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Self-Reported Supervisory Behavior and Beliefs vs. Actual Observations of Caregiver Behavior at Beaches

Lauren A. Petrass, Jenny D. Blitvich, and Caroline F. Finch

This study examined self-reported supervisory behaviors of caregivers at beaches and ascertained whether self-reported supervision reflects observed behavior. Observations were conducted of caregiver/child pairs at 18 Australian beaches, with questionnaires subsequently completed by caregivers. Caregivers identified visual contact as essential for close supervision and proximity a key determinant in distinguishing supervision and close supervision. Supervisory behavior was associated with child age, while lifeguard patrol had no effect on supervision. All supervision statements from the PSAPQ-BEACH were associated with supervision. Only three statements were significant independent predictors of supervision. Comparisons suggest caregivers' self-reported supervisory behavior reflects actual supervision. As this is the first study of its kind, it is essential that further prospective research using mixed-method approaches build on this information.

In Australia, like most developed countries, unintentional injuries are the leading cause of premature death and hospitalization for children after the first year of life (World Health Organization, 2008). The burden of child injury is reflected in both statistics and health care costs. Despite a dearth of literature on the costs of child injury, it is clear that the economic and social burden associated with child injury is substantial (World Health Organization, 2008). Because of the scope of this health issue, there have been numerous calls for research to elucidate factors that contribute to child injury (Miller, Romano, & Spicer, 2000).

One risk factor consistently linked to children's injury in the home (Morrongiello & Corbett, 2006; Morrongiello, Ondejko, & Littlejohn, 2004), aquatic environments (Blum & Shield, 2000; Bugeja & Franklin, 2005; Ross, Elliott, Lam, & Cass, 2003), and supermarkets (Harrell, 2003) is the role of caregiver supervision. To date, our understanding of this relationship is limited by the use of different methodologies to examine supervision and child injury (Schwebel & Kendrick, 2009). A recent systematic review (Petrass, Finch, & Blitvich, 2009) highlighted the range of methodologies used and concluded that many studies are of low to moderate quality. Self-report was most common but corresponded to the lowest possible quality of evidence (Petrass et al., 2009).

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An important methodological concern is the validity of self-reported behavior (Nelson, 1996). The potential for inaccurate reporting has been attributed to social desirability in which participants substantially underreport socially undesirable behaviors (Watson, Kendrick, & Coupland, 2003) and overreport socially desirable behavior (Nelson, 1996; Parada, Cohn, Gonzalez, Byrd, & Cortes, 2001; Watson et al., 2003) rather than describe their true actions or beliefs (Watson et al., 2003). Few supervision and child injury studies have validated self-reported supervision practices (Morrongiello & Corbett, 2006; Morrongiello & House, 2004). Although Moran (2009) used a self-report questionnaire in his recent investigation of caregiver supervision in beach settings, to date there are no published validated self-report supervision questionnaires specific to aquatic settings, despite the increased importance of supervision for children near water (Fisher & Balanda, 1997). Consequently, it is unknown whether self-report aquatic studies accurately represent the nature of caregiver supervision or if social desirability may be operating. Therefore this study aimed to (a) develop and validate a self-report supervision questionnaire specific to beach settings, (b) describe the self-reported supervisory behaviors and beliefs of caregivers at the beach, and (c) ascertain how well self-reported supervision at beaches reflects observed supervision.

Method

Participants

Unobtrusive observations were conducted of convenience samples of children (aged 1–14 years) engaged in beach play and their caregivers at 18 popular beaches over weekends and school holiday periods during September-April 2008/09, with questionnaires subsequently completed on site by caregivers who agreed to do so. To maximize survey return rate, participants were followed up by the researcher after approximately 20 min. The study received approval from the University human research ethics committee and consent was implied through questionnaire return.

Procedures

One researcher collected all data to ensure recording consistency, observation instrument familiarity, and to guarantee consistent instructions were provided to caregivers who agreed to complete the questionnaire. A standardized verbal introduction and invitation to complete the questionnaire was delivered in an effort to eliminate caregivers providing socially desirable responses or responses that were not reflective of their actual supervision behavior. As caregivers completed and returned the questionnaire at the beach, all questionnaires were completed in a standardized environment. It is acknowledged that the beach would only be standardized for caregivers at a given beach, not across beaches. All data collection procedures were pilot tested.

A convenience sample of Victorian and Queensland beaches, popular and well frequented sites for family recreation, included both patrolled and nonpatrolled beaches. The timing of data collection was based on convenience with two

strategies implemented for participant selection, as outlined previously (Petrass, Blitvich, & Finch, in press-b). Observations of caregiver supervision and child behavior were recorded on a two-part data collection sheet, with measures coded at two-minute intervals for 20 min. Environmental factors were recorded at the beginning of the data collection day, and at half hour intervals throughout. Details of the instrument development and constructs recorded are reported elsewhere (Petrass et al., in press-b).

Instrumentation

In developing the questionnaire, a broad conceptual approach to supervision and child drowning was adopted, based on risk factors identified in the literature, Morrongiello's conceptual model of child-injury risk factors (Morrongiello, 2005), and Moran's drowning risk framework (Moran, 2006). While data on some identified variables have been considered in other supervision studies (Morrongiello et al., 2004; Wills et al., 1997), there was a need for a questionnaire that measured beach relevant constructs. A new questionnaire "Kids @ Beach" was designed and, unlike many previously-used supervision questionnaires (Petrass et al., 2009), this underwent extensive testing to establish validity and reliability.

The "Kids @ Beach" questionnaire was a self-report, forced-choice response questionnaire designed for completion at the beach. It contained four main sections. Section A collected information on caregiver supervision practices (e.g., "Which of the following best describes what you do to ensure the safety of your child when they are in/near the water at the beach?"), beach practices (e.g., "How often do you ensure that your child swims between the red and yellow flags?"), and perception of drowning risk (e.g., "Please indicate the risk of drowning you feel your child is at when at a patrolled surf beach, if they were constantly supervised?"). The modified PSAPQ-BEACH was included as section B (Petrass, Blitvich, & Finch, in press-a), section C sought profile information about the child, and caregiver demographics were reported in section D.

To establish content validity, the "Kids @ Beach" Questionnaire was presented to Australian and International water safety experts in an interactive workshop at the Australian National Water Safety Conference, 2008 (Blitvich, Petrass, & Finch, 2008). The amended version was piloted with caregiver/child pairs (children aged 8 months–12 years) representative of the intended beach population, as they were known by the researcher to frequent beaches over summer. The pilot study enabled face validity to be determined, instructions and question wording clarified, and ambiguity within questions identified. Feedback was addressed for questionnaire improvement.

The pilot study enabled item reliability assessment via repeat completion over a short time interval (mean 18 days, range 10–24 days). On both occasions, caregivers who had not returned the questionnaire were followed up twice (seven days after initial administration and again seven days later). Caregivers failing to return both test and retest questionnaires were excluded from the reliability sample. Kappa (κ) statistics were used to establish test-retest reliability of nominal survey questions, while weighted Kappa (κw^2) statistics were calculated for questions where the data were ordinal. Reliability was categorized according to the scale of Landis and Koch (1977).

Analysis

To enable matching of observation and self-report, questionnaires and corresponding observational data were allocated unique identifiers. Both observations and questionnaires were double entered into a Microsoft ACCESS database and transferred to Microsoft Excel for cleaning. Predictive Analytics SoftWare (PASW) Version 18 was used for analysis.

Descriptive statistics were used to report caregiver sociodemographics and to summarize self-reported supervisory behavior and beliefs. For every completed questionnaire ($n = 114$), a mean score was calculated for each supervision dimension (attention visual, attention auditory, proximity, continuity, and engagement) based on the individual scores assigned at each of the 10 separate observation points. The mean scores were then entered into a five-factor principal component analysis, and the score coefficients used as weights to compute an overall supervision score. Before parametric statistical procedures were employed, the distribution of the overall supervision score was assessed and found to be approximately normal.

As observations were conducted at 18 different beaches, the data were hierarchical in nature. Accordingly, linear mixed models were used to test for random effects due to beaches and for correlation of random errors within beaches.

One-way analysis of variance (ANOVA) was conducted to compare overall supervision score means across each of the nine supervision statements from the modified PSAPQ-BEACH. Statements that demonstrated an association ($p < 0.25$) with the observed supervision score in the univariate analysis were then included in a multivariate regression analysis to identify significant independent predictors of the overall supervision score. In defining the final model, a backward selection procedure was used with variable stepwise inclusion and exclusion criteria set at $p < 0.05$ and $p > 0.10$, respectively. Model fit was assessed using the R^2 statistic.

Results

Test-retest assessment indicated perfect agreement for 29 (30.6%) questions. All other questions had moderate ($n = 3$, 3.2%), substantial ($n = 15$, 15.8%), or almost perfect ($n = 48$, 50.5%) agreement (Landis & Koch, 1977), thus indicating that the instrument was appropriate for examining caregiver supervision at beaches.

Unobtrusive observation of 183 caregiver/child pairs was conducted; however, removal of missing data (e.g., where the caregiver, child, or caregiver/child pair left the beach for some part of the observation period) reduced the sample size to 165. Of these, 114 caregivers completed the questionnaire, a response rate of 69%. While a majority (62%) of surveys was completed at Queensland beaches, response rates were comparable across states (Queensland 71%; Victoria 66%).

The majority (96%) of questionnaire respondents were parents with relatives, guardians, nannies, or other caregivers accounting for the remaining 4%. More than half (59%) of caregivers were aged 35–54 years, with fewer aged 20–34 years or 55+ years (34% and 7%, respectively). Almost two thirds (65%) of caregivers were female.

Caregiver understanding of the term "supervision" varied. Constant or occasional visual contact from a distance greater than five meters was consistently identified (82.5%), and the majority (78.9%) of caregivers associated close supervision with close proximity or being within arm's reach (Table 1). Further, most (85%)

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Table 1 Parent/Caregiver Understanding of the Terms Supervision and Close Supervision

	Percent Respondents who Rated This Situation as:			
	Supervision		Close Supervision	
Situation	n	%	N	%
Constant visual contact from a distance >5m	50	43.9	24	21.1
Occasional visual contact from distance > 5m	44	38.6	0	0
Visual contact and in close proximity ≤ 5m	15	13.1	64	56.1
Visual contact and within arm's reach	4	3.5	26	22.8
No visual contact but within hearing distance	1	0.9	0	0
Total	114	100	114	100

caregivers rated the role of supervision as very important/important in preventing child drowning, while fewer considered supervision somewhat important (11.6%) or were undecided (3.5%). Three-quarters (74.6%) of participants believed that the caregiver was best able to provide supervision when their child was in/near the water, and slightly less than one-fifth (17.5%) believed that lifeguards were best able to supervise their children. Very few caregivers believed that other children their child was playing with, or adults nearest to their child in the water, could best supervise (4.4% and 3.5%, respectively).

The factor which caregivers identified as most important when supervising varied with child age (Table 2). For children under five years, caregivers were most likely to report close distance and constant watching as key, whereas for children aged 5–9 years, caregivers were most likely to report direct watching of the child. Playing/engaged with the child and close distance with constant watching were also frequent responses for children aged 5–9 years. For the 10–14 year age group, caregivers were most likely to report direct watching as the essential factor.

There was also an association between self-reported supervisory behavior and child age with caregivers reporting closer supervision of younger children (Table 2). Caregivers were most likely to report staying close to their child in the water if the child was aged 0–4 years and less likely to report constant watching only. The inverse was found for caregivers with children aged 5–9 years. Constant watching was also the most frequent supervisory behavior reported by caregivers with a child aged 10–14 years, while staying close to the child in the water was less common.

For almost two-thirds (60.7%) of caregivers, the same level of supervision was reported, regardless of whether their child was swimming inside or outside the flags. More than one-third (35.7%) reported a higher level of supervision if their child was swimming outside the flags, while 3.6% reported decreased supervision if their child was between the flags.

Table 2 Parent/Caregiver Self-Reported Supervisory Beliefs and Behavior, Categorized According to Child Age

	All		Child Age					
			0–4 years		5–9 years		10–14 years	
	N	%	n	%	n	%	n	%
Which factor is most important when supervising your child to prevent drowning?								
Close distance and constant watching	41	36.0	23	62.2	11	25.0	7	21.2
Direct watching of child	34	29.8	1	2.7	13	29.6	20	60.6
Playing/engaged with child	19	16.7	6	16.2	12	27.3	1	3.0
Close distance to child only	13	11.4	7	18.9	6	13.6	0	0
Checking child intermittently	7	6.1	0	0	2	4.5	5	15.2
Total	114		37		44		33	
Which of the following best describes what you do to ensure the safety of your child when they are in/near the water?								
I stay close to my child in the water	46	40.3	32	86.5	12	27.3	2	6.1
I watch my child constantly	41	36.0	4	10.8	23	52.3	14	42.4
I make sure someone is with my child	10	8.8	1	2.7	2	4.5	7	21.2
I tell my child not to go out too deep	11	9.6	0	0	5	11.4	6	18.2
Other*	6	5.3	0	0	2	4.5	4	12.1
Total	114		37		44		33	

* Other = child had completed swimming/beach safety lessons and/or child wears flotation devices.

Linear mixed modeling results showed no significant beach effects, and no significant within-beaches cluster effects (i.e., no significant evidence of hierarchical effects) and no significant departures from the assumptions of independence, normality, and homogeneity of random errors. Therefore, standard techniques for independent observations (ANOVA and multivariable linear regression) were used for the subsequent analysis.

Based on the unadjusted univariate analysis, all nine supervision statements from the PSAPQ-BEACH were associated with observed caregiver supervision (Table 3). The final multivariable linear regression model included only three statements as significant independent predictors of the level of observed supervision (Table 3). Responses to the statement "I have my child within arm's reach at all times when at the beach" accounted for 42.2% of the variance in supervision scores. Of the remaining eight statements, "I hover next to my child" and "I keep a close watch on my child" were the only other significant predictors, accounting for 5.5% and 3.1% of the variance in supervision scores, respectively. The R^2 of the final model was high at 50.8%.

Table 3 PSAPQ-BEACH Items Associated With Observed Level of Supervision

	Univariate analysis			Multivariable analysis			
PSAPQ-BEACH item	F	df	p value	β	95% CI (for β)	*p* value	% contribution to R2
I have my child within arm's reach at all times.	24.154	4	< 0.001	–0.765*	(–1.244, –0.287)	0.002	42.2
I hover next to my child.	21.154	4	< 0.001	–0.815*	(–1.360, –0.270)	0.004	5.5
I keep a close watch on my child.	12.523	4	< 0.001	–0.845*	(–1.495, –0.195)	0.001	3.1
I stay within reach of my child when he/she is playing on the equipment.	17.209	4	< 0.001			ns	
I can trust my child to play by himself/herself without constant supervision.	14.107	4	< 0.001			ns	
I stay close enough to my child that I can get to him/her quickly.	10.663	4	< 0.001			ns	
I know exactly what my child is doing.	10.439	4	< 0.001			ns	
I make sure I know where my child is and what he/she is doing.	5.504	4	< 0.001			ns	
I say to myself that I can trust him/her to play safely.	3.311	4	0.013			ns	

ns = not significant in multivariable analysis, $p > 0.05$

β = Beta coefficient

* The fact that all Beta coefficients were negative for each significant predictor in the final multivariable model indicates that as the score on the PSAPQ-BEACH item increased, the value of the other construct, overall supervision score decreased. This finding was expected, as a lower overall supervision score corresponds to greater supervision, and vice versa.

Discussion

The combination of naturalistic observation with a self-report questionnaire means the current study provides data addressing several gaps in the child drowning risk literature. More than any other age group, infants and toddlers (age range of 0–4 years) rely directly on others for their safety and require close supervision in most situations (National Public Health Partnership, NPHP, 2004). The study's findings are consistent with this, with caregivers reporting close distance and constant watching as the most important factor when supervising younger children (0–4 years) to prevent drowning, while direct watching was considered most important for older children (10–14 years).

Consistent with findings from a recent beach study (Moran, 2009), in which caregivers reported what they did to ensure the safety of their child, most caregivers (86.5%) reported staying close to their child (0–4 years), indicating awareness of the need for constant supervision. Although the requirement for continuous, direct supervision declines with increasing child age (Peterson, Ewigman, & Kivlahan, 1993), it is concerning that our study found that over half (52.3%) of caregivers reported direct watching of 5–9 year olds, rather than close proximity in the water. Young children in the 5–9 year age group do not have fully developed cognitive strategies and therefore frequently overestimate their ability (Plumert, 1995), placing them at increased drowning risk. With close and constant supervision, caregivers are able to compensate for children's limited capacity to identify dangerous situations (Wills et al., 1997); however, the effectiveness of this approach may be compromised with decreased proximity (i.e., when the caregiver is on the sand while the child is in/near the water). While water safety organizations recognize that increased distance, but within eyesight and ready for action, is adequate for children aged 5–9 years (Royal Life Saving Society Australia [RLSSA], 2009), further studies should investigate whether this level of supervision is appropriate for preventing drowning when children are in open water.

It is concerning that 17.5% of caregivers believed lifeguards were best able to supervise their children. This finding corroborates with a previous study (Moran, 2009), where 22% of caregivers believed lifeguards could provide the best supervision. Lifeguard supervision is acknowledged as a successful drowning prevention intervention (Branche & Stewart, 2001), but research indicates that efficacy decreases in busy conditions, lateness in the day, and in the presence of other lifeguards (Harrell, 2006). Although 17.5% of caregivers in the current study believed lifeguards could best supervise, only 3.6% actually reported providing a lower level of supervision when their child was within the patrol area, indicating that caregivers are not mistakenly abdicating supervision responsibility to lifeguards. Caregivers appeared to be conscious of the increased risk outside the patrol area, with 35.7% reporting a greater level of supervision when their child was outside the flags.

To our knowledge, this is the first study to consider whether self-reported supervision at beaches reflects observed supervision behavior. Overall, the comparison results suggest that caregivers' self-reported supervisory behavior reflects actual supervision and by far the most important factor in predicting actual supervision was keeping the child within arm's reach, accounting for 42.2% of the variance within the observed supervision score. This finding is encouraging, as previous research found supervisor proximity to be the most critical factor for child injury

prevention, with actual physical contact required to moderate injury risk in contexts where injury incidents can be life threatening (Morrongiello & Barton, 2009).

Limitations

The results from this study provide enhanced understanding of caregiver self-reported supervisory behavior and new knowledge on the validity of caregiver self-reported water safety supervision behaviors. The results should be interpreted with some caution in light of several methodological limitations. First, only beaches rated as safest/moderately safe were included, as they had the greatest attendance of families. While the findings suggest that caregivers provide increased supervision in higher risk situations (e.g., 35.7% reported higher level of supervision if their child was swimming outside the flags), future studies should consider the level of supervision at higher risk beaches to determine whether this trend is consistent and to gain a better understanding of what environmental information caregivers are using to inform their judgment about what constitutes adequate supervision. Second, one must be cautious generalizing the results. This study was conducted during the peak beach going times of weekends and school holidays and thus caregiver/child pairs who visit the beach outside of these hours were not considered. Third, reasons for noncompletion of questionnaires were not obtained, which could result in potential bias; however, this appears unlikely as there were no significant differences in observed supervision scores for completers versus noncompleters. Finally, our study did not consider the effect of child age or gender on independent predictors (PSAPQ-BEACH items) of overall supervision, primarily because the authors wanted to determine if the PSAPQ-BEACH self-report supervision items could be used to predict actual supervision of children for the broad age range of 1–14 years. Based on the current findings, future studies considering whether there are differences in models that best predict observed supervision for gender and different age groups (e.g., 0–4, 5–9, and 10–14 years) are warranted.

Conclusion

Observational studies of caregiver supervision eliminate the possibility of bias and distortion associated with self-reported measurement of individual's behavior and thus should continue to be implemented to confirm and characterize the risk relationship between supervision and injury and to validate self-reported behavior.

This study provides numerous insights into caregivers' self-reported and actual supervisory behavior at beaches. Caregivers identified visual contact as essential for close supervision and proximity as a key determinant in distinguishing supervision and close supervision. As expected, supervision varied as a function of child age, with younger children supervised more closely than older children, especially when in or near the water. Some caregivers appear to be conscious of the potential increased risk outside the patrolled area, reporting greater supervision when their child was outside the flags.

Young children do not have fully developed cognitive strategies and thus frequently overestimate their ability, placing them at increased drowning risk when in/near the water and consequently the importance of close and constant supervision in child drowning prevention is paramount. Encouragingly, the regression analysis

demonstrated that keeping the child within arm's reach was by far the most important factor in predicting observed supervision. While comparison results suggest that caregivers' self-reported supervisory behavior reflected actual supervision, as this is the first study of its kind, it is essential that further prospective research using mixed-method approaches (such as unobtrusive observation along with caregiver questionnaires or interviews), builds on this information. This would enable further understanding of the validity of self-reported supervision, at beaches and in other aquatic settings. It is possible that the validated and reliable questionnaire implemented in this study may be modified for use in mixed-method studies of supervision in nonbeach settings.

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