Children’s distress during intravenous placement: The role of child life specialists

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ABSTRACT

The purpose of this study was to assess the effectiveness of child life specialists’ intervention to minimize distress for children undergoing IV placement procedures. We hypothesized that regardless of child age or gender, children who received child life services during IV placement would exhibit less distress than would children undergoing the procedure absent a child life specialist (i.e., those with standard care). Ninety-five children were observed during IV placement at a children’s hospital, and children’s level of distress was rated by observers during the placement. Presence of child life specialist occurred randomly. Results indicated that children who had child life intervention during IV placement (n = 45) exhibited less distress than those children with standard care (n = 50), controlling for child age and typical distress during procedures. They were also more likely to have a J-Tip used during IV placement. The most common strategy employed by child life specialists was distraction, which was used for every IV placement. The results support the use of certified child life specialists (CCLS) for reducing children’s distress during painful and invasive procedures such as IV placement.

Medical procedures that use needles are feared by children and adolescents, considered painful, and cause distress. Medical procedures, including those involving needles, are reported to be the second most commonly occurring fear in children, more common than a fear of the dark or fear of thunderstorms, heights, or water (Meltzer et al., 2008). Needle fear, which may actually increase with age, is prevalent in children, and IVs are perceived to be among the most painful and distressing procedures for hospitalized children (Babl, Mandrawa, O’Sullivan, & Crellin, 2008; Ellis, Sharp, Newhook, & Cohen, 2004; Gullone, 2000; Hart & Bossert, 1994; Kennedy, Luhmann, & Zempsky, 2008; Sparks, Setlik, & Luhman, 2007). At the extreme end of fear of needles is a blood-injection-injury phobia, which is a disorder in the Diagnostic and Statistical Manual of Mental Disorders (5th edition) (American Psychiatric Association, 2013).
2013) that can cause significant subsequent distress and noncompliance with medical care in adulthood (Kennedy et al., 2008). Individuals with fear and anxiety around needles may avoid medical visits and procedures and make medical procedures more difficult (e.g., by fainting or requiring restraint); furthermore, traditional pain interventions may be less effective for patients with severe fear of needles (McMurtry et al., 2015; Noel, McMurtry, Chambers, & McGrath, 2010).

Not only are needles frequently feared, they are also associated with the perception of pain. A prospective, cross-sectional survey at a large U.S. children’s hospital indicated that needle pokes, such as those associated with intravenous cannula insertions (IVs), are the most common source of pain in hospitalized children (Friedrichsdorf et al., 2015). Furthermore, children in the study recalled the needle pokes as the “worst pain” they experienced (Friedrichsdorf et al., 2015). Observational studies also consistently find that venipunctures are related to high levels of pain and distress in children (Fradet, McGrath, Kay, Adams, & Luke, 1990; Humphrey, Boon, Van Linden, van den Heuvel, & van de Wiel, 1992). For example, in one study, 83% of children age 2.5–6 years, 51% of preadolescents, and over a quarter of adolescents demonstrated high levels of distress in the absence of anesthetic or psychological intervention during venipuncture (Humphrey et al., 1992). Another study demonstrated that 36–64% of children aged 3–6 years, and 35–55% of children aged 7–17 years experienced moderate to severe distress during venipuncture; results varied by who (nurse, parent, or child) reported on the distress. Studies also show that venipunctures are associated with varying degrees of pain, with over a quarter of children reporting moderate or severe pain from venipuncture (Fradet et al., 1990; McGrath, Hsu, Cappelli, & Luke, 1990).

Moreover, there is often a bidirectional relationship between fear and pain perception (McMurtry, Noel, Chambers, & McGrath, 2011), such that fear increases the perception of pain, and painful events become more feared. Children who experience greater pain and distress appear to develop exaggerated memories, which become a predictor of their pain and distress during subsequent exposures to needles (Noel et al., 2010). The fear of needles is important because the majority of inpatient children have an IV, which are used for numerous conditions to deliver drugs, fluids, and medications (Blount, Piira, Cohen, & Cheng, 2006).

Given that venipunctures such as IV insertions invoke fear, distress, and pain for children, various pharmacological and non-pharmacological strategies are used to reduce IV pain, fear, and distress. Topical anesthetic cream can be used and appears to be related to success rates and less time taken to complete the venipuncture (Taddio, Soin, Schuh, Koren, & Scolnik, 2005). However, anesthetic cream requires sufficient time and planning to implement, and professionals may experience barriers to its use in a clinical setting.
Behavioral approaches, such as distraction and preparation, are also related to lower distress during intravenous insertion (Miller et al., 2016). One strategy aimed at reducing children’s distress is to provide support by certified child life specialists (CCLS). CCLS are educated and trained to provide strategies and interventions to support children during hospitalization and to reduce children’s distress. CCLS focus on the development and well-being of hospitalized children and their families, rather than on their medical and physical needs (American Academy of Pediatrics [AAP], 2014; Thompson, 1989). The goal of child life specialists is to address the psychosocial concerns that children face and ease the experiences of children and their families throughout the hospital process (Christian & Thomas, 1998; Thompson, 1989, 2009). A child life specialist strives to help children by becoming a safe person who explains in a developmentally appropriate way what is happening, provides developmentally appropriate play, offers psychological preparation before and during procedures, and helps children identify and practice coping strategies (AAP, 2014; Christian & Thomas, 1998; Moore, Bennett, Dietrich, & Wells, 2015). Child life services are offered in most children’s hospitals, as well as in outpatient clinics, emergency departments, hospice programs, rehabilitation units, and other units, and are considered an indicator of excellence in pediatric care (AAP, 2014).

Research examining the benefits of child life services is important to justify the cost of these services and to learn how to best support children across the continuum of care. Early research on child life intervention compared hospitalized children ages 3–13 years who received comprehensive child life intervention with those who did not, and demonstrated children’s reduced anxiety (Carson, Jenkins, & Stout, 1985), less emotional distress, better coping, less time on initial pain-management narcotics, shorter length of stay, and more satisfied parents (Wolfer, Gaynard, Goldberger, Landley, & Thompson, 1988). Research on specific aspects of CCLS intervention is limited and mixed. For example, a systematic review of 6 studies examined the effectiveness of therapeutic play interventions on child outcomes after elective surgery. Results were inconsistent regarding effectiveness of play on children’s anxiety, negative behaviors, and pain, with some studies demonstrating reduced anxiety, fewer negative behaviors, and less postoperative pain, and other studies showing nonsignificant effects (He, Zhu, Chan, Klainin-Yobas, & Wang, 2015).

Other research has examined specific dimensions of child life services, such as procedural preparation, during specific types of procedures. Brewer, Gleditsch, Syblik, Tietjens, and Vacik (2006) completed a double-blind intervention study of 142 children between 5 and 11 years old to examine child life procedure preparation for same-day, elective surgery. Both the patient and surgeon were blind to intervention group. Anxiety was significantly lower for patients with child life preparation compared to those in the
non-intervention group. Another study demonstrated that child life procedural preparation and distraction reduced children’s (3 to 13 years) observed and parent-reported distress during laceration repairs in the emergency department compared to children who did not have that type of child life intervention (Gursky, Kestler, & Lewis, 2010).

Child life services may be a critical part of helping children cope with IV placement, yet little research has examined the role of CCLS in reducing children’s distress in this context. Given how common and feared intravenous insertions are, it is critical to identify and understand factors related to children’s distress during IVs. The present study compared children’s observed distress for those who randomly received child life services during IV placement with those who received standard of care with no child life specialist present during IV placement.

Hospitalization and IV placement do not affect all children in the same ways. A number of factors influence how a child will respond to and be affected by a medical situation. Child life specialists are trained to recognize these factors and create interventions for specific patients based on them. These factors include child characteristics such as age, coping style and temperament, extraneous procedural variables, and parent variables such as parent anxiety and coaching (McCarthy & Kleiber, 2006; McCarthy et al., 2010). Older children are assumed to cope better with IV placement. However, some studies have failed to demonstrate a link between children’s age and their distress during IV placement; other studies show that younger children are more likely to experience distress during IV insertions (Koller, 2008; McCarthy et al., 2010). Although we were unable to examine all possible factors, the present study examined the association between children’s age and distress during IV placement.

Another potential moderator of children’s distress during IV placement that shows inconsistent results is children’s gender. Some studies show that girls are more distressed by hospitalization than are boys (Rennick, Johnston, Dougherty, Platt, & Ritchie, 2002; Small & Melnyk, 2006); other studies show that boys are more distressed and anxious (Tiedeman & Clatworthy, 1990); still other studies show no gender differences (Bossert, 1994; Hart & Bossert, 1994; McCarthy et al., 2010). The present study examined gender effects on children’s distress during IV placement.

We also examined previous stress levels as a covariate, given that children vary widely in how distressing they find medical procedures. A history of distress during previous medical procedures predicts increased distress during a subsequent procedure (Frank, Blount, Smith, Manimala, & Martin, 1995; Kleiber, Craft-Rosenberg, & Harper, 2001).

The research reported here examined whether child life intervention during IV placement was related to lower child distress. We also examined specific behaviors (i.e., distraction, explanation, providing choices, providing
support, and positions of comfort) used by child life specialists during the IV placement in an effort to better understand observed connections between the specific administrations of child life specialists and the effects of these on children’s experience of distress. We hypothesized that children who received child life intervention would exhibit less distress relative to children who did not receive child life intervention, controlling for other correlates of distress.

**Method**

**Participants**

Inclusion criteria included English-speaking and child age 2 years or older receiving IV placement. One hundred nine children and their families met inclusion criteria and were approached to participate in a study examining children’s distress in hospitals. Eighty-seven percent of those approached (n = 95) provided both parental consent and child assent. Ninety-five children (M = 115 months, SD = 62 months) participated, 56 (59%) of whom were male. A child life specialist was present for 45 (47%) of the IV placements (see Table 1). Seventy-seven percent of the children (n = 73) were non-Hispanic Caucasian, 1 child was American Indian or Alaskan Native, 1 was Asian/Pacific Islander, 2 were Black or African American, and 9% (n = 8) were Hispanic. The remaining children were mixed race or the parents chose not to disclose the child’s race. Seventy-seven percent of the children had a prior hospitalization, according to parent report. No data were available for families who declined to participate in the study.

The participants in this study were receiving treatment at a children’s hospital which was a tertiary, Level I Trauma Center providing pediatric hospitalization for the intermountain West. The hospital has 289 beds, treats about 130,000 ambulatory patients, and has over 12,000 patients admitted

### Table 1. Means (Standard Deviations) [95% Confidence Intervals] of child life intervention and comparison groups.

<table>
<thead>
<tr>
<th>Sample Characteristic</th>
<th>Child Life Intervention Group (n = 45)</th>
<th>Comparison Group (No Child Life Intervention during IV placement; n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Age (in months)</td>
<td>114.20 (57.80) a</td>
<td>115.56 (66.21)</td>
</tr>
<tr>
<td></td>
<td>[97.73, 132.79]</td>
<td>[95.39, 132.75]</td>
</tr>
<tr>
<td>Child Male</td>
<td>59%a</td>
<td>59%</td>
</tr>
<tr>
<td>Child Non Hispanic Caucasian</td>
<td>80%a</td>
<td>85%</td>
</tr>
<tr>
<td>J-Tip Used During IV Placement</td>
<td>42%</td>
<td>31%</td>
</tr>
<tr>
<td>Parent-Reported Typical Distress during Medical Procedures</td>
<td>2.82 (1.35) a</td>
<td>2.71 (1.36)</td>
</tr>
<tr>
<td></td>
<td>[2.38, 3.25]</td>
<td>[2.31, 3.11]</td>
</tr>
<tr>
<td>Child Had Prior Hospitalization</td>
<td>78%a</td>
<td>76%</td>
</tr>
<tr>
<td>Child Had Prior IV Placement</td>
<td>93%a</td>
<td>92%</td>
</tr>
</tbody>
</table>

Note: aThe groups did not significantly differ from one another on age, child sex, race/ethnicity, parent-reported distress during medical procedures, prior hospitalization, or prior IV placement based on X² or analyses of variance tests.
annually. The hospital was associated with a Department of Pediatrics at a nearby state university. The hospital provided unit-based child life services, as well as a playroom with opportunities for developmentally appropriate play, medical play, support during procedures, services for siblings, special events and recreational opportunities, and strategies for coping. Because the IV teams in the hospital serve all units in the hospital, children were in many different units receiving various treatments, including emergency, oncological, surgical, medical, and other treatments.

**Procedure**

There are two IV teams at the hospital, one of which is accompanied by a child life specialist, and one team which is not. The composition of the IV teams changes on a daily basis depending on employee shift assignments. Similarly, the CCLS did not shadow one specific IV team but joined one or the other team randomly. When a child anywhere in the hospital needs an IV inserted, the IV team administrator is alerted, and the next available IV team goes to the patient’s room to place the IV. Thus, which IV team administers procedures is a random process, as is which patients have a child life specialist present for their procedures. Researchers in this study alternately observed IV insertions performed by each IV team. Before the IV team entered, researchers approached the patient’s parents to obtain parent consent to participate in the study. If the patient was 7 years old or older, written assent from the patient him/herself was also obtained. Parents also completed a brief questionnaire about their child. Researchers then waited for the IV team to arrive, and observed the IV placement. Child distress was coded, and if a child life specialist was present, her behavior also was coded (described in the following section). The study was approved by the Institutional Review Boards at the University of Utah and Primary Children’s Hospital.

**Measures**

Distress of the children receiving an IV and, when present, behaviors of the child life specialists, were coded during the IV placement. Five coders were initially trained on the coding scheme using videotapes of adults and children with varying levels of distress. Videotaped data enabled the coders to pause and discuss the child’s distress level and to observe repeatedly. Once trained, coders assessed videotaped data separately, and then resolved discrepancies through discussion. Coders met weekly to prevent drift in coding. It was also noted whether the child received a J-Tip during IV placement.
Child distress

Child distress was based on a modified version of the Observational Scale of Behavioral Distress (OSBD; Elliott, Jay, & Woody, 1987). The scale was modified such that observers made a global rating of distress collapsing across the 12 categories of behavior (e.g., crying, seeking emotional support, screaming, verbal or physical resistance). Instead of coding 12 different discrete indicators of distress, coders made a single global rating of distress. A global rating was necessary to enable observers to also code child life strategies during the 15-second interval. Thus, distress level was determined based on facial expressions, vocalizations, and body language for each 15-second interval. Distress Level was coded on a scale of 0–3. Zero was coded when the child did not exhibit any distress. One was coded when the child displayed mild distress. Examples of “mild distress” included tenseness of the body, mild body language showing anger, sadness, or fear, mild negative vocalization, or facial expression such as grimace. Two was coded when the child expressed moderate vocal distress, such as sniffling, whining, whimpering, or crying. The child may have shown moderate anger and resistance, such as pushing away any physical support or fear, such as pulling away. Three, the highest score, was coded when the child displayed severe distress. This included high intensity screaming, crying, or flailing. The child may have shown forceful resistance or strong negative emotion.

Child distress was coded every 15 seconds. The researchers listened to a recording as they were coding which alerted them every 15 seconds. For each participant, ratings for distress level were summed across 15-second episodes, then divided by the number of 15-second episodes coded for that participant. This provided the average level of distress for the duration of the observation for each participant. The inter-rater reliability for this category was high, with an inter-class correlation of 0.99.

Child life specialist behaviors

When Child Life Specialists were present, their strategies were also coded every 15 seconds. In order to determine which strategies to code, researchers met with child life specialists at the hospital about the strategies they used during IV placement. Researchers were unable to code child life behaviors that may have occurred at times other than during the IV placement, such as preparation or medical play. After developing the initial coding scheme based on input from the CCLS and a review of the literature, the research team revised the coding scheme based on additional input from CCLS and based on pilot coding. Five CCLS behaviors were coded:

(1) Explanation was coded when the child life specialist explicitly explained something to the child related to his/her hospitalization or medical care.
(2) **Distraction** was coded when the child life specialist did anything to try and direct the child’s attention away from IV placement. Examples included asking questions about the child's life, talking with the child about non-hospital/medical topics, playing a game with the child, deep breathing, or playing with a toy with the child.

(3) **Providing choices** was coded when the child life specialist gave the child a choice, either about something related to hospitalization/medical care or something unrelated to hospitalization/medical care.

(4) **Providing support** was coded when the child life specialist displayed any kind of physical or emotional support to the child. Examples included the child life specialist saying to the patient, “You’re doing a good job”, or perhaps holding the patient’s hand during the procedure.

(5) **Position of Comfort** was coded when the child life specialist initiated or helped a parent initiate a *position of comfort* with the child. A *position of comfort* provides a child’s sense of safety or security through close contact with the parent or caregiver, and a sitting position provides a sense of control. For example, sitting on the parents’ lap chest to chest or back to chest, or in a side sitting position were considered comforting positions.

For each observation including a child life specialist, the total frequency of each child life behavior was divided by the number of 15-second episodes coded for that observation. This provided a score that represented the percentage of episodes the particular behavior was employed.

Inter-rater reliability for these behaviors was established on the same videotapes used for the child behaviors. There was strong inter-rater reliability for these behaviors, with the inter-class correlations being 0.98 (Explanation), 0.99 (Distraction), 0.83 (Provide Choices), 0.97 (Provide Support). Position of Comfort was coded on a presence/absence basis for the entire IV placement.

**Parent report of demographics and child distress during procedures**

Parents completed a brief questionnaire before their child’s IV was inserted. They reported on demographic information, the number of previous IV placements, and their child’s typical level of distress during medical procedures (such as IV insertion, blood draws, or injections) rated on a 5-point scale from 1 = no distress to 5 = extreme distress.

**J-Tip use**

Observers noted whether a J-Tip was used with the IV placement. A J-Tip Needle-Free Injector delivers lidocaine subcutaneously for an IV start, providing anesthesia in less than 2 to 3 minutes, as opposed to 30 minutes or more with EMLA anesthetic cream.
**Analytic plan**

The analytic plan involved three sets of analyses. The first set involved chi-square tests and analyses of variance to examine whether the two groups of children (those with child life intervention during the IV placement and those without) differed on demographic variables and parent-reported medical history. These analyses also examined whether the number of 15-second episodes it took to complete the IV insertion differed for the two groups (Child life intervention group vs. no CCLS intervention). The second set of analyses examined age and gender effects on children’s distress during IV placement. These analyses also examined correlates of children’s distress during IV placement. The third set of analyses examined child life strategies and the impact of child life intervention on children’s distress during IV placement.

**Results**

**Group differences analyses on child demographic and parent-reported medical history and time spent on IV placement**

Chi-square analyses and analyses of variance were conducted to examine whether the two groups (child life intervention or no child life intervention) differed on child age, gender, parent reported typical distress during medical procedures, whether the child had a prior IV placement and hospitalization, and whether a J-Tip was used during IV placement (see Table 1). These analyses indicated that the two groups of children were not significantly different from one another in terms of child age, $F(1,93) = 0.01, p = 0.93, \eta^2 = 0.00$. Gender did not differ by intervention group, $X^2 (1, n = 95) = 0.001, p = 0.98$. Parent-reported typical distress during medical procedures did not differ by child life intervention group, $F(1,82) = 0.12, p = 0.73, \eta^2 = 0.00$. Groups did not differ by whether the child had a prior hospitalization, $X^2 (1, n = 90) = 0.08, p = 0.78$, nor a prior IV insertion, $X^2 (1, n = 90) = 0.02, p = 0.88$. Children who received child life intervention were more likely to have a J-Tip used when their IV was started, $X^2 (1, n = 94) = 4.13, p = 0.04$.

Analyses of variance with number of 15-second intervals as the dependent variable and child life intervention group as the independent variable were conducted to determine whether the length of time the IV insertion took differed for the two groups. This analysis indicated that the IV insertion times did not differ significantly, $F(1, 83) = 0.01, p = 0.93, \eta^2 = 0.00$, $M = 27.16, SD = 21.37$, [95% CIs = 22.28, 32.39] for the standard care group and $M = 27.32, SD = 15.73$, [95% CIs = 21.83, 32.71] for child life intervention group.
**Associations of age, gender, and medical history on observed children’s distress during IV placement**

A series of analyses of variance was conducted with observed child distress during IV placement as the dependent variable and child gender, prior hospitalization, prior IV placement, and use of J-Tip as the between subjects variables. The analysis of variance with child gender as the between subjects factor indicated no significant gender differences on children’s distress, \(F[1,92] = 1.24, p = 0.27, \eta^2 = 0.01, M = 0.95, SD = 1.00, [95% CIs = 0.66, 1.24]\) for girls; \(M = 0.74, SD = 0.84, [95% CIs = 0.50, 0.98]\) for boys). Prior hospitalization was not related to greater observed child distress, \(F(1,87) = 2.14, p = 0.15, \eta^2 = 0.02, M = 1.06, SD = 1.01, (95% CIs = 97.73, 132.79)\) for children with no prior hospitalization and \(M = 0.74, SD = 0.86, (95% CIs = 97.73, 132.79)\) for children with a prior hospitalization. Children with prior IV placements did not show differences in observed distress compared to children with no prior IV placements, \(F(1,89) = 0.03, p = 0.86, \eta^2 = 0.00, M = 0.76, SD = 1.11, (95% CIs = 0.07, 1.44)\) for children with no prior IV placements, \(M = 0.82, SD = 0.89, (95% CIs = 0.62, 1.02)\) for children with prior IV placement. There was no effect of J-Tip use on child observed distress, \(F(1, 92) = 0.04, p = 0.84, \eta^2 = 0.00, M = 0.82, SD = 0.12, (95% CIs = 0.58, 1.05)\) for those without J-Tip, and \(M = 0.86 SD = 0.16, (95% CIs = 0.55, 1.17)\) for those with J-Tip. Given that gender, prior hospitalization, prior IV placements and J-Tip use were not significantly associated with child observed distress, these variables were not included in subsequent analyses.

Correlations were conducted between observed child distress during IV placement and parent report of typical distress during medical procedures before the IV was placed and child age. These analyses indicated that younger children were significantly more distressed than older children, \(r(93) = -0.61, p < 0.001\). As well, parents who reported that their child experienced greater distress during medical procedures had children who exhibited more observed distress during IV placement, \(r(87) = 0.67, p < 0.001\). Given these significant correlations, subsequent analyses controlled for child age and parent-reported distress during medical procedures.

**Child life intervention and impact of that intervention on children’s observed distress**

Initial analyses examined descriptive statistics for child life strategies during IV placement (see Table 2). These analyses demonstrated that distraction was the most frequently used strategy of those strategies coded. Distraction was used in 100% of the IV placements, and most children received distraction for the majority of the time the IV was being placed \((M = 70\% of the\)
episodes coded). Explanation and support were also used frequently, with almost all the children.

Our main analyses examined the impact of child life intervention on children’s observed distress. To do so, an analysis of covariance was conducted with observed child distress as the dependent variable, child life intervention (yes, no) as the between subjects variable, controlling for parent report of children’s distress during procedures and child age. This analysis showed a main effect of child life intervention on child observed distress, $F(1, 78) = 4.09, p < 0.05, \eta^2 = 0.05$, [95% CIs = 0.01, 0.52]. The effects of child age, $F(1,78) = 20.93, p < 0.001, \eta^2 = 0.21$, [95% CIs = –0.01, –0.00] and child parent-reported distress during medical procedures, $F(1,78) = 40.78, p < 0.001, \eta^2 = 0.34$, [95% CIs = 0.45] were also significant. Children with child life intervention showed less observed distress during IV placement, $M = 0.63, SD = 0.82$, [95% CIs = 0.45, 0.84] than children without child life intervention, $M = 0.92, SD = 0.94$ (95% CIs = 0.73, 1.08) (see Figure 1).

### Discussion

CCLS are important members of the health care team. They are primary advocates of family-centered care who work in partnership with other members of the health care team to meet the unique emotional and developmental needs of each child and family. It is important to better understand the role of child life specialists in supporting children during painful procedures such

<table>
<thead>
<tr>
<th>Child Life Strategy</th>
<th>% Children Receiving Strategy</th>
<th>Mean (SD)</th>
<th>Percentage of Episodes Strategy Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distraction</td>
<td>100%</td>
<td>69% (25%)</td>
<td></td>
</tr>
<tr>
<td>Explanation</td>
<td>91.9%</td>
<td>23% (22%)</td>
<td></td>
</tr>
<tr>
<td>Providing Choices</td>
<td>64.9%</td>
<td>6% (6%)</td>
<td></td>
</tr>
<tr>
<td>Providing Support</td>
<td>83.8%</td>
<td>18% (14%)</td>
<td></td>
</tr>
<tr>
<td>Position of Comfort</td>
<td>13.5%</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

![Figure 1](Observed child distress during IV placement by child life intervention.)
as IV placement. This study confirmed that during IV placements, child life intervention was related to lower levels of observed child distress. Our results suggest that child life intervention during procedures may be especially important for younger children, as they demonstrated more overt distress. Furthermore, children whose parents report that they experience high levels of distress during medical procedures may also be important recipients of child life services. Given limited resources, child life specialists might choose to prioritize patients by child age and previous distress if they cannot support all patients. That children showed less overt distress during IV placement when child life specialists were present indicates that child life specialists play an important role in alleviating children’s distress during this common medical procedure. At the hospital under study, only one of the two IV teams had a child life specialist supporting the children receiving IVs, but it may be more children would benefit from child life support during IV placement.

Researchers observed child life specialists using many techniques to try to reduce children’s distress. Although J-tip use was not associated with children’s distress levels, children who had a child life specialist present during their IV placement were also more likely to have a J-Tip used during their IV placement. Child life specialists may be advocating for the use of J-Tips. A prospective, randomized trial examined fear and pain with patients 8 to 18 years undergoing IV insertion with either topical anesthetic cream (EMLA) or J-Tip. Results indicated that post-procedure fear scores were lower than pre-procedure fear scores in both groups, but that pain scores were lower for EMLA than for J-Tip. However, pain scores were low for both groups, and fear did not differ between the groups (Stolz & Manworren, 2017). Given bidirectional relationships between fear and pain, future research should examine whether consistent J-Tip use over time for every IV insertion is related to lower distress levels.

This study also demonstrated that distraction was the most common child life strategy used during IV placement. Previous research shows that distraction is an effective strategy to cope with distress (Gursky et al., 2010; Kleiber & Harper, 1999; Manimala, Blount, & Cohen, 2000; Thompson, 2009). For example, parental distraction during immunization was related to lower levels of distress and lower rates of restraint compared to control groups (Manimala et al., 2000). Distraction is one technique of many that CCLS use and can also be taught to parents (Cohen, 2008), although parents vary in the quantity and quality of distraction they provide (McCarthy et al., 2010). Parents who more effectively distract their children have children who show less behavioral, biological, and parent-reported distress during IV insertion (McCarthy et al., 2010). Child life specialists are employing an evidence-based strategy to reduce children’s distress.
The role of child life specialists should be prioritized in the health care setting so they can adequately attend to children’s developmental and emotional needs during hospitalization. In this study, child life specialists faced some challenges in the hospital setting, such as not having adequate time to prepare patients before the IV placement was done. Instead, child life specialists typically entered patients’ rooms at the same time as the IV team, and immediately started assessing, preparing, and explaining to the child what was going to happen. Ideally, preparation would be done before the IV team entered the room to protect the time of the IV team and to enable sufficient time to prepare the child before the procedure begins. It is important to note that the time spent on the IV insertion did not differ by whether the IV team included child life intervention.

A strength of this study is that this study addresses a major gap in the literature on CCLS intervention. This study is part of the small but growing body of research addressing specific dimensions of child life interventions. Additional research is needed to educate health care professionals so that they can be aware of the benefits of child life intervention and advocate for more child life positions and availability in hospitals and pediatric clinics. Research on the cost effectiveness of child life intervention is also needed. Another strength of the study is the random, control group design, enabling a strong test of the effects of child life intervention relative to an observational study that did not randomly vary child life intervention.

A weakness of this study is that there is a relatively small sample size, which gives less power to detect significant results. Further research is needed with larger sample sizes to determine how specific child life strategies are related to child distress. Another weakness of the study is that all the data was collected at one hospital, meaning researchers may not have captured the full range of child life behaviors that child life specialists at other hospitals use to try to alleviate distress in children during procedures. The present study only examined immediate levels of distress; a longitudinal study would have been needed to detect long-term differences between those patients served by child life specialists and those that did not receive child life intervention. Furthermore, we were unable to disentangle the effects of specific child life interventions, which often co-occurred as child life specialists used multiple strategies during the IV placement. That is, it is unclear whether distraction was the key component of the child life involvement, or whether other CCLS strategies, such as support and explanation, also impacted children’s distress.

Because we were unable to collect detailed medical histories, the present study was also unable to examine previous interactions with CCLS that occurred before the IV team entered the hospital room. It is likely that children’s previous experiences with child life intervention, such as preparation or medical play, impacted children’s distress levels. We did not compare CCLS interventions to those provided by other professionals, and therefore
our findings pertain to the interventions provided, rather than definitively to the child life specialists providing them. Finally, the ethnic diversity of the sample was limited, and thus, results may not generalize to individuals from other racial and ethnic backgrounds. However, a previous large scale study of children (n = 542) between the ages of 4 and 10 years of age failed to find associations between ethnicity and observed distress, cortisol responsivity, self-reported pain or parent report of children’s distress during IV insertion (McCarthy et al., 2010). Future research with large sample sizes will be needed to determine which specific dimensions of child life intervention are critical to reducing children’s distress, and to further understand the moderators and mediators of these relationships.

**Implications for Practice**

This research demonstrated that child life intervention was related to lower child distress levels during IV placement. Child life specialists are important in the hospital setting, as they are trained to specifically assess and support patients emotionally and developmentally, although we were unable to compare CCLS to other professionals’ interventions. Child life specialists’ unique and extensive training is a vital part of a pediatric patient’s health care experience. Child life specialists employed evidence-based non-pharmacological pain management strategies, including distraction, in every IV placement. Clear communication among health care members about the importance of child life intervention can help child life specialists be utilized better in the hospital setting. With more education of health care professionals and more research about child life, child life specialists can be given more time to work with patients, which may lower distress in pediatric patients. Given limited resources, it may be especially important for younger children to receive child life intervention during procedures. Furthermore, children who previously experienced high distress should also be prioritized for child life intervention if not all children are able to receive the services of a child life specialist. Child life specialists may also coach parents, caregivers, and staff in implementing non-pharmacological pain management strategies, such as distraction, during medical procedures such as needle sticks.

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