-	- 97. SleepL
1	-	0	0	0	0	0	0	0	-	- 98. SleepL
1	-	0	0	0	0	0	0	0	-	- 99. SleepL
1	-	0	0	0	0	0	0	0	-	- 100. SleepL
1	-	0	0	0	0	0	0	0	-	- 101. SleepL
1	-	0	0	0	0	0	0	0	-	- 102. SleepL
1	-	0	0	0	0	0	0	0	-	- 103. SleepL
1	-	0	0	0	0	0	0	0	-	- 104. SleepL
1	-	0	0	0	0	0	0	0	-	- 105. SleepL
1	-	0	0	0	0	0	0	0	-	- 106. SleepL
1	-	0	0	0	0	0	0	0	-	- 107. SleepL
1	-	0	0	0	0	0	0	0	-	- 108. SleepL
1	-	0	0	0	0	0	0	0	-	- 109. SleepL
1	-	0	0	0	0	0	0	0	-	- 110. SleepL
1	-	0	0	0	0	0	0	0	-	- 111. SleepL
1	-	0	0	0	0	0	0	0	-	- 112. SleepL
1	-	0	0	0	0	0	0	0	-	- 113. SleepL
1	-	0	0	0	0	0	0	0	-	- 114. SleepL
1	-	0	0	0	0	0	0	0	-	- 115. SleepL
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1	-	0	0	0	0	0	0	0	-	- 133. SleepL
1	-	0	0	0	0	0	0	0	-	- 134. SleepL
1	-	0	0	0	0	0	0	0	-	- 135. SleepL
1	-	0	0	0	0	0	0	0	-	- 136. SleepL
1	-	0	0	0	0	0	0	0	-	- 137. SleepL
1	-	0	0	0	0	0	0	0	-	- 138. SleepL
1	-	0	0	0	0	0	0	0	-	- 139. SleepL
1	-	0	0	0	0	0	0	0	-	- 140. SleepL
1	-	0	0	0	0	0	0	0	-	- 141. SleepL
1	-	0	0	0	0	0	0	0	-	- 142. SleepL
1	-	0	0	0	0	0	0	0	-	- 143. SleepL
1	-	0	0	0	0	0	0	0	-	- 144. SleepL
1	-	0	0	0	0	0	0	0	-	- 145. SleepL
1	-	0	0	0	0	0	0	0	-	- 146. SleepL
1	-	0	0	0	0	0	0	0	-	- 147. SleepL
1	-	0	0	0	0	0	0	0	-	- 148. SleepL
1	-	0	0	0	0	0	0	0	-	- 149. SleepL
1	-	0	0	0	0	0	0	0	-	- 150. SleepL
1	-	0	0	0	0	0	0	0	-	- 151. SleepL
1	-	0	0	0	0	0	0	0	-	- 152. SleepL
1	-	0	0	0	0	0	0	0	-	- 153. SleepL
1	-	0	0	0	0	0	0	0	-	- 154. SleepL
1	-	0	0	0	0	0	0	0	-	- 155. SleepL
1	-	0	0	0	0	0	0	0	-	- 156. SleepL
1	-	0	0	0	0	0	0	0	-	- 157. SleepL
1	-	0	0	0	0	0	0	0	-	- 158. SleepL
1	-	0	0	0	0	0	0	0	-	- 159. SleepL
1	-	0	0	0	0	0	0	0	-	- 160. SleepL
1	-	0	0	0	0	0	0	0	-	- 161. SleepL
1	-	0	0	0	0	0	0	0	-	- 162. SleepL
1	-	0	0	0	0	0	0	0	-	- 163. SleepL
1	-	0	0	0	0	0	0	0	-	- 164. SleepL
1	-	0	0	0	0	0	0	0	-	- 165. SleepL
1	-	0	0	0	0	0	0	0	-	- 166. SleepL
1	-	0	0	0	0	0	0	0	-	- 167. SleepL
1	-	0	0	0	0	0	0	0	-	- 168. SleepL
1	-	0	0	0	0	0	0	0	-	- 169. SleepL
1	-	0	0	0	0	0	0	0	-	- 170. SleepL
1	-	0	0	0	0	0	0	0	-	- 171. SleepL
1	-	0	0	0	0	0	0	0	-	- 172. SleepL
1	-	0	0	0	0	0	0	0	-	- 173. SleepL
1	-	0	0	0	0	0	0	0	-	- 174. SleepL
1	-	0	0	0	0	0	0	0	-	- 175. SleepL
1	-	0	0	0	0	0	0	0	-	- 176. SleepL
1	-	0	0	0	0	0	0	0	-	- 177. SleepL
1	-	0	0	0	0	0	0	0	-	- 178. SleepL
1	-	0	0	0	0	0	0	0	-	- 179. SleepL
1	-	0	0	0	0	0	0	0	-	- 180. SleepL
1	-	0	0	0	0	0	0	0	-	- 181. SleepL
1	-	0	0	0	0	0	0	0	-	- 182. SleepL
1	-	0	0	0	0	0	0	0	-	- 183. SleepL
1	-	0	0	0	0	0	0	0	-	- 184. SleepL
1	-	0	0	0	0	0	0	0	-	- 185. SleepL
1	-	0	0	0	0	0	0	0	-	- 186. SleepL
1	-	0	0	0	0	0	0	0	-	- 187. SleepL
1	-	0	0	0	0	0	0	0	-	- 188. SleepL
1	-	0	0	0	0	0	0	0	-	- 189. SleepL
1	-	0	0	0	0	0	0	0	-	- 190. SleepL
1	-	0	0	0	0	0	0	0	-	- 191. SleepL
1	-	0	0	0	0	0	0	0	-	- 192. SleepL
1	-	0	0	0	0	0	0	0	-	- 193. SleepL
1	-	0	0	0	0	0	0	0	-	- 194. SleepL
1	-	0	0	0	0	0	0	0	-	- 195. SleepL
1	-	0	0	0	0	0	0	0	-	- 196. SleepL
1	-	0	0	0	0	0	0	0	-	- 197. SleepL
1	-</									

Appendix 8

Scatterplot showing no linear relationship between DICA IV child and parent reports for the number of full diagnoses.



Appendix 9

Tests of homogeneity of variance for the purpose of working out the appropriate statistical analysis for differences between PTSD diagnosis and test variables.

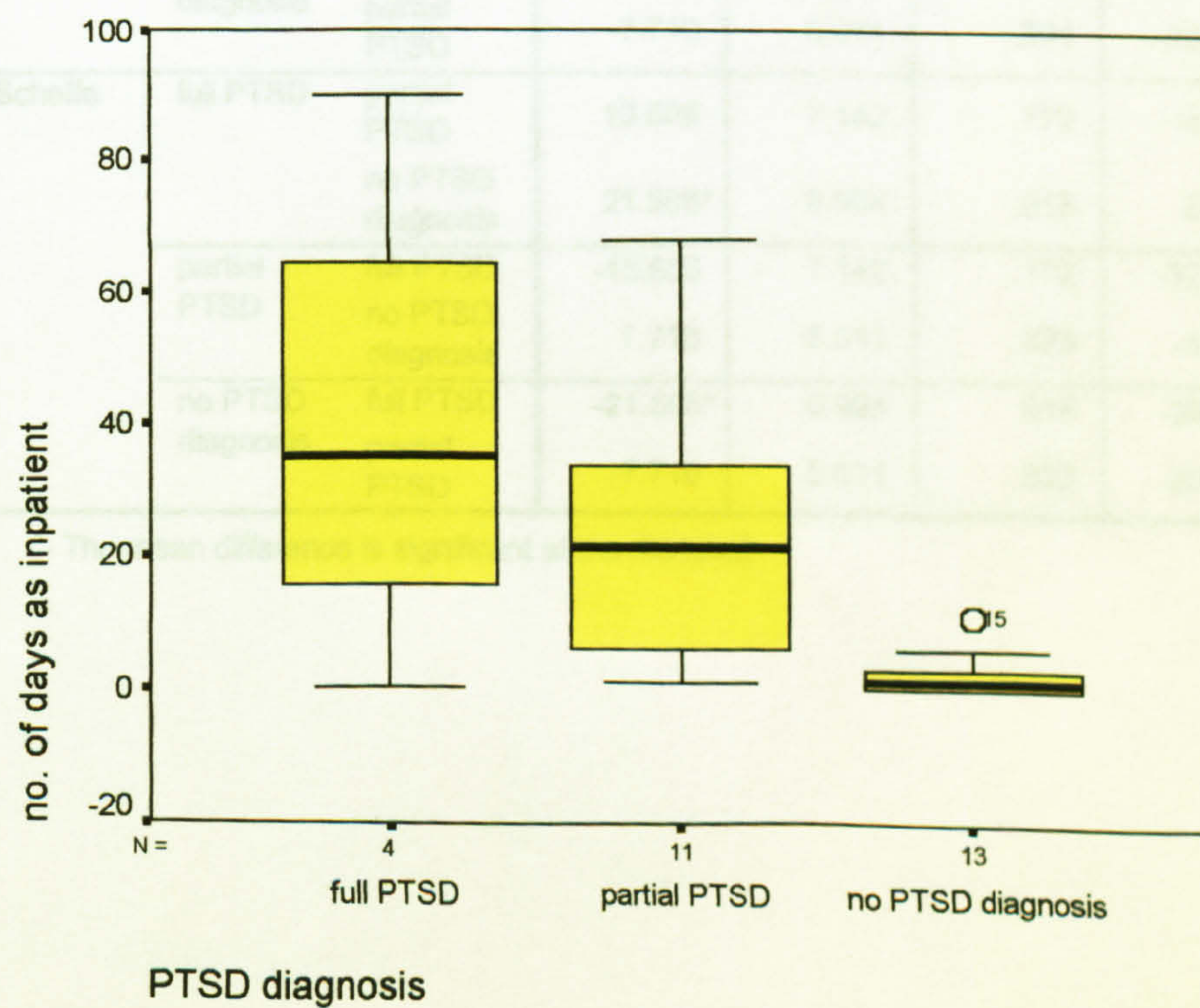
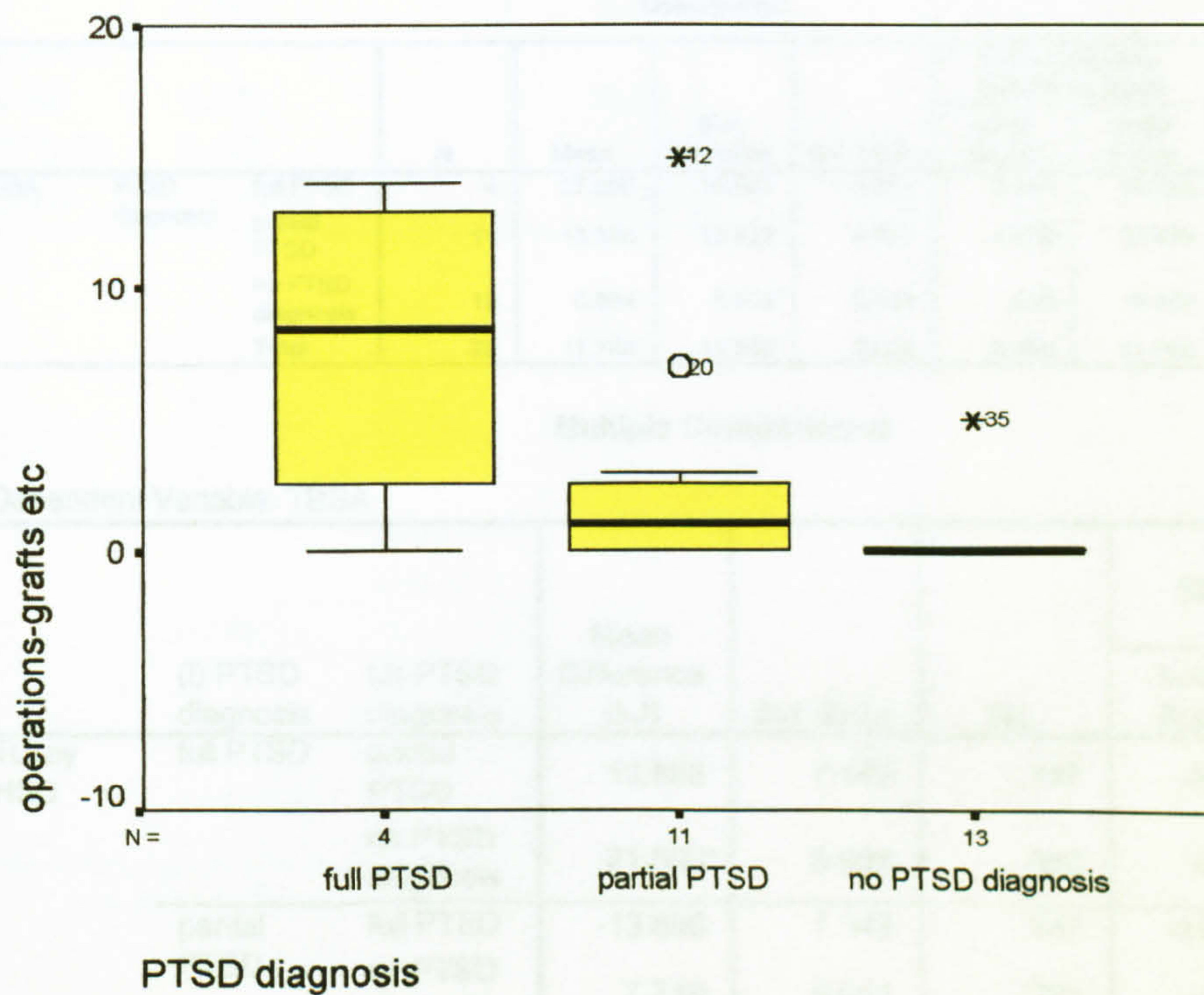
Significant results for “operations” and “no. of days as inpatient” signify the need for nonparametric analysis (Kruskal Wallis 1 way ANOVA). Non-significant results show the other data is suitable for parametric analysis (1 way ANOVA)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
age now, not at time of injury	2.590	2	25	.095
age at time of injury	1.396	2	25	.266
no. of days as inpatient	8.597	2	25	.001
DSRS	.465	2	19	.635
FSS	.557	2	19	.582
IES	.253	2	18	.779
INTRUSION	1.008	2	18	.384
operations-grafts etc	6.684	2	25	.005
PTS-RI	.291	2	22	.750
TBSA	.991	2	25	.385
Total score(CBCL)	.521	2	21	.601
AVOIDANCE	.080	2	18	.923
C-PTS-RI	.314	2	18	.734

Appendix 10

Box-plots illustrating that children with ANY PTSD diagnosis stayed in hospital significantly longer than those children with no PTSD diagnosis and had significantly more operations than those children with no PTSD diagnosis



Appendix 11

Descriptive statistics and unplanned comparisons for examining differences between groups based on PTSD diagnosis (Variable= TBSA), after one way ANOVA revealed significant statistical differences

Descriptives										
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
TBSA	PTSD diagnosis	full PTSD	4	27.250	18.661	9.331	-2.444	56.944	1.0	45.0
		partial PTSD	11	13.364	13.522	4.077	4.279	22.448	1.0	51.0
		no PTSD diagnosis	13	5.654	8.503	2.358	.515	10.792	1.0	26.5
		Total	28	11.768	13.896	2.628	6.380	17.156	1.0	51.0

Multiple Comparisons

Dependent Variable: TBSA

			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	full PTSD	partial PTSD	13.886	7.142	.147	-3.904	31.677
		no PTSD diagnosis	21.596*	6.994	.013	4.174	39.018
	partial PTSD	full PTSD	-13.886	7.142	.147	-31.677	3.904
		no PTSD diagnosis	7.710	5.011	.291	-4.773	20.192
	no PTSD diagnosis	full PTSD	-21.596*	6.994	.013	-39.018	-4.174
		partial PTSD	-7.710	5.011	.291	-20.192	4.773
Scheffe	full PTSD	partial PTSD	13.886	7.142	.172	-4.698	32.471
		no PTSD diagnosis	21.596*	6.994	.018	3.397	39.795
	partial PTSD	full PTSD	-13.886	7.142	.172	-32.471	4.698
		no PTSD diagnosis	7.710	5.011	.323	-5.330	20.749
	no PTSD diagnosis	full PTSD	-21.596*	6.994	.018	-39.795	-3.397
		partial PTSD	-7.710	5.011	.323	-20.749	5.330

*. The mean difference is significant at the .05 level.

Appendix 12

Cramers-V correlations between other trauma measures and PTSD diagnosis
using DICA IV (all n.s. at 0.05 level)

Measure	Cramers- V Value	Sig.
IES	0.483	0.497
IES-avoid	0	1
IES-intr	0.222	0.595
C-PTS-RI	0.422	0.28
PTS-RI	0.483	0.069

Appendix 13

Scheffe Post-hoc tests after one way ANOVA showed significant differences between PTSD groups and internalising scores on the CBCL. Significant difference between those with full and no PTSD internalising scores.

Multiple Comparisons

Dependent Variable: INTERNAL

	(I) PTSD diagnosis	(J) PTSD diagnosis	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	full PTSD	partial PTSD	13.78	5.712	.077	-1.26	28.82
		no PTSD diagnosis	18.25*	5.531	.012	3.69	32.81
	partial PTSD	full PTSD	-13.78	5.712	.077	-28.82	1.26
		no PTSD diagnosis	4.47	3.778	.508	-5.48	14.42
	no PTSD diagnosis	full PTSD	-18.25*	5.531	.012	-32.81	-3.69
		partial PTSD	-4.47	3.778	.508	-14.42	5.48

*. The mean difference is significant at the .05 level.

Appendix 14

DICA IV PTSD diagnosis and other outcome measures- descriptive statistics and one way ANOVA (n.s. at the 0.05 level)

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
Total score	PTSD diagnosis	full PTSD	3	66.67	9.07	5.24	44.13	89.21	57	75
		partial PTSD	9	51.67	8.76	2.92	44.93	58.40	39	62
		no PTSD diagnosis	12	50.58	10.81	3.12	43.72	57.45	34	69
		Total	24	53.00	10.85	2.22	48.42	57.58	34	75
CPTSDRI	PTSD diagnosis	full PTSD	3	17.00	7.55	4.36	-1.76	35.76	9	24
		partial PTSD	9	18.67	12.60	4.20	8.98	28.35	8	49
		no PTSD diagnosis	9	12.22	11.14	3.71	3.66	20.79	0	31
		Total	21	15.67	11.34	2.47	10.51	20.83	0	49
DSRS	PTSD diagnosis	full PTSD	3	12.67	5.51	3.18	-1.02	26.35	7	18
		partial PTSD	9	12.00	8.25	2.75	5.66	18.34	2	29
		no PTSD diagnosis	10	21.70	10.03	3.17	14.52	28.88	6	41
		Total	22	16.50	9.78	2.08	12.16	20.84	2	41
IES raw score	PTSD diagnosis	full PTSD	3	13.33	14.64	8.45	-23.04	49.70	0	29
		partial PTSD	9	13.22	15.17	5.06	1.56	24.88	0	38
		no PTSD diagnosis	9	17.89	18.96	6.32	3.32	32.46	0	58
		Total	21	15.24	16.21	3.54	7.86	22.62	0	58
PTSDRI	PTSD diagnosis	full PTSD	3	32.67	19.40	11.20	-15.52	80.86	20	55
		partial PTSD	9	18.56	12.12	4.04	9.24	27.87	3	34
		no PTSD diagnosis	13	13.92	15.97	4.43	4.27	23.57	0	59
		Total	25	17.84	15.81	3.12	11.39	24.29	0	59
FSS	PTSD diagnosis	full PTSD	3	42.67	14.15	8.17	7.51	77.83	34	59
		partial PTSD	9	29.89	21.51	7.17	13.35	46.43	6	75
		no PTSD diagnosis	10	47.70	21.36	6.75	32.42	62.98	20	78
		Total	22	39.73	21.54	4.59	30.18	49.28	6	78
AVOIDANC	PTSD diagnosis	full PTSD	3	9.00	10.15	5.86	-16.21	34.21	0	20
		partial PTSD	9	7.44	8.59	2.86	.84	14.05	0	21
		no PTSD diagnosis	9	11.11	10.29	3.43	3.20	19.02	0	29
		Total	21	9.24	9.23	2.01	5.04	13.44	0	29
Intrusion Subscale Raw Score	PTSD diagnosis	full PTSD	3	4.33	4.51	2.60	-6.87	15.54	0	9
		partial PTSD	9	5.78	6.63	2.21	.68	10.87	0	17
		no PTSD diagnosis	9	6.78	9.81	3.27	-.76	14.32	0	29
		Total	21	6.00	7.67	1.67	2.51	9.49	0	29
INTERNAL	PTSD diagnosis	full PTSD	3	66.33	13.28	7.67	33.35	99.32	51	74
		partial PTSD	9	52.56	8.34	2.78	46.15	58.96	39	65
		no PTSD diagnosis	12	48.06	7.59	2.19	43.26	52.90	39	62
		Total	24	52.04	10.10	2.06	47.78	56.31	39	74
EXTERNAL	PTSD diagnosis	full PTSD	3	63.00	8.89	5.13	40.92	85.08	56	73
		partial PTSD	9	48.78	8.61	2.87	42.16	55.40	32	62
		no PTSD diagnosis	12	50.33	9.30	2.68	44.43	56.24	35	66
		Total	24	51.33	9.74	1.99	47.22	55.45	32	73

(further table on next page)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Total score	Between Groups	646.417	2	323.208	3.289	.057
	Within Groups	2063.583	21	98.266		
	Total	2710.000	23			
CPTSDRI	Between Groups	193.111	2	96.556	.731	.495
	Within Groups	2377.556	18	132.086		
	Total	2570.667	20			
DSRS	Between Groups	496.733	2	248.367	3.124	.067
	Within Groups	1510.767	19	79.514		
	Total	2007.500	21			
IES raw score	Between Groups	110.698	2	55.349	.194	.826
	Within Groups	5145.111	18	285.840		
	Total	5255.810	20			
PTSDRI	Between Groups	863.548	2	431.774	1.904	.173
	Within Groups	4987.812	22	226.719		
	Total	5851.360	24			
FSS	Between Groups	1532.708	2	766.354	1.774	.197
	Within Groups	8209.656	19	432.087		
	Total	9742.364	21			
AVOIDANC	Between Groups	60.698	2	30.349	.332	.721
	Within Groups	1643.111	18	91.284		
	Total	1703.810	20			
Intrusion Subscale Raw Score	Between Groups	14.222	2	7.111	.110	.896
	Within Groups	1161.778	18	64.543		
	Total	1176.000	20			
INTERNAL	Between Groups	803.153	2	401.576	5.470	.012
	Within Groups	1541.806	21	73.419		
	Total	2344.958	23			
EXTERNAL	Between Groups	479.111	2	239.556	2.955	.074
	Within Groups	1702.222	21	81.058		
	Total	2181.333	23			

Appendix 15

Peer-reviewed, published papers

More on DICA IV

Journal of the American Academy of Child and Adolescent Psychiatry, (2001)40;
130-132.

Mina K. Dulcan MD
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Journal of the AACAP Editorial Office,
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2300 Children's Plaza #156
Chicago,
IL 60614-3394

7th July 2000

To the Editor:

This letter reports on the use of DICA IV (Reich et al., 1997) in a British sample of burned children and adolescents as part of a longitudinal study.

DICA IV was used for various reasons. Briefly; it could be used for research purposes with no prior training, it was computerised, it was used in the only previous similar research design (Stoddard et al., 1989). A number of problems were encountered which limited the research findings and were implicated in the poor follow-up rate.

Length of the interview

DICA has over 1600 questions. This makes for an extremely structured interview, covering all the categories of childhood disorder, but also makes for an interview which can last for 2 hours, depending on the child or adult. Many children and their parents found this problematic, and many children clearly found the interview boring, despite all the efforts of the interviewer. If the interview lasted more than approximately 45 minutes, all children, regardless of age, tended to have problems with attention. On a practical level, if both a parent and child were being interviewed, home visits could last as long as 5 hours, which was obviously inconvenient for the family.

Types of questions

DICA IV was not designed to be culture specific, and has been used successfully in Spanish samples (e.g. Ezpeleta et al., 1997). In the present sample however, there were cultural and language problems with some of the questions. Although these could be usually corrected by the interviewer as the interview was being used as an “interview driver”, some questions were problematic. Children often giggled at questions, and parents voiced concern. An example was the questions pertaining to “gangs”. A question “Are there any gangs in your neighbourhood?” could be changed to “Are there any gangs where you live?”, but the meaning of the term “gang” obviously varies between American inner cities and Scottish housing estates.

Another example was questions pertaining to alcohol. If a child answered the question “Have you ever had a drink of alcohol” with “yes”, there could be up to 10 minutes of questions about alcohol consumption. Moderate drinking in European teenagers is not generally regarded as a problem behaviour, and is probably viewed as a “rite of passage”. Children and teenagers could become quite exasperated about questions concerned with alcohol addiction when they had honestly answered “yes”, but were referring to a drinking with their parents on special occasions! Leaving out such questions would have questioned the internal reliability and validity of the study. DICA IV is certainly useful, but if it is to be used successfully in British samples, it may need to be more culturally attuned. The author is not aware of any other British studies which have employed DICA IV, and this may be why.

Diagnostic categories

It is unfortunate the PTSD section in DICA IV asks about “lifetime” PTSD and does not permit an ASD diagnosis, or even a “present” diagnosis without the interviewer working this out from the “summary of responses”. This detracts from the usefulness of DICA IV as a research tool which minimises inferences, and requires a trained interviewer. The increased interest in PTSD as a diagnostic category means that future versions of DICA IV should take present, lifetime and acute responses into account.

ADHD was probably over-diagnosed in the present study, with just under half the sample meeting a “partial” diagnosis. Although this may in part be due to selection bias, the responses suggest that the problems lies in the nature of the questioning. A sizeable minority endorsed questions such as “Do you make a lot of mistakes in your school work” , but did not report this interfering with how they got along with their parents or teachers, resulting in a “partial” diagnosis. Previous research has reported over-identification of ODD and overanxious disorder (Boyle et al., 1993) using DICA IV, and ADHD reporting in this sample may be due to similar problems. Problems may also be involved with the continuing lack of validity in normal population samples (Boyle et al., 1996).

It is important that such limitations are recognised by future researchers and that further versions address these issues.

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Body image Issues for Children and Adolescents with Burns

Journal of Burn Care and Rehabilitation, 2000;21:194-198

Abstract

Body image is a far reaching, multi-dimensional, dynamic concept. As burn injuries threaten the integrity of both the physical and psychological identity, body image issues in burn injuries would appear to be a meaningful area of investigation. Little research has been done to directly assess body image issues in burned children and adolescents. This article reviews the general findings that body image adaptation occurs and is influenced by; overall adjustment, gender, burn severity, developmental stage and social support. It is suggested that body image revision, if it occurs, is largely successful, but that body image issues may not be directly related to psychosocial adjustment following burn injury.

Introduction

The body is not only a physical object, it is a psychological construct.

Discussions of body image and the evolution of such a concept, which today includes terms such as self-perception, body-schema, bodily awareness, body images etc., have gained momentum in recent years. It can be suggested that the concept as we understand it originated from Schilder's¹ 1935 definition of body image as the way in which we see ourselves, involving not only the physicality of the body and the head and body alignment, but the psychological awareness of such things as body unity and integrity. This is of course, a far reaching definition, and is perhaps more a description than a definition at all, but it is of importance as it highlights the multi-dimensional nature of body-image; that is, that there are a number of related but not identical concepts generally termed "body image"^{2, 3}.

There is a long history of this multi-dimensional body-image construct in developmental psychology in both psychoanalytic and Piagetian theories, which are perhaps those which have most influenced child and adolescent psychology and psychiatry. Body-image is seen as central to the development of a child's affective and cognitive states⁴. Body image does not just come from inside ourselves because we do not exist as solitary beings. One perspective is to regard the existence of both external and internal body images². We live within a society, interacting with family, friends and strangers; we all exist within a context, so it is not surprising that we are contextually influenced. External body image, for example, may be influenced by how we perceive the treatment we receive from others.

Additionally, body image is not a stable thing, it is dynamic. We continuously experience things differently and change in our ways of cognitively

representing images and perceptions. This dynamic environment influences our body image, particularly as we progress through developmental stages. This is not to say however, that body image swings from extreme to extreme. Change appears to be slight and gradual.

Body image and the burn injured child

As body image is thought to be such a fundamental part of the individual personality, research on burned children and adolescents has occasionally employed this construct in examining psychosocial adjustment following burn injury. This may follow from the early work by Schilder¹ which posited

“Two factors, apparently, play a special part in the creation of body image.

The one is pain, the other the motor control over our limbs,”

This suggests that body image may be a very pertinent question to consider in examining the psychosocial aspects of burns. There is evidence that any sudden change in our bodies can be psychologically disruptive, whether this change is positive or negative⁵. The burned child or adolescent deals with many physical experiences, depending on the nature of the burn. Contracture may result in reduced physical function, and skin sensation may be affected by itching or reduced temperature moderation. These may come after the intense pain of not only the initial burn injury, but also the daily or weekly rituals of the removal of dead skin (debridement) and years of reconstructive surgery^{6, 7}. A new body and a whole new way of physical existence is forced upon the burned child very abruptly.

The importance of the skin as our physical boundary has its basis in psychoanalysis. Fisher⁸ suggests that Freud strongly implicated body image in the developing child, although it may never have been explicitly discussed.

Freud's account of growing up gave prominence to the body as a directly experienced object. Bick⁹, following in this psychoanalytic vein, sees the skin as that which serves as a tangible focus in life, upon which we know we can rely. This can be a useful concept in considering the lot of the burned child or adolescent. The burn can be seen as one of the ultimate forms of body damage, and perhaps more so, as a threat to the sense of being a 'whole' individual. The burn injury threatens the physical integrity of how we 'live' inside our bodies. The skin, that which normally holds us together is damaged and painful, and this pain can exist for a prolonged period. Shontz¹⁰, following Fisher and Cleveland¹¹ discusses body boundaries in terms of bodily awareness. He suggests that our awareness of our body boundaries helps us to distinguish the inner, psychological, personal self from the general world at large. It follows therefore, that if our body boundaries are threatened, as is the case with a burn injury, our psychological self would also be threatened.

Although many researchers on burn injuries mention the influence of body image, few have looked directly at body image in burned children and adolescents. The key assumption made in research on body image development in the burned child is that after a burn, body image needs revision^{12, 13}.

Stoddard¹², following in the tradition of other developmental theorists such as Piaget and Erikson, examined the different body image concerns of 3 groups of children: infants and toddlers, school-age children and adolescents using case studies, as he believes that developmental stage is vital to the role of body image.

Body image development

It is generally accepted that by 2-3 years, children are aware of their bodies, of what is inside and what is outside, and that they are distinct from other individuals, so body-image foundations are thought to be present. Infants and toddlers tend to see their bodies and their mothers bodies essentially as one and the same. If normal development resumes after the burn injury, there is every reason to believe that any scarring or disfigurement would be fully integrated into the emerging body image. Indeed, Stoddard¹² using case material and Belfer et al¹⁴ found this in slightly older children who had already begun body image formation. It would appear vital that this integration would only be successful if the child's parenting and social circumstances supported normal development.

The school age child has already formed a relatively stable body image, and Stoddard¹² finds evidence of a type of mourning for the loss of the previous body image and indeed, of the previous self in the burned child. In the school age group, the reaction of the peer group to the burned child may be particularly influential to the external body image. Even in school age children, the 'what is beautiful is good' stereotype exists⁵. Staring and teasing at visible scarring and disfigurement can make the burned child's adaptation more problematic. Thompson¹⁵ found potential negative sequelae of teasing on the body image of the child such as depression, low self-esteem and general psychological dysfunction.

Cash¹⁶ discussed how physical attractiveness is far from a superficial construct in human interactions and experiences. There is evidence that physical unattractiveness can be so far reaching as to be a risk factor for general psychopathology¹⁷. There is evidence that children by the age of 6 years have learned to differentiate and stereotype according to physical attractiveness. Kleck et al¹⁸ for example, found that irrespective of how long children between 9 and 14

years had known and interacted with each other, physical appearance and attractiveness cues remained salient. Their evidence using photographs indicated that children tended to choose friends based on appearance, and that although those appearance cues decreased in salience, with time, negative interactions etc. were consistently attributed to appearance. The consequences of this may be twofold; (i) children with visible deformity may have difficulty making friends, and (ii) even when they have friends, may be constantly reminded of their appearance. These consequences make post burn adjustment more problematic.

This would obviously lead one to expect the worst outcome for those children sustaining visible injuries such as to the hands and face, but there is a great deal of evidence which finds little or no correlation between body damage caused by any burn, and the degree of negative psychological response. When body image is specifically examined, there is a similar lack of correlation between the extent of injury, burn location and time since burn and body-image adjustment^{2, 19}. For example, Byrne et al²⁰, in looking at 145 children burned over a 12 year period, have found quite the opposite results using the CBCL²¹. They found that those children with more severe burns may actually have a more positive outcome in social competence. It could be suggested however, that 'social competence' is not in itself a broad measure of adjustment. Byrne et al²⁰ speculate that this may be due to the interaction of several variables such as increased support for these children, as it appears that the majority of these children came from larger families.

Conversely, using scaled psychological tests, Herndon et al²² found that in 21 children between 1 and 12 years with massive burns (>70% third degree, >80% TBSA) there are moderate to severe psychological problems in areas of

self-esteem, body-image, anxiety, fears, interpersonal relationships and active mastery and adaptation. It is important to note however, that these same children are generally regarded to have adjusted *well*, despite their combined psychological and physiological difficulties. This is a salient point. The existence of psychological problems does not necessarily lead to poor adaptation and adjustment. However, Pruzinsky and Doctor² report that hidden scars can lead to a poorer adjustment. Those with hidden scars may live with the fear of discovery and the subsequent guilt. Children in particular, may experience stress when changing for sports at school or when wearing summer attire²³. This reaction may be related to Stoddard's¹² ideas on the necessity of body image revision. If the scarring or disfigurement is hidden, body image revision may be delayed or remain incomplete

Adolescence

Adolescence as a developmental stage receives a great deal of attention when looking at the effects of burns on the body image. Bernstein⁶ suggests that the meaning of the burn injury will change over time, and that encountering new life stages will affect body image, although Fisher⁸ makes the point that there is a paucity of convincing empirical evidence that adolescents experience the turmoil so often implicit in discussion of adolescent issues. However, adolescence is generally regarded as a major life stage, so developmental considerations would appear to be important to consider when looking at the body image of both those burned in adolescence and those burned in childhood who become adolescents. According to Erikson's²⁴ theories, adolescents struggle between role confusion and identity formation. It can be suggested that the burned and scarred adolescent has an even greater struggle, as they need to deal with both a role

and an identity that has been forced upon them and which is more often than not, derogated by peers. Jessee et al²⁵ did not find any evidence that burned adolescents had lower body image scores than a control group, and found that *both* burned and normal adolescents had lower body image scores than younger subjects using human figure drawings. Bernstein²⁶ is of the opinion that body image is particularly important to the adolescent because the actual physicality of the body changes in a way that will never happen again, heightening bodily awareness of both the self and others. In the burned adolescent, we may expect this effect to be even more salient. Bowden et al²⁷ for example, found that children burned between 0 and 11 years had changing needs over time, although the sample used in this study may not be representative of the burned population as a whole, as the sample group had larger burns and contained more Caucasian children. Children who previously had no self esteem problems as measured by an adapted Self Esteem Inventory²⁸ sometimes developed problems at later stages- up to 6 years after their burn injury. This adds emphasis to the authors speculation that subsequent life changes such as entry into the more independent world of the adolescent brings body image issues to the fore.

It can be suggested that the emergence of adult relationships and sexual behaviour in adolescence is a particularly salient measure of adolescent adjustment and would be closely linked to body image concerns. Robert et al^{30,31} investigate this in a study on the impact of disfiguring burn scars on 2 or more areas of head, neck, hand and genitals in a group of nineteen 13-20 year olds at least 1 year post burn. Their findings show this group as no different to non-burned adolescents. Although this study was descriptive and used a very small sample, it elicits information unique to the emerging developmental

concerns of every adolescent, and it would appear that body image concern, if they exist, do not hinder normal sexual development.

Social support

A possible way of regarding such issues is to look at social support, and perhaps specifically, parental support. Evidence clearly shows that parental factors such as protectiveness and educational level are the single most important influential variables in body image adjustment³⁰. Parental support naturally reduces as a child gets older, particularly in adolescence when personal autonomy becomes an important issue for the individual. The adolescent tends to prefer the peer group for social support, which the burned adolescent may not have readily available²⁷. Bowden et al²⁷ also suggest that the adolescent burned as a child may suffer as a result of withdrawal of support from parents and doctors when it is actually still needed. Bernstein^{6,26} suggests the hypothesis that in the struggle for acceptance, burned adolescents may become part of a deviant peer group, only being able to find an identity with other ostracised or marginalised adolescents. This is an area which may warrant additional investigation.

Gender issues

Pruzinsky and Cash⁷ discuss the particular concerns of the adolescent female. There is evidence to suggest that adolescent females are more strongly appearance oriented than other age and sex groups, and as a result body image concerns come to the fore^{7,32}. Cultural studies indicate that this is not only a result of Western society, as the popular media would have us believe. This would lead us to expect that the scarred female, whether scars are visible or not,

may have more adjustment problems and body image concerns. Indeed, Orr et al¹⁹ found that burned females had more depression, lower self-esteem and more negative body images than males of the same age with equivalent burn injuries. In contrast, Fisher⁸ reports a study analysing activity self reports over four weeks in both a normal and control group which found that males were more inhibited than females. The concern in the adolescent male may be more related to loss of role than body image problems: the adolescent male with burn disfigurement may, for example, feel less masculine or may more severely experience the loss of physical function^{12, 33}. Overall, however, the evidence on gender differences in post burn adjustment do not show females to be at a disadvantage to males, so it may be that either body image has little impact on gender differences and post burn adjustment or that we simply do not have enough information to draw conclusions at this stage.

Failure to deal successfully with body image concerns can actually lead to what Stoddard¹² terms body image disorders. It is conceivable that such disorders may arise in the adolescent who appears to have adjusted well to the new body image after a childhood burn. Such disorders may manifest as fears of physical annihilation, distortion of injury meaning and escalation of normal teenage anxieties¹²

Reconstruction

A discussion of body image in burned children and adolescents cannot fail to mention the role of reconstructive surgery and other physical interventions in the rehabilitation of this group. It is often during such processes that body image issues arise, and with each new surgical intervention, a new body image must be found. Realistic expectations of surgical and physical outcome may be difficult to

achieve, but it would appear that as in other aspects of burn rehabilitation, social, and particularly parental support is vital. Many issues in this field are beyond the scope of body image alone.

Conclusions

This discussion has examined the role of body image in the adjustment of the burned child and adolescent. Through looking at the influencing variables of developmental stage, burn severity, degree of visible injury, social support and gender, it has become apparent that body image issues are rarely clearly defined. It can be suggested that although body image is a popular concept, it may suffer from the problems of similar discussions of physical appearance and attractiveness in the injured or disfigured in that it is an uncomfortable personal and political issue. This is perhaps why few researchers have looked specifically at body image in burned children and adolescents. It is clear, as was stated previously, that body image can mean different things depending on the research and the researcher.

Pruzinsky and Doctor² suggest that adaptation to body image following burn injury will be influenced by many variables such as overall psychological adjustment, social support, temperament, pre-burn psychology and family socio-economic status. The important point, it would seem, is that body image is intricately woven into every dimension of *normal* life. The evidence presented here clearly indicates that we still know relatively little about body image in the burned child. The reason for this may simply be the fact that body image is not a particularly useful means of assessing post-burn adjustment, and that other avenues of research would be more fruitful. It would appear that in general, at this early stage in our knowledge, body image revision occurs following burn injury, and is relatively successful. Shontz¹⁰ clarifies this in stating "If life has meaning

and purpose, then a disorder of body image may fade into insignificance" (p.167). It would appear that for the majority of burned children and adolescents, this is thankfully, the case.

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