A Randomized Controlled Trial of a Web-Based Early Intervention for Children and their Parents Following Unintentional Injury

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Objective The aim of this article was to evaluate the effectiveness of an information provision web-based early intervention via a randomized controlled trial for children and their parents following pediatric unintentional injury. Method Participants were randomly assigned to an intervention (n = 29) or a control group (n = 27) following baseline measurements. Further assessment was taken at 4–6 weeks and 6 months post-trauma event. Results Analyses revealed that children within the intervention group reported improved anxiety, in comparison to a worsening of symptoms for children in the control group. Furthermore, children who had higher baseline trauma scores reported the intervention to be helpful. Conclusions The intervention showed promising results in its ability to aid child recovery.

Key words Children; early intervention; information provision; unintentional injury; web-based.

Pediatric unintentional or accidental trauma is a common occurrence among children. Approximately 25% of all Australian children may be exposed (ABS, 2004–2005), yet the potential debilitating effects it can have on a child’s psychological development are often neglected. A broad range of psychological reactions have been reported including clinical levels of acute stress symptoms, post-traumatic stress, phobic anxiety, persistent mood disturbances, tantrums, mood swings, and sleep disturbances (Bryant, Mayou, Wiggs, Ehlers, & Stores, 2004; Caffo, Barbara, & Lievers, 2005; Di Gallo, Barton, & Parry-Jones, 1997; Keppel-Benson, Ollendick, & Benson, 2002). Most children will experience such reactions immediately following trauma, yet these will often remit as the child naturally recovers over time (Bryant, 2004). However, some children (10–18%) will continue to experience a range of persistent chronic symptoms, for up to 2 years post trauma (De Vries et al., 1999; Le Brocque, Hendrikz, & Kenardy, 2010). Although often not reaching the full set of diagnostic criteria, these negative psychological outcomes have the potential to disrupt a child’s normal development, influencing their long-term adaptation, the development of cognition and attention, social skills, personality style, self-concept, self-esteem, and impulse control (Caffo & Belaise, 2003). Furthermore prolonged distress following an unintentional injury has been associated with poor physical recovery, avoidance of follow-up treatment, and high health-risk behaviors (Shalev, Schreiber, Galai, & Melmed, 1993; Shemesh et al., 2004). Therefore, unintentional injury is a common and potentially harmful event that can place a child on the downward spiral of psychopathology and interfere with physical recovery. Armed with this knowledge we have a unique opportunity to intervene early and prevent the development of chronic symptoms.

A number of interventions are available to families following unintentional injury. These range in intensity with regards to therapy content, number of sessions, as well the costs and demands placed on the family involved. However, when considering this particular population a number of factors need to be considered. Firstly, it has been recommended that the least intrusive intervention necessary be adopted, to assist but not hinder a child’s recovery (Wraith, 2000). Secondly, an appropriate intervention should involve the provision of comfort, support, and information that meets a child’s immediate practical and emotional needs (Litz, Gray, Bryant, & Adler, 2002; Osterman & Chemtob, 1999). Thirdly, Bisson and
Cohen (2006) argue that psychoeducation be provided that normalize reactions and provide skills that may strengthen natural coping abilities. Furthermore, parents should be encouraged to model appropriate coping, help manage or regulate their child’s emotions and reinstate a sense of safety, security, and normality back into the family home (Silvermann & Trefers, 2001). The final consideration when dealing with a large and heterogeneous population is the practical constraints associated with mental health delivery such as time, financial cost, and availability of therapists. Thus an intervention that offers delivery flexibility at little cost may be most appropriate.

One approach that appears to take into account all these recommendations and considerations and has gained much interest within the literature, is the provision of information or self-help booklets. Information or self-help provisions commonly present in the form of booklets or handouts that provide information regarding common reactions, time course, and basic coping strategies to deal with any negative reactions. Information provision offers individuals the ability to control and self-guide their “psychological treatment.” This is particularly important when considering that many children exposed to unintentional injury may only need minimal assistance, thus can control their participation. Furthermore, as the literature reveals that parents often underestimate and under-report child reactions to trauma, particularly internalizing reactions (Hock, Hart, Kang, & Lutz, 2004; Schreier, Ladakakos, Morabito, Chapman, & Knudson, 2005), self-help information tools enable children to be “in charge” of their own “treatment.” Limited research has been conducted as to the effectiveness of such an approach. Self-help information provision for adults has largely been found to be ineffective in reducing rates of stress symptoms (Ehlers et al., 2003; Scholes, Turpin, & Mason, 2007; Turpin, Downs, & Mason, 2005). These negative results however, may be indicative of methodological issues (i.e., inappropriate timing of intervention, significant clinical population) rather than their true effectiveness. Investigations into how children respond to self-help information provision have been more promising, perhaps due to the intervention and protocol of delivery being more in line with self-help intentions.

Ponsford and colleagues (2001) examined the use of an information-based early intervention, with parents whose children had sustained a head injury. Parents were provided with an information booklet outlining common symptoms associated with head injury, their likely time course, and how to best deal with them. Results indicated that the intervention significantly reduced reporting of neuropsychological symptoms and behavioral difficulties at 3 months post injury. A more recent study by Kenardy and colleagues (2008) examined the effect a brochure had on trauma symptoms following unintentional injury. A brochure was given to both children and parents that outlined the common short-term reactions to accidents, the likely time course, practical self-help advice for minimizing distress, and from whom to seek help (if necessary). Findings revealed that the intervention reduced child anxiety symptoms at 1-month follow-up and parental post-trauma intrusion and overall post-traumatic symptoms at the 6-month follow-up. Neither trial however was rigorously tested under controlled conditions. Therefore, evidence is not conclusive as to the effectiveness of information-based early interventions, particularly as natural recovery is often observed following trauma. Despite this, studies by Ponsford et al. (2001) and Kenardy et al. (2008) do suggest that an information provision approach to early intervention can help reduce symptomatology following unintentional injury in children.

The development of information provision interventions has been predominantly conducted in an atheoretical manner. However, the provision of information does have theoretical underpinnings. In line with Ehlers and Clark (2000) cognitive model of post-traumatic stress disorder (PTSD), children may overgeneralize and catastrophize the trauma event that produces a sense of current and real threat, interrupting their ability to move on from the accident. Children may also interpret one’s negative reactions and the consequences of the trauma (e.g., anxiety, pain) as an abnormal and fearful process. If a child does not have the capacity (e.g., accurate information, coping strategies) to manage these negative appraisals psychological difficulties are probable (Ehlers & Clark, 2000). Resiliency theory also underpins the early provision of information. Benard (2004) comments that building a child’s internal assets or personal competencies can help strengthen a child’s resiliency and help them cope following a stressful event. Specifically, developing a child’s social competence, problem solving ability, sense of autonomy, and sense of purpose can build resilience in a child. Family attributes such as a warm parent–child relationship, adequate communication, family cohesion, and the overall competence and well being of the parent (i.e., mental health) have also been determined as positive family attributes enabling resilience to develop in children (Garmezy, 1987; Masten et al., 1988). Thus the early provision of accurate information regarding recovery as well as coping strategies to assist problematic coping is theoretically sound.
Providing information and psychoeducation early following unintentional injury is an attractive approach. Associated costs of psychological treatment (i.e., therapist, sessions) are greatly reduced and flexibility of delivery and scope of audience is enhanced. The present study aimed to investigate, via a randomized controlled trial, the effectiveness of a booklet- and website-based information provision to aid recovery by reducing symptomatology. Based on the significant results of Kenardy et al. (2008) study it was hypothesized that children who received the intervention via the website would primarily reduce their anxiety. Secondary outcomes were also analyzed in an exploratory manner that have been associated with child trauma reactions. These include post-traumatic stress, anger, depression, and dissociative reactions. It was hypothesized that parents who received the intervention via the booklet would reduce in their intrusion reactions and overall post-traumatic stress symptoms as found in Kenardy et al. (2008) study. Due to little research being conducted in this area of parental reactions to child’s unintentional trauma, further secondary outcomes were measured and analyzed such as avoidance and hyperarousal. We hypothesized that the intervention (both booklet and website) would significantly decrease symptoms as measured by the primary and secondary outcomes in both parents and children in comparison to a control group. Furthermore, it was important to explore the subjective responses of the families concerning both the booklet and website and whether this may correlate with symptom levels.

Methods

Participants

The sample consisted of 85 children (26 females and 59 males) who were recruited from pediatric surgical wards over a 12-month period in 2007. Children were admitted to the study if they fulfilled the following criteria: (a) the child was aged between 7 and 16 years, (b) consent was obtained from parent/s and additional child consent for those aged ≥11 years, (c) the child was hospitalized overnight, (d) the child had acquired an accidental or unintentional injury including mild traumatic brain injury (as defined by the American Congress of Rehabilitation Medicine, 1993), and (e) the family had internet access.

Children were excluded from the study if any of the following criteria were present: (a) parents or child’s English was insufficient for completion of the questionnaires, (b) the child had acquired a moderate to severe head injury, or (c) the injury was a result of suspected intentional trauma (e.g., child abuse, assault, self harm).

Procedure

Children were recruited from the principal children’s hospital in Queensland, Australia, The Royal Children’s Hospital. Those who experienced an unintentional injury were identified via nursing staff and approached by a researcher within 72 hr of the accident. Families invited to participate were told that the research would be investigating their emotional and behavioral recovery as well as examining their reactions to an information booklet and website if randomized into the intervention group. On written consent, the parent and child were given an assessment pack containing self-report questionnaires and encouraged to return it within 1 week (T1). On returning of the assessment pack, the participants were randomized via a computerized random-number generator in Microsoft Excel, into either the intervention group (website and booklet) or the control group (assessment only). The details of the randomization were known to the researcher; however this did not interfere with participant results as the measures were all self-report. Once participants were assigned (within 2 weeks of the accident), the web link (on a one-sided information sheet) and parents booklet were sent to the family assigned to the intervention group. It was expected that children and their parents would get approximately 2–4 weeks of exposure to the intervention before the first post-intervention assessment was undertaken. Post-intervention assessment (self-report measures) was administered at 4–6 weeks (T2) and 6 months post unintentional injury (T3). Additionally, at both T2 and T3, the intervention group subjects were asked whether they read the intervention materials, how often, and completed a satisfaction survey (i.e., did they find the intervention helpful, not applicable, or of no use?). Families were encouraged to view the website and booklet materials as often as they wished, but by 6 months (T3) it was assumed that children and their parents would have been exposed to the intervention and its potential effects for 5 months. Importantly, in line with self-help principles, at no point did the researchers provide direct orientation or training (other than providing the materials) of the website or booklet to the children or parents. On completion of the study all families were compensated for their time with movie vouchers and control participants were sent intervention materials. See Figure 1 for the flowchart of the procedure and participants through each stage.

Based on child anxiety results from Kenardy et al. (2008) study with an effect size of 0.63 (between groups) a power analysis revealed that 40 families
per group \( (N = 80) \) will result in 80% power for detecting a significant difference between the intervention and the control groups at the 5% significance level. However, with an estimated 25% attrition rate over the assessment time periods, a total of 100 families were aimed to be recruited for the study.

**Intervention**

The information provision intervention was based on cognitive and resiliency theory (Ehlers & Clark, 2000; Kumpfer, 1999) as well as evidence and recommendations regarding how best to respond to trauma from the literature (Bisson & Cohen, 2006; Kenardy, Thompson, Le Brocque, & Olsson, 2008; Ponsford et al., 2001; Silvermann & Treffers, 2001). The early intervention consisted of a booklet for parents titled, “So your child has been in an accident...Information for parents about dealing with accidents?” and a website for children titled, “So you have been in an accident,” with separate sections for children aged ≤10 years and those aged ≥11 years. This website and the parent’s booklet can be viewed at the following address http://kidsaccident.psy.uq.edu.au. A web approach for children was utilized as it has been suggested as a being more child friendly approach as well.
as offering greater accessibility and reduce costs of delivery (Lutz Stehl et al., 2008; Wade, Wolfe, Brown, & Pestian, 2005). The information contained in both the parent and child interventions was aimed at normalizing and relieving trauma reactions. The parent’s four-page booklet aimed to emphasize their role in their child’s recovery. It contained information regarding common child reactions, their likely time course, and how best they can assist their child’s emotional recovery (e.g., offer your child the opportunity to talk, don’t avoid talking about the accident, and encourage normal routine). A brief section for parents was also included regarding their own potential distress with additional strategies to encourage positive coping (e.g., pleasant events and coping statements). The children’s website included a home page orientating them to the site and then once clicking on the appropriate age group (children: ≤10 years; adolescents: ≥11 years) icons were displayed such as “Feelings,” “Problem Solving,” “Reaching Out,” and “Growing and Learning.” Similar to that of parents, these icons contained information aiming to normalize and promote recovery. Practical tools based on cognitive behavioral and resiliency strategies (Bernard, 2004; Bisson, Shepherd, Joy, Probert, & Newcombe, 2004; Cohen, Mannarino, Berliner, & Deblinger, 2000; Goldstein & Brooks, 2005) were provided and examples used to encourage learning and implementation. Strategies include: relaxation, coping statements, problem solving, pleasant events, identifying personal strengths, reflection on the event (learning and growing from the challenge). As this was a self-help approach, children and parents were encouraged to read and utilize what they thought to be most appropriate and relevant to their situation.

**Measures of Outcomes**

**Child Reactions**

To assess the primary outcome of anxiety as well as other secondary outcomes, The Trauma Symptom Checklist for Children-A (TSCC-A) (Briere, 1996) was given to children at each time point. The TSCC-A is a 44-item measure of post-traumatic reactions that encompasses five subscales: anxiety, post-traumatic stress, depression, anger, and dissociative symptoms. Children were asked to rate how often they experience a reaction/response on a scale from 0 (never) to 4 (always). High reliability ($\alpha = .82–.89$) and good validity has been found for the five subscales (Briere, 1996; Sadowski & Friedrich, 2000).

**Parent Reactions**

The primary outcome measure of intrusion and overall post-traumatic stress was assessed via the Impact of Events Scale-Revised (IES-R) (Weiss & Marmar, 1997). It is a 22-item self-report scale that assesses intrusive, avoidance, and hyperarousal symptoms associated with PTSD. Each item is scored on a scale from 0 (not at all) to 4 (extremely). Strong reliability has been reported ($\alpha = .79–.92$) for all three subscales and good internal validity ($\alpha = .93$) established (Weiss & Marmar, 1997). The IES-R was given to parents at each time point.

**Subjective Intervention Evaluation**

To evaluate the acceptability and use of the intervention, parent and child feedback questionnaires were developed. Specifically, parents and children were asked whether or not they read booklet and website materials, how often, what they remembered, and whether the information was helpful and/or effective. The subjective evaluation measure was sent to the intervention group at T2 and T3.

**Statistical Analysis**

To examine demographic characteristics of the population and investigate potential group differences, a number of bivariate analyses were conducted prior to the main analyses. First, group demographic variables at baseline (T1) were explored, secondly, participant dropout was examined between groups on both demographic and outcome measures, and lastly, baseline (T1) outcome measures between groups were assessed on the completer data only (which is in line with the main intervention effect analyses). In the main analysis which investigated the interaction between groups and change over time, primary and secondary outcomes were investigated via a repeated measures analysis of covariance (ANCOVA) on the intervention data (T2 and T3) while controlling for T1. Using multiple outcomes to assess the effectiveness of the intervention may incur a risk of detecting an effect where none exists (Type I error). However, the recommended adjustment, which entails increasing the statistical threshold for differences to be considered significant (i.e., Bonferroni adjustments), has been discussed by many researchers as being inappropriate and too conservative (Perneger, 1998; Pocock, 1997; Rothman, 1990). Furthermore, as this study is the first investigation of its type (i.e., RCT of an early intervention for children following unintentional injury) and children following unintentional injury present with a breadth of symptoms, the identification of intervention benefit was taken in a more exploratory manner. Therefore, it was decided to reject the more conservative $p$-value and adopt the significance level of $p = .05$. Furthermore in line with recommendations, primary and secondary outcomes were defined prior to the analyses (Feise, 2002). Intention to treat (ITT) analyses
were conducted with participant’s missing data being replaced using the last observation carried forward (LOCF) method. If participants had been recruited and randomized into the study following T1 they were included into the ITT analyses. Where participants were missing T2 and/or T3 data, these data were replaced with their value for that variable at the preceding occasion. Correlation analyses were performed to examine the subjective evaluations of those participants who received the intervention. Statistical Package for the Social Sciences version 15 was used to conduct the analyses.

Results

Descriptive Statistics

Demographic characteristics of the families who participated at T1 (N = 85, intervention n = 44, control n = 41) are shown in Table I. Children recruited for the study ranged in age from 7 to 16 years (M = 10.90, SD = 2.18) with an average duration of hospitalization of two nights (SD = 2.83, range 1–13 nights). The cause of the unintentional injury included 41 falls (48%), 13 sport injuries (15%), 12 motor vehicle accidents as a passenger or pedestrian (7%), 6 burns (7%), 1 knock or blow (1%), and 12 (14%) were involved in other types of unintentional injury. Of the 85 parents involved in the study, 81 (95%) were the child’s biological parents, 2 (2%) were step-parents, and 2 (2%) had another type of relationship with the child (Grandparent and Aunty). A series of t-tests and chi-square tests indicated that the two groups did not differ significantly on any of the trauma or injury related or demographic variables (e.g., age, gender) other than on the child rating of hopelessness. Children in the intervention group endorsed a sense of hopelessness significantly more frequently than those children randomized into the control, \( \chi^2(1) = 4.58, p = .03 \). Thus this variable was used as a covariate in the intervention effects analyses.

Participant Dropout

Of the 140 children and their parents who agreed to participate in the study, 85 (61%) families completed and returned the T1 set of questionnaires. Of the families who completed T1 questionnaires, 62 of the 85 (73%) participated in T2. At T3, 56 of the 85 (69%) participants completed and returned the questionnaires. Therefore, the overall analyses were conducted on the completer sample of N = 56. Reasons for withdrawal included difficulties in contacting the families, responding outside the timeframe, and parents reporting that they were “too busy” or that their child was “fine” and thus did not need to be involved in the research. At T3, those participants who did not return T2 questionnaires and did not verbally withdraw from the study (e.g., they responded out of the timeframe or were unable to be contacted) were also sent T3 questionnaires. ITT analysis included all participants that had been recruited into the study and randomized following T1. This resulted in an additional 29 participants in the ITT analysis, (N = 85; control = 41; intervention = 44).

The potential differences between T1 dropouts and those that continued were examined on a number of demographic variables and outcome measures. Completers and those who withdrew at T1 did not differ significantly on age or gender of the child, length of hospital stay, injury severity score, or type of injury. Furthermore, withdrawal from the study was unrelated to the allocation of experimental group. Chi-square tests revealed that 15 of the 20 (75%) parents who dropped out were females compared to 60 of the 65 (92.3%) who continued to participate—\( \chi^2(1) = 4.41, \ p < .05 \). With regards to employment, 11 of the 20 (55%) who dropped out were employed compared to 51 of the 65 (78.5%) participants who remained in the study—\( \chi^2(1) = 4.27, \ p < .05 \). No significant differences were found between dropouts at T1 and completers on all of the baseline outcome measures.

Baseline Scores for Intervention and Control Group

All baseline outcome measures were compared between the intervention and control groups on the completer
data set (N = 56). This is in line with the main statistical analyses conducted in the study. Independent t-tests revealed no significant differences at the 0.05 level between groups for the parent scores. However, a significant difference between groups was revealed in TSCC-A post-traumatic stress subscale—t(49.03) = 3.38, p = .001. This baseline difference was controlled for via the repeated measures ANCOVA which controlled for T1. Tables II and III outline the completer data’s (N = 56) means and standard deviations for both children and parent’s post-trauma reactions.

**Intervention Effects: Analyses Conducted with Completers Only (N = 56)**

**Child Results**

**Primary Outcome.** The analysis of the primary outcome of anxiety was conducted on the TSCC-A anxiety subscale. The ANCOVA indicated that treatment condition had an effect on child anxiety as indicated by the TSCC-A, F(1, 52) = 4.18, p < .05, d = −.34 (CI = −.86 to .19). Results showed that the children in the intervention group significantly decreased in their anxiety over the 5-month period between T2 and T3 (Mean change = −1.11) in comparison to the children in the control group whose anxiety increased (Mean change = +1.38).

**Secondary outcomes.** No significant interactions were found when examining secondary outcomes with the completer data or the ITT analysis. Although not reaching significance a trend in the outcome measures associated with the TSCC-A was noted. Children in the intervention group were observed to decrease in their symptoms while the control group increased, similar to that seen in Figure 2. No significant interactions were found when examining the ITT data. Results can be seen in Table II.

**Parent Results**

**Primary Outcome.** When examining the primary outcome of intrusion (subscale of IES-R) and overall post-traumatic stress (total IES-R score) no significant differences were noted between the parent responses for the intervention group and those in the control group. Both groups appeared to decrease in their symptoms over the 6-month time period. **Secondary Outcome.** No significant interaction effects were found for avoidance and hyperarousal reactions as measured by the IES-R with both groups decreasing over time in the completer.

**ITT Analysis (N = 85)**

ITT analysis was conducted using the LOCF method, replacing missing values at T2 and T3 with all children
and parents recruited and participating in T1. The results of the ANCOVAs conducted are shown in Tables II and III in brackets. The analyses resulted in the child’s primary outcome of anxiety not found to be significant, $F(1, 81) = 3.49, p = .07, \text{d} = –.25 (\text{CI} = –.67 \text{ to } .18)$. Although non-significant, a trend in the data was evident that similarly depicted the significant results found in the completer data, as seen in Figure 2. Similarly, no significant interaction effects were noted between the groups when examining the secondary outcomes for children with the ITT sample. For the parent data, no significant interaction effects were noted between groups for the parents in both the primary and secondary outcomes. Again, both groups were noted to decrease in their symptoms over the 6 months following trauma.

Subjective evaluation of the intervention

Of the 44 families who received the intervention 32 (73%) participated in evaluating the intervention. Of the 32 families, 100% of the parents reported that they read the booklet, while only 56.3% (18) of the children reported to have visited the website. The majority of parents and children also reported to having read the materials once (76 and 56%, respectively). No significant differences were found when running independent $t$-tests on those that did and those that did not visit the website with regards to outcome and demographic measures. The majority of parents and children that participated in the intervention reported it to be helpful (56 and 63%, respectively). However, on the self-reported positive effectiveness of the booklet and website, few children and parents reported the intervention as being “effective.” Interestingly however, Spearman’s correlation analyses found a strong correlation between self-reported helpfulness and effectiveness for both children and parents. Children and parents who reported the intervention to be helpful also reported

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**Table III. Comparison and Results of Post-Trauma Reactions for Parents**

<table>
<thead>
<tr>
<th></th>
<th>Control ($N = 29$)</th>
<th>Intervention ($N = 29$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IES-R</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Intrusive</td>
<td>5.28 (3.87)</td>
<td>2.72 (4.32)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>1.80 (3.32)</td>
<td>1.83 (4.22)</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>3.28 (3.22)</td>
<td>1.45 (3.90)</td>
</tr>
<tr>
<td>Total</td>
<td>10.72 (10.52)</td>
<td>6.00 (7.30)</td>
</tr>
</tbody>
</table>

Note. IES-R: impact of events-revised; ITT: intention to treat. Negative effect size shows that the control group has higher scores than the intervention group. While positive effect size shows that the intervention group had higher scores than the control group.

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**Figure 2. TSCC-A anxiety interaction between the intervention and cohort group. T2, T3 whilst controlling for T1 and child helplessness.**
the intervention to be effective; children (N = 16, \( r_s = .69, p < .01 \)), parents (N = 30, \( r_s = .45, p < .01 \)). See the Supplementary Table I (available online), for data displaying the parent and child subjective evaluations of the booklet and website.

Spearman’s correlation analyses were used to explore the reported effectiveness and helpfulness of the intervention and whether this related to child and parent symptoms at T1. Results revealed that children who reported the website to be helpful reported higher scores at T1 on their anxiety (N = 17, \( r_s = .52, p < .05 \)), anger (N = 17, \( r_s = .62, p < .01 \)), and the total TSCC-A score (N = 17, \( r_s = .62, p < .01 \)). Parent’s reported the intervention to be helpful if they reported higher T1 avoidance scores (N = 30, \( r_s = .43, p < .01 \)). These results suggest that those who were initially experiencing distressing symptoms were the ones who found the intervention to be helpful. However, this was not reflected with regards to the self-reported effectiveness of the website for both children and parents.

Discussion

The aim of this article was to investigate the effectiveness of a web- and booklet-based early intervention aimed at children and their parents following unintentional injury. The intervention consisted of the provision of information aiming to relieve and normalize trauma reactions. It was hypothesized that children and parents in the intervention group would experience a significant decrease in their primary outcomes of anxiety for children and intrusion and overall post-traumatic stress for parents. Additional secondary outcomes were analyzed in an exploratory manner due to the heterogeneous presentation of children following unintentional injury.

Over the 6 months, children involved in the intervention experienced a significant decrease in the primary outcome assessed, anxiety. Conversely, children in the control group exhibited an increase in anxiety. These results are in line with other child studies that suggest that information provision can be effective in reducing anxiety (Kenardy, Thompson, Le Brocque, & Olsson, 2008). Although not reaching significance, the secondary outcomes of anger, depression, post-traumatic stress, and dissociative suggest that these symptoms decreased if the children received the intervention while increasing for those in the control group. This increase in symptoms for children in the control is surprising considering the literature suggests that the “normal” pattern of symptoms following trauma is a gradual reduction. Perhaps these results represent a cause for concern, indicating the potential increase in symptoms for children who do not receive preventative assistance.

The active components of the intervention that account for the symptom changes observed are difficult to identify. Perhaps in line with the theoretical underpinnings of information provision, the provision of accurate information and positive coping strategies is effective in helping make children feel understood, normal, and that they can move on positively from the accident. These promising results are particularly interesting when considering that just over half of the children reported to have visited and read the materials on the website. This perhaps is not surprising considering the low rates of symptoms in this population, thus engaging in an intervention may not have been a priority for some children.

Interestingly, results of the subjective evaluation of the intervention suggest that the majority of children who used the intervention had higher baseline symptoms. Furthermore, those with higher baseline symptoms found it to be helpful as well as effective. Therefore, although disappointingly not all children read the materials, those that did needed it, used it and found it to be helpful and effective.

What also perhaps led to the significant child reduction in anxiety is the 100% rate of parental up-take of the booklet, which may have resulted in second-hand intervention effects. Despite no significant differences noted for parents between the groups on both the primary and secondary trauma outcomes, this perhaps reflects the focus of the parent intervention and how it may have influenced child reactions. The booklet’s major aim was to not just provide the parent with information regarding their child’s possible reactions but importantly to arm the parent with tips and strategies as to how they can encourage appropriate coping. Thus, this positive coping focus may have been adopted by parents and then modeled by children. This follows a number of recommendations and treatment protocols that encourage parental involvement in trauma interventions due to the strong association between parental coping/adjustment and child outcome (De Vries et al., 1999; Kenardy, Thompson, Le Brocque, & Olsson, 2008; Silvermann & Treffers, 2001). However, it would be hasty to suggest that parents should only be targeted, particularly as the literature suggests that parents are often poor identifiers of child trauma reactions, especially internalizing reactions (Hock, Hart, Kang, & Lutz, 2004; Schreier, Ladakakos, Morabito, Chapman, & Knudson, 2005).

The randomized controlled trial design of this study is a unique strength of this research. No known RCT has
been done in this population which is the most rigorous way of determining whether a cause–effect relation exists between the early intervention and child/parent outcome. Furthermore, this study followed the detailed guidelines and tracking of participants as recommended by the CONSORT Statement (Altman et al., 2001). Despite these strengths, there are a number of limitations. Firstly, it is important to acknowledge that due to the large number of analyses conducted due to the exploratory nature of this study, there is an increased chance of making a Type I error, thus care needs to be taken when interpreting the results. Secondly, the intervention group appeared to report higher distress at T1 which suggests that the reduction in symptoms over time may have been due to a regression to the mean. However, T1 was controlled for in the analysis and scores at T2 do not reflect such differences between groups. It is important to also acknowledge that at all times symptom levels for both parent and child were below clinically significant elevations. Although this may suggest that this population is not worth intervening upon, literature indicates that this group of children are at risk of potential psychopathology, up to 2 years post accident (Le Brocque, Hendrikz, & Kenardy, 2010). Thus due to the preventative nature of this study, the target population and the time limit of the follow-up, it was not surprising that clinically significant symptom levels were not observed within the groups. Thirdly, the low participation rate of children reading the web materials was disappointing and unfortunately, reasons behind this were not examined. This low participation rate perhaps reflects self selection; meaning that children who were feeling fine did not use it, however we cannot be certain. Future research needs to examine this, perhaps as part of the subjective evaluation; children (as well as parents) could be asked further questions as to why they did not read the materials.

Another limitation of concern is that significant drop-out was observed. This perhaps impacted the power of the analyses in being able to detect significance despite trends and moderate to large effect sizes suggesting intervention effect. Disappointingly when conducting an ITT analysis, no further significant effects were noted despite trends supporting the interventions influence on children. This is perhaps due to the conservative nature of the LOCF method used. The main reasons for drop-out included the parents reporting that they were too busy or that their child was fine and thus did not need to participate in the research. Due to the preventative nature of the intervention, children and parents reported limited baseline symptomatology, thus it is not surprising that many children and parents would opt out of the study. Similar difficulties with retention have been noted in other RCT’s of early interventions with medical patients such as Lutz Stehl and colleagues (2008) study of pediatric cancer patients. Medical patients present with unique needs and presentations, quite different to that of mental health patients. Primarily and understandably, the focus in medical settings is on physical health and/or rehabilitation. However this is at a cost, with little staff and patient awareness as to the emotional and psychological recovery following of the medical treatment, diagnosis, and injury. Thus conducting psychological trials in this setting is challenging.

Yet, despite the limitations discussed it is important to recognize the ecological and external validity this study provides. This study was conducted in a busy hospital with few resources and staff available demonstrating the feasibility of delivering an early intervention to children following an accident. Furthermore, minimal exclusion criteria were used thus increasing the generalizability of these results. Therefore, this study offers internal and external validity of the provision of information to children and their parents following unintentional injury.

There are a number of avenues for future research. Firstly, future research into the effectiveness of information provision intervention is needed particularly due to the promising but not yet convincing findings with children following unintentional injury. As research suggests that only a minority of children will result in psychological difficulties (Keppel-Benson, Ollendick, & Benson, 2002; Le Brocque, Hendrikz, & Kenardy, 2010), there is an avenue for future research to explore this at-risk group and their response to treatment. Thirdly, due to the non-significant findings, there is an avenue for future research to enhance the parent component of the intervention. This may include more information regarding how parents may deal with their own trauma reactions. Lastly, to enhance the ability to adequately examine and identify components of change in a self-directed web-based intervention; future research should take advantage of the monitoring and tracking systems now available. For example, children could use an identification number to log on to the website thus enabling tracking and usage more adequately.

Overall, this information provision intervention has shown some promise in reducing child anxiety following unintentional trauma. Subjective responses further endorse the intervention promise as those who needed it, used it. Due to the limitations discussed, the effectiveness of the intervention needs to be interpreted with caution and future research is necessary to confirm and substantiate the current promising findings. If shown to be effective, this information-provision intervention offers practitioners
and families a useful, easy, accessible, and inexpensive tool to use in the emotional and behavioral recovery from unintentional injury.

**Supplementary Data**

Supplementary data can be found at: http://www.jpepsy.oxfordjournals.org/

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