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ABSTRACT

For this study, information was obtained about accidential injuries among children in day care centers (DCC) and family day care homes (DCH) in North Carolina. An Accident Survey Questionnaire was used to report injuries that required treatment by a staff member, doctor, or nurse. Results of data analyses showed that: (1) falls were the leading cause of injuries in DCCs, and falls and human bites were the leading causes of injuries in DCHs; (2) the equipment most frequently associated with DCC injuries was playground climbing structures; (3) injuries for DCCs and DCHs were almost evenly divided among outdoor and indoor locations; (4) abrasions and cuts were the most commonly reported injuries overall; (5) the head and upper extremities were the most frequently injured parts; and (6) the two most hazardous days of the week were Thursday and Wednesday for both DCC and DCH. Results showed injury rates to be almost twice as high in DCHs as in DCCs; however, DCHs had a better record regarding severity of injuries. Data from previous investigations indicates that children may be safer in day care than they are at home or in other settings. (SH)

Accidental Injuries Among Children in Day Care Centers and Family Day Care Homes

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Over a decade ago, Pizzo and Aronson (1976) warned that "In the areas of emergency preparedness, accident prevention, fire and burn prevention, (and) detection of lead paint...day care centers are woefully inadequate" (p. 4). More recent investigations have confirmed that significant hazards exist in day care centers and family day care homes (Aronson, 1983; Davis & McCarthy, 1988; Wasserman, Dameron, Brozicevic & Aronson, 1989). Aronson (1983) concluded that accidental injuries to children represent one of the most significant problems faced by child care providers. However, current studies are inadequate to determine whether actual injury rates and severity of injuries are consistent with warnings about safety hazards in day care facilities.

The purpose of this study was to obtain information about the incidence and epidemiology of accidental injuries among children attending day care centers (DCC) and family day care homes (DCH) in North Carolina.

Methodology

An Accident Survey Questionnaire was mailed to approximately ten percent of the child day care facilities in North Carolina selected randomly from a list provided by the North Carolina Office of Child Day Care Licensing. Out of the 622 facilities surveyed, a total of 163 (26.2%) questionnaires were returned from which 148 responses were sufficiently complete for use in data analysis. The responses included 77 day care centers (DCC) and 71 family day care homes (DCH). A total of 4041 children, ages birth to 9 years of age were enrolled in the 148 facilities, including 3663 DCC participants and 378 DCH participants.

The respondents were asked to report all injuries that occurred during

the one month (30 days) period prior to the receipt of the questionnaire. A reportable injury was defined as an injury that required treatment by a facility staff member, a doctor, or a nurse. A medically treated injury was defined as one that was treated by a doctor at a medical facility. Information was requested for each injury on the age and sex of the accident victim, the type, cause, place of occurrence, body part injured, day and time of injury, the body part injured, severity and treatment of the injury.

Results

From the 148 facilities responding, a total of 66 injuries were reported by 26 DCC's and 9 DCH's over the one month designated time period. The DCC's accounted for 55 of the injuries while the DCH's reported 11 injuries. Fifty-one of the 77 DCC's had no injuries while 62 of the 71 did not report any injuries. The average number of injuries was .71 per DCC and .15 per DCH.

Injury Rates. The overall injury rate for all facilities combined was 19.6 injuries per 100 children per year. When calculated according to the type of care, the rate for the DCC's was 18 injuries per 100 children per year. The injury rate for DCH's was 34.9 per 100 children per year.

The respondents indicated that out of the 66 total injuries, 14 (21.2%) were severe enough to require medical attention from a doctor. Consequently, separate rates were calculated for the more severe injuries. The medically attended injury rate for all facilities combined was 4.16 per 100 children per year. All of these injuries occurred in the DCC's. Consequently, the annual rate for DCC medically attended injuries is 4.6 per 100 children per year, while the DCH medically attended rate is 0.

Sex and Age. More accidents occurred among male than female children. Sex differences in injury frequencies were more pronounced in the DCC than the

DCH facilities (see Table 1). When the factor of age is considered, the largest number of injuries in the DCC's were reported for the 4 and 5 year olds (see Table 2). The DCH's had the largest number of injuries in the birth to two-year-old age group. Overall, age differences in injuries reported are not particularly striking.

Additional Findings. The results of the data analyses for the causes, location, types, body parts, and time of injuries are briefly summarized as follows:

1. Falls (from playground equipment or while running) were the leading cause of injuries in the DCC's (see Table 3). Falls while running and human bites were the most frequent causes of injuries in the DCH's. Most of the injuries in both types of facilities were self-inflicted.

2. The type of equipment most frequently associated with DCC injuries was playground climbing structures. Most of the medically attended injuries involved playground equipment. None of the DCH injury reports included equipment of any type.

3. For both DCC's and DCH's, the injuries were almost evenly divided among outdoor and indoor locations (see Table 4). The most hazardous indoor place was the classroom for the DCC's and the livingroom/den for the DCH's. Outdoors, the most hazardous place was the playground for both types of facilities.

4. Abrasions and cuts were the most commonly reported injuries, overall (see Table 5). The two leading types of injuries for the DCC's were minor abrasions and cuts. In the DCH facilities, bruises and bites (human) were the two most frequently reported

injuries. The injuries requiring medical attention included more serious cuts, broken bones, and abrasions.

5. The head (including parts above the neck) and the upper extremities (arms, hands, fingers) were the body parts most frequently injured in both types of facilities accounting for more than 75% of all injuries (see Table 6).

6. The two most hazardous days of the week were Tuesday and Wednesday for the DCC and DCH's (see Table 7). The injuries were almost evenly divided among the morning and afternoon hours in both types of facilities (sse Table 8).

Conclusions

The results of the present study found injury rates to be almost twice as high in DCH's as they were in DCC's. However, when the severity of injury is considered, DCH's has a better record since all of the doctor attended injuries took place in DCC's. The difference in the severity of injuries between the two types of facilities may be partially explained by the type of play equipment available. Many (36%) of the more severe injuries in this study, as well as injuries reported by Sacks, Kaplan, Lambert, Sattin, & Sikes (1989), were associated with playground equipment that is typically not available in DCH arrangements.

Injury rates as well as other findings of the present study need to be considered in the context of the study's potential limitations. The 26% response rate may not be sufficiently representative of the day care facility population for the results to be meaningful. Day care operators may be suspicious of researcher motives and concerned that injury reports will reflect negatively on their facility in particular and day care in general.

The results of the present study are thus likely to be an underestimate of injury rates in day care facilities. However, the findings are somewhat consistent with other investigations. The annual medically attended rate (4.16 per 100) for DCC's reported here falls within the range of 2.86 (per 100) reported by Sacks, et al., (1989) and 7.02 (per 100 children) reported by Landman and Landman (1987). Unfortunately there are no injury rates in the existing literature for comparison with the DCH findings.

Comparison of the medical injury rate found in the present study with rates reported in other investigations is difficult and inexact, but may provide a rough estimate of the relative injury risk children face in day care versus other settings. Rivara and Mueller (1987) provide an estimate of 23.75 injuries per year (per 100 children) for non-day-care population based emergency room treated unintentional injuries. Gallagher, Finison, Guyer, and Goodenough (1984) estimate that annually there are 10.47 (adjusted for time) injury-related emergency room visits per 100 children. Even if the rate for the present study is doubled, the result compares favorably with the lowest estimated rate of non-day-care children within the same age range. Thus it appears that children may be safer in day care than they are at home or in other settings.

The predominance of injuries we found for males is consistent with injury incidence by sex in general population studies (Rivara, Bergman, Logerfo, & Weiss, 1982), but not with most of the day care reports (e.g. Sacks et al., 1989). The incidence of injuries that we found among 4-to-5 year olds in DCC facilities contrasts with other studies (Chang, Lugg, & Nebedum, 1989; Elardo, Solomons, & Snider, 1987; Garrard, Leland & Smith, 1988) that show injuries in day care tend to be more prevalent among toddlers (approximately

13-24 months). However, those reports are consistent with our DCH findings.

We found that falls, especially from playground equipment, are a major cause of injury, and that young children tend to injure a body part above the neck. These findings are consistent with day care (Chang et al., 1989) and general population injury studies (Cline et al., 1989; Gallagher et al., 1984).

The leading types of injuries which we report are abrasions, cuts, bruises and bites. Although percentages of incidence vary among studies, the same types of injuries are reported in other in other day care investigations (Chang et al., 1989; Solomons, Lakin, Snider, & Peredes-Rojas, 1982). In contrast to general population studies (e. g. Rivara & Mueller, 1987), but consistent with other day care reports, we did not find any poisoning, or burn injuries. Day care studies that report injuries by day of week or time of day are not sufficiently consistent to provide a basis of comparison with our results.

Injury Prevention

While it appears that DCH and DCC facilities are as safe, if not safer, than other environments for children, the results should not be interpreted to mean that injuries in child care centers are not a significant problem. Day care injury studies, including the present investigation, indicate that most injuries can be prevented through environmental modification and increased vigilance by caregivers. Priority should be given to the prevention of falls from running or from playground equipment. Educational programs about accident prevention should be made available to caregivers in all types of day care facilities.

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Table 1

Frequency of Injuries By Sex

Sex	DCC		DCH		Combined	
	N	%	N	%	N	%
Female	19	(34.5)	5	(45)	24	(36.4)
Male	36	(65.5)	6	(55)	42	(63.6)
Totals	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers

DCH: Day Care Homes

Table 2

Frequency of Injuries By Age of Children

Age	DCC		DCH		Combined	
	N	%	N	%	N	%
B - 2 years	8	(14.6)	7	(64)	15	(22.7)
2 - 3 years	10	(18.0)	-	-	10	(15.2)
3 - 4 years	11	(20.0)	2	(18)	13	(19.7)
4 - 5 years	14	(21.8)	2	(18)	16	(24.2)
5 + years	12	(21.8)	-	-	12	(18.2)
Totals	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers

DCH: Day Care Homes

Table 3

Frequency of Injuries By Cause

Cause	DCH		DCC		Combined	
	N	%	N	%	N	%
Fall/Climbing Equipment			7	(12.7)	7	(10.6)
Fall/Running	3	(27.3)	12	(21.8)	15	(22.7)
Bite/Human	3	(27.3)	5	(9.1)	8	(12.1)
Thrown object			4	(7.3)	4	(6.0)
Bee sting			3	(5.5)	3	(4.5)
Rough play			3	(5.5)	3	(4.5)
Door slam			3	(5.5)	3	(4.5)
Ran into person/object	1	(9.0)	6	(10.9)	7	(10.6)
Other	4	(36.4)	12	(21.8)	16	(24.2)
Totals	11	(100)	55	(100)	66	(100)

DCH: Day Care Homes

DCC: Day Care Centers

Table 4

Frequency of Injury By Place of Occurrence

Place	DCC		DCH		Combined	
	N	%	N	%	N	%
Playground	25	(45.5)	1	(09)	26	(39.4)
Parking area	1	(01.8)	1	(09)	02	(3.0)
Sidewalk	2	(03.6)	1	(09)	03	(4.5)
Away from DCH			1	(09)	01	(1.5)
Total Outdoors	28	(50.9)	4	(36)	32	(48.5)
Classroom	20	(36.4)	1	(09)	21	(31.8)
Livingroom/den			5	(46)	05	(7.6)
Kitchen			1	(09)	01	(1.5)
Other	7	(12.7)			07	(10.6)
Total Indoors	27	(49.1)	7	(64)	34	(51.5)
Overall Totals	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers

DCH: Day Care Homes

Table 5

Frequency of Injuries By Type

Type	DCC		DCH		Combined	
	N	%	N	%	N	%
Abrasion	15	(27.3)	2	(18.2)	17	(25.8)
Cut	10	(18.2)	1	(09.1)	11	(16.2)
Bruise	5	(09.0)	4	(36.4)	9	(13.6)
Swelling/bump	9	(16.4)			9	(13.6)
Bite	6	(10.9)	3	(27.2)	9	(13.6)
Broken bone	3	(05.5)			3	(04.5)
Nosebleed	1	(01.8)			1	(01.5)
Other (dental, bit lip, etc.)	6	(10.9)	1	(09.1)	7	(10.6)
Total	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers

DCH: Day Care Homes

Table 6

Frequency of Injury By Body Part

Body Part	DCC		DCH		Combined	
	N	%	N	%	N	%
Head (above the neck)	31	(56.4)	5	(45.5)	36	(54.5)
Upper extr. (arms, hands, fingers)	15	(27.3)	3	(27.3)	18	(27.3)
Trunk (chest, shoulder, stomach)	2	(3.6)	2	(18.2)	4	(6.0)
Lower extr. (knees, legs feet)	7	(12.7)	1	(9.0)	8	(12.1)
Totals	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers

DCH: Day Care Homes

Table 7

Frequency of Injuries by Day of Week

Day	DCC		DCH		Combined	
	N	%	N	%	N	%
Tuesday	12	(21.8)	5	(45.6)	17	(25.8)
Wednesday	12	(21.8)	2	(18.2)	14	(21.2)
Monday	9	(16.4)	2	(18.2)	11	(16.7)
Friday	8	(14.6)	1	(9.0)	9	(13.6)
Thursday	5	(9.0)			5	(7.6)
Unspecified	9	(16.4)	1	(9.0)	10	(16.4)
Totals	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers

DCH: Day Care Homes

Table 8

Frequency of Injuries by Time of Day

Time	DCC		DCH		Combined	
	N	%	N	%	N	%
AM	26	(47.2)	6	(45)	32	(48.5)
PM	28	(50.9)	5	(55)	33	(50.0)
Unspecified	1	(1.9)			1	(1.5)
Total	55	(100)	11	(100)	66	(100)

DCC: Day Care Centers DCH: Day Care Homes