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Parents of preschool fire setters: perceptions of the child-play fire hazard

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The present study sought to learn about risk perceptions held by parents of preschool fire-setters. A 41-item survey was distributed to 60 parents whose children, aged 6 years and younger, had previously set fires and who were involved in intervention programmes throughout the US. Most parents did not think their children would play with matches/lighters, or knew how to use these items, although some had witnessed their children playing with matches/lighters previously. Most parents reported having taken precautions to keep matches/lighters out of reach and also educating their children about fire. Regardless, children not only set fires, but in 40% of cases climbed to access the match/lighter. Parents' perceptions of their children's proclivity for fire play were not consistent with their actual fire-play behaviour. Parents underestimated the likelihood that their children would play with matches/lighters. Although most reportedly undertook preventative measures aimed at thwarting fire play, these strategies were ineffective. Traditionally relied upon precautionary techniques, such as storing lighters out of reach and discussing the dangers of fire, were not sufficient to stem interest and resultant fire play.

Keywords: Preschoolers; Fire play; Fire setting; Parental perceptions; Prevention

1. Introduction

Interest in fire by preschool children is believed to be somewhat common, reflecting developmentally appropriate curiosity about the environment (Kafry 1980). There are many reasons why some young children are drawn to fire. The fire itself may be intriguing, as the flames are dynamic, changing in colour and configuration and responsive to a child's breath or movement. The object that creates the flame (e.g. lighters, matches) may also intrigue the child. Some preschoolers who have set fires with barbecue lighters apparently believed the product to be a toy (Meiers 1996).

Although parents often admonish children not to touch these items, some children cannot resist. Preschoolers, who enjoy imitating the behaviours of their parents, particularly relish using realistic objects in their role play activities (Bandura 1977). Further, preschoolers have an interest in operating objects in order to create an effect and master their environment (Lutkenhaus 1984).

Young children are not likely to appreciate the hazards associated with using a lighter or matches. Children's knowledge of fire – what materials can burn, how quickly different materials burn and how to put out fires – is typically inadequate (Cole *et al*. 1986). Further, most have only observed successful match/lighter use, rather than scenarios where unintentional fires have occurred.

The growing incidence of fires set by preschoolers playing with lighters prompted the US Consumer Product

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Safety Commission to enact standards requiring cigarette and utility lighters to be 'child-resistant' (Code of Federal Regulations 1993, 1999). A 'child-resistant' lighter is one that resists operation by 85% of test children, aged 42–51 months. The standards are an important element in reducing child-play fires. However, there are limitations to the standards' effectiveness, including the fact that they do not require lighters to be 'childproof', meaning that some children under the age of 5 years are still capable of actuation. Further, the standards do not apply to expensive, refillable lighters. While the standards have been able to significantly reduce the number of child-set lighter fires (Smith *et al*. 2002), the design changes mandated through these regulations cannot prevent all child-play fires.

Another important factor for overcoming child-play fires is preventing access to fire-starting devices. Children gain access to matches and lighters when adults bring these items into the home. Therefore, it is essential that parents of preschoolers are aware of their child's risk for fire-play activities and how to deal with this proclivity in terms of how and where to store their matches and lighters. Yet parents are not necessarily good judges of risks to their children at home. In a study of perceived risks in the home, parents of 1-, 2- and 3-year-olds expressed relatively low concern for hazards in the home (Garling and Garling 1993). In particular, the bedroom, family room and playroom were identified as areas of the home that were generally safe for children to play in, alone. This may be due to the presence of plush furniture in these rooms and the relative absence of open and obvious hazards, as compared to the kitchen or bathroom. Contrary to parental perceptions, however, the bedroom and living room are actually common locations where child-related injuries occur. Hu *et al*. (1993) reported that falls from plush furniture to be the most frequent reason for admission to the emergency room of a paediatric trauma centre. Studies on child fire-setting behaviour have determined that the bedroom is the location where most fires started by preschoolers occur (Harwood 1987, Hall 2000, Porth and Hughes 2000).

Failing to perceive risks, parents may not supervise children as closely as they might if they had safety concerns. Even when risks are perceived, constantly watching one's children may be impossible, particularly with multiple children and given the chores and obligations of running a household. For example, it is difficult to constantly supervise one child in the bathtub and also constantly supervise another child in a different room of the home. In their study of reported supervision levels of children while they are in the bathtub, Simon *et al*. (2003) learned that many parents reported leaving their young children at times inadequately supervised in the bathtub. A study of parental perceptions, attitudes and behaviours towards child safety in European countries found that the most common response given as to why some parents find it difficult to protect their children from accidental injury was not being able to watch their children constantly (Vincenten *et al*. 2005).

Other studies have also reported that parents of young children do not supervise their children directly at every minute of the day (Peterson *et al*. 1993, Pollack-Nelson and Drago 2002, Morrongiello *et al*. in press). In Pollack-Nelson and Drago's (2002) study of supervision practices of parents with children aged 2–6 years old, they found 98% reported that there were times when their child(ren) were out of sight while they performed chores in a different room. Further, while most children in this sample reportedly got out of bed in the morning before a parent, 95% of respondents did not perceive their children to be at risk of injury if awake in the morning before a parent. Similar to Garling and Garling's (1993) findings noted above, this study also found the bedroom to be an area of the home that was perceived to be safe for children to play alone. A recent study by Morrongiello *et al*. (in press) examined reported supervision levels in children aged 2–5 years. Researchers found that while children were supervised more often than unsupervised, they were reportedly completely out of view of supervisors for about 20% of their waking time.

One reason that parents may not feel the need to directly supervise their children is their failure to appreciate risks in the home, including but not limited to matches and lighters. A study by Morrongiello *et al*. (1996) found that some parents perceive injuries largely as a natural consequence of childhood and that children learn about risk avoidance from injury experiences. The authors also reported that respondents believed that children naturally fear danger and can recognize danger for themselves. This overestimation of children's abilities could lead to adults providing inadequate protection from possible injury.

The perception that children are safe in the home extends beyond perceptions of the child's ability. It is also based on one's belief that their home is a safe place for the child to be in (without direct supervision). Yorkston *et al*.'s (2005) study of self-report home safety practices found that parents significantly underestimated home hazards and over-reported safety practices. Similar findings were reported by Evans and Kohli (1997), who hypothesized that some parents develop a sense of 'complacency' towards familiar household objects, even if they pose a potential hazard. This explains why, in some cases, children have started fires with lighters and matches that they obtained from readily accessible locations, such as a coffee table, drawer or kitchen counter.

The purpose of the present study was to learn about current risk perceptions held by parents of young fire-setters. Understanding parent perceptions regarding this hazard is important for knowing how to prevent child-play fires, as parents' perceptions and associated preventive

behaviours are key. It was hypothesized that these parents fail to appreciate their children's interest in matches/lighters and the risk of fire play.

2. Methods

2.1. *Study design and instrument*

A 41-item survey was designed to capture parental perceptions of the child-play fire hazard and information regarding children's prior fire-setting experience. Surveys were distributed to parents whose children were participating in fire-setting intervention programmes due to a fire-setting incident. From April 2002 to July 2003, 60 surveys were collected; three surveys were discarded due to the inability to obtain accurate information. The resulting 57 surveys included representation from participating municipalities in: Broward County, FL (11 surveys); Duluth, MN (five surveys); Houston, TX (11 surveys); Indianapolis, IN (12 surveys); King County, WA (two surveys); Phoenix, AZ (nine surveys); Pierce County, WA (two surveys); Portland, OR (five surveys; and Rochester, NY (five surveys). Data collection was challenged by the lack of young children sent to juvenile fire setting intervention programmes, as well as the lack of programmes on a nationwide basis. Further, some parents of young fire setters do not report the incident to fire officials and therefore would not be directed to a fire safety programme.

Data collection was coordinated by SOS Fires: Youth Intervention Programs, a non-profit organization for fire-setting intervention services. Juvenile fire-setting intervention professionals administered surveys, in writing or verbally. Directions for survey completion were printed on the cover sheet of each survey. An informed consent document was signed. No identifying information was included. Data were analysed using SPSS, version 11.0 (SPSS Inc., Chicago, IL, USA).

Two forms of the survey were distributed, based on the fire-starting device used by the child – one for matches, the other for lighters. Both versions contained identical content. The first section of the survey presented 18 questions concerning parents' perceptions of their children and fire play including: children's interest in and ability to use lighters/matches; children's awareness of fire risk; whether or not parents felt they had stored their matches/lighters out of reach; and whether or not they believed their children would climb to access matches/lighters. Questions were answered on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The second section of the survey included 19 questions presented in various formats (open-ended, Likert scales, direct answers). These questions probed issues relating to children's experiences with fire including the number of times the parent had observed the child playing with matches/lighters and the number of times that child had started a fire and the location where lighters were kept in the home. Some questions in this section were redundant with those in the first section for cross-validation purposes. Finally, four demographic questions inquired as to the age of the child, number and ages of other children in the home and the number of smokers in the home.

2.2. *Respondents*

Parents of 57 preschoolers, aged six years and younger who were attending fire safety and prevention classes, completed the survey. The preschoolers had previously engaged in some form of fire play and had been requested and/or required to attend a fire safety prevention and education workshop with their parents. These children ranged in age from 1.33 to 6.5 years, with the mean age of 4.07 (SD 1.00) years; modal age was 5 years. There were no 2-year-olds in the sample.

Including the fire setter, there was an average of 2.78 children per household. The ages of children in residence with the juvenile fire setter ranged from 6 months to 15 years. The modal age was 7.69 years of all children in the household.

Caregivers present at the time of the fire-setting incident ranged in age from 14 to 65 years, with a mean caregiver age of 32.17 (SD 12.15) years; modal age was 25 years. Families with a person in the home who smoked comprised 70.1% ($n = 40$) of the sample.

3. Results

3.1. *Location of most recent fire-setting activity and location of parent*

Most respondents (74%) reported that their children's most recent fire-setting activity occurred in a bedroom ($n = 42$). Of those, 44.6% ($n = 25$) specified the child's bedroom and 22.8% ($n = 13$) the parents' bedroom.

At the time of the fire incident, most parents reported being inside the home (84.2%). Only 15.8%, ($n = 9$) were outdoors. Caregivers were involved in various activities at the time of the incident including tending to another child, sleeping, showering, watching TV, cooking, working or talking in another room. Others reported being at home, but outside (e.g. in a vehicle, outside smoking). In one case, the parent reported being away from the home. (Three respondents either did not know or did not respond.)

Figure 1 shows parents' location at the time that the fire was set. As is evident, parent activity outside the home increased with child's age. Whereas parents of children aged 3 years and younger all reported being inside the home during the fire event, some parents of children aged 4 years and older did report being outside at that time. Specifically,

16.6% of respondents with 4-year-old fire starters and 26.0% of those with 5-year-old fire starters reported that they were engaged in some activity outdoors at the time of the incident.

3.2. *Children's fire experience*

Nearly three-quarters of the children used lighters to start the most recently set fire (73.2%; $n = 41$). The rest 26.8% ($n = 15$) used matches. In 76.8% of cases, assistance from the fire department was needed; 71.4% of the fires resulted in property damage. Personal injuries occurred in 25% of the cases. There was one fatality.

Parents were asked about their child's fire-setting history. About 63.6% reported having witnessed their child play with match/lighters. When asked the number of times their child had started a fire, the average response was 1.42 fires. However, with the large standard deviation (2.36), it is apparent that there was a good deal of diversity in the number of fires started. Table 1 breaks this out further, showing the frequency of fire starting episodes. Of the 57 children, 21 had set a fire more than once. Six of the children had set fires five times or more. Excluding those who had set five or more fires, the mean number of fire starts was 1.25 (SD 1.41; $n = 51$).

3.3. *Parental perceptions of child interest in fires, lighters and matches*

Parents reported on their child's interest in matches/lighters prior to the fire. Using a 5-point scale, where '1' indicated strong disagreement, and '5' represented strong agreement,

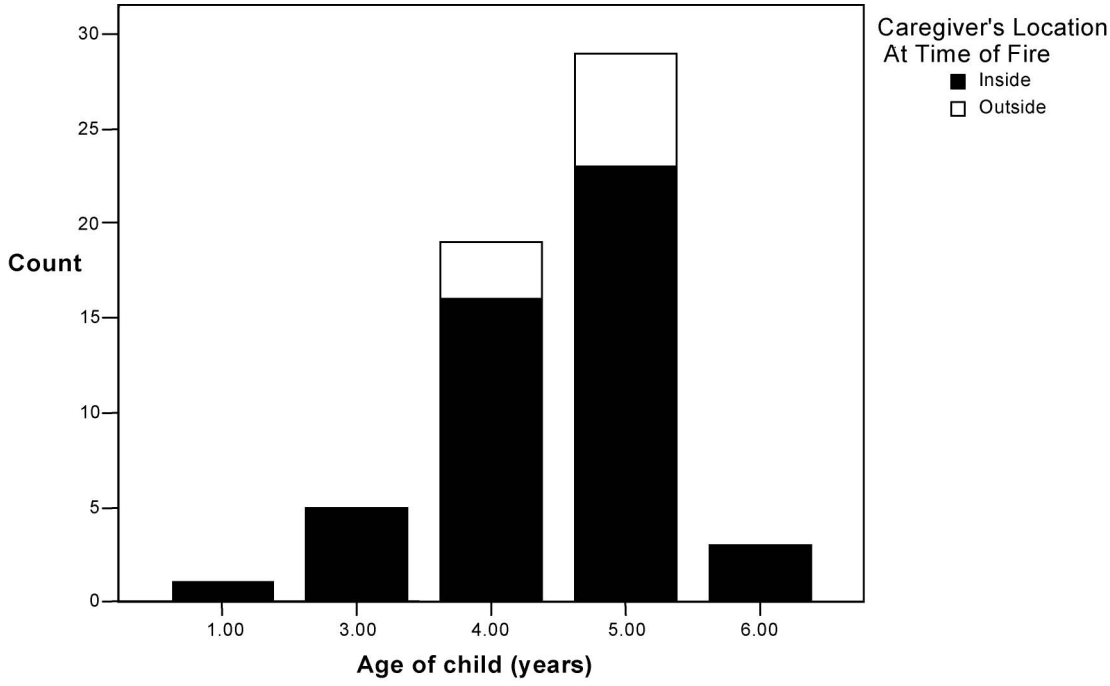

Figure 1. Location of caregiver at time of fire.

Table 1. History of fire play.

Frequency of child fire starts	Parents reporting	Percentage	Frequency of parent observations of child fire play	Parents reporting	Percentage
0	15	26.8	0	20	36.4
1–2	35	62.5	1–2	22	40.0
3–4	4	7.1	3–4	7	12.8
5–6	1	1.8	5–6	2	3.6
7–8	0	0.0	7–8	0	0.0
9–10	0	0.0	9–10	3	5.5
>10	1	1.8	>10	1	1.8

respondents were asked if, prior to this particular fire-setting incident, their child had expressed interest in fire. The average response was 2.98 (SD 1.27); about half of parents (47%, $n = 27$) indicated that their child had not previously expressed interest in fire and half indicated that their child had.

Most respondents – 65% ($n = 37$) 'agreed' or 'strongly agreed' that, prior to the fire, they 'did not believe that their child would play with matches/lighters'. The average response to this question was 3.57 on a 5-point scale (SD 1.18). In fact, 30% of respondents felt 'surprised' by the fire-setting event. Six of those who felt surprised had children who had previously set at least one fire.

There was a weak, but significant correlation between parents' perception of their children's interest in lighting the fire ('my child has expressed interest in fire') and number of times children had played with matches/lighters ($r = 0.294$, $p = 0.028$). However, there was no significant correlation between number of times child had been observed playing with matches/lighters and parent's belief that their child would play with lighters or matches.

3.4. *Parental perception of match/lighter accessibility*

Most parents ($n = 35$) reported that matches/lighters were typically obtained from locations such as on top of the refrigerator and kitchen cupboards. Only 18.6% ($n = 10$) indicated that the matches/lighters were in what they considered to be 'readily-accessible' locations, such as on table/desk or fireplace area. The 12 remaining parents stated they had 'no idea' where the child had gotten the matches/lighters or the information was incomplete.

Parents were asked if they believed that their child would climb on something in order to obtain matches or lighters. Less than one-quarter (23.6%) believed that their child would climb to reach matches or lighters. Yet 40% reported that their child had climbed on something in order to obtain the matches/lighter used for the most recently set fire. It is interesting to note that in the one fatality reported, a 5-year-old had climbed on top of the refrigerator to access matches that the mother felt were well hidden.

3.5. *Parental perceptions of children's abilities to use matches/lighters and handle fire*

Parents were asked if, before the fire occurred, they thought their child did not know how to use matches/lighters. Most, 61.4% ($n = 35$), 'agreed' or 'strongly agreed' with that statement; the mean response was 3.61 (SD 1.01).

More than half of parents (65%) also did not think their children could extinguish a small fire. On the 5-point Likert scale, the average response to the statement: 'I thought my child could extinguish a small fire' was 2.30 (SD 1.24). Parents were asked if (prior to the fire) they believed that their child 'was incapable of starting a fire that would get out of control'. The mean response was 3.47 (SD 1.81).

3.6. *Parental perceptions of children's awareness of fire danger*

The majority of respondents – 70.2% ($n = 43$) – thought their children knew the dangers of playing with matches and lighters (mean 3.93; SD 0.96). Half (50.8%; $n = 29$) believed their children had received some education in school or day care regarding the danger of fire (mean 4.07; SD 1.27). The majority (86.0%; $n = 49$) of parents indicated their children had observed fire being used for a task or tool.

3.7. *Behavioural interventions*

The survey inquired as to whether or not parents had taken steps to stem their child's fire activity/interest. As seen in table 2, parents reported having taken various preventive measures to thwart fire play. For example 82.5% ($n = 50$) 'agreed' or 'strongly agreed' with the statement that they 'took precautions to keep matches/lighters out of reach of their child' (mean 4.07; SD 1.03).

More than 80% of respondents stated that they either 'agreed' or 'strongly agreed' with statements that they had 'spoken with their children about the dangers of playing with matches/lighters . . . ' (82.5%)' . . . and fire' (84.3%). As shown in table 2, for each of these statements, the average response was over 4 on the 5-point scale.

Parents were slightly less confident that they had 'effectively explained the dangers of fire to their child'. For this question, the mean response was 3.93. Three-quarters of respondents 'agreed' or 'strongly agreed' with this statement.

3.8. *Parental reaction*

As shown in table 3 common responses to the fire-setting event included: talking to the child (20%); feeling scared or angry (18%); and calling the emergency services (911) (16%). In only a few cases, the parent scolded (3.6%) or spanked the child (1.8%). In one case, the caregiver blamed a spouse for the incident (1.8%).

4. Discussion

Consistent with earlier studies of child-set fires, parents were at home for the majority of the fires set by their children (Harwood 1987, Hall 2000). Parental presence clearly did not thwart fire interest and exploratory fire-setting behaviour for these children. However, it may

Table 2. Behavioural interventions taken by parent.

Question: Before the fire occurred...	Mean	SD
I took precautions to keep matches/lighters out of reach from my child	4.07	1.03
I told my child about the dangers of playing with matches/lighters	4.16	0.98
I told my child the danger of playing with fire	4.18	0.98
I thought I had effectively explained the dangers of fire to my child	3.93	1.27

Table 3. Parent responses to fire.

Parent reaction	Frequency	Percentage
Surprise/couldn't believe it	17	30.4
Talked to child	11	19.6
Scared/angry	10	17.9
Called emergency services (911)	9	16.1
Put fire out	3	5.4
Yelled/scolded	2	3.6
Cried/felt bad	2	3.6
Spanked child	1	1.8
Blamed spouse	1	1.8

have capped the severity of these incidents; most incidents resulted in property damage rather than injury.

The young children reported on in this study appeared to have been aware that fire play is prohibited, as they typically took this activity to a bedroom, rather than engaging in fire play in a more public area. This finding is consistent with other researchers' findings (Harwood 1987, Hall 2000, Porth and Hughes 2000). Not only does a bedroom afford the child a 'private' place to use matches or lighters but, as other studies indicate, parents may not be concerned by a child who goes into the bedroom to play.

In some cases, parental perceptions were in line with children's fire-setting history. For example, increased fire-play activity was associated with elevated (parental) perceptions of children's fire interest. Whilst this relationship is to be expected, not all perceptions were consistent with prior fire-play experience. Specifically, there was no significant relationship between frequency of prior involvement with matches/lighters and parent's belief that their child would play with matches/lighters. That is, even parents whose children had played with matches/lighters previously still did not necessarily think that their child would play with lighters/matches again. This finding shows that parents either do not appreciate the 'draw' lighters/matches have for their children or they believe that prior education (including scoldings) would be effective deterrents. Either way, it is evident that some parents do not fully appreciate their child's susceptibility to fire play, despite prior episodes.

Parents' failure to recognize their child's susceptibility is also evident in the finding that nearly one-third of respondents felt 'surprised' by the fire-setting event. Moreover, a number of those who expressed surprise at their child's fire setting had actually observed their children play with matches or lighters previously.

A number of factors may contribute to parents' failure to appreciate the risk of child fire play. One is the belief that they have taken precautions to prevent such behaviour. For example, most respondents reported keeping matches and lighters out of reach. Despite such efforts, the desire of a young child to use a match or lighter can be so strong that she/he will climb to reach lighters/matches that parents ordinarily consider to be 'inaccessible'. This was reflected in the results obtained in this study, as fewer than one-fourth of parents believed that their children would climb to reach matches/lighters, yet 40% of children actually did climb in order to reach fire-starting materials.

Thus, one of the most common precautionary measures – storing matches/lighters 'out of reach' – can be ineffective, since young children are skilful climbers. It could be argued that parents should realize that children will be able to climb to reach matches/lighters that are stored up high, as many have previously observed their children's climbing prowess (e.g. on playgrounds, stairs, etc.). However, storing a lighter/match up high may be considered the only practical solution by busy parents who need these items to be accessible to them for household tasks, without being (in their opinion) readily accessible to a child. Further, parents who use height as a deterrent may simply be underestimating the draw of lighters/matches to their child.

Another precautionary measure taken by most parents in this study was talking with children about the dangers of fire, matches/lighters. While such discussions are important, they clearly were unable to suppress the child's curiosity. This is consistent with study findings demonstrating that informational intervention alone was insufficient to prevent young children from playing with guns (Hardy *et al*. 1996).

Another factor that may contribute to parents' failure to appreciate the fire-play risk is their erroneous overestimation of children's understanding of the hazard. Parents in this study reported that they thought their children knew the dangers of playing with matches and lighters. Also, many parents reported that they thought their children had learned of these hazards at school or day care.

It should be noted that the small sample size and large standard deviations to many questions were limitations of this study. As indicated earlier, there are serious challenges to obtaining sample participants for this type of research. An additional limitation of note was the fact that parents were asked to recall their pre-existing risk perceptions *after* the fire event occurred. Obviously, this limitation was necessitated by the fact that we do not know in advance and therefore cannot sample those persons whose children will ultimately set fires.

5. Conclusions

A number of key findings are noted in this study. First, most of the fires that resulted in the children's involvement in a fire intervention programme were started while parents were at home. Thus, the presence of a parent or caregiver did not inhibit fire play. Second, parents often underestimated their children's interest in and ability to use matches/lighters. They also underestimated the likelihood that their children would play with matches/lighters – in some cases, despite their having observed prior use of these devices. Clearly, parents' perceptions of their children's proclivity for fire play are not consistent with actual fire-play behaviour. Third, parents may overestimate the effectiveness of precautionary measures. Traditionally relied upon precautionary techniques such as storing lighters out of reach and discussing the dangers of fire, matches/lighters with children were not sufficient to stem their interest and resultant fire play.

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