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Carol C. Irwin¹, Richard L. Irwin¹,
Timothy D. Ryan¹, and Joris Drayer¹

Abstract

African American children's rates for fatal and non-fatal drowning events are alarmingly elevated, with some age groups having three times the rate as compared to White peers. Adequate swimming skills are considered a protective agent toward the prevention of drowning, but marginalized youth report limited swimming ability. This research examined minority children's and parents/caregivers' fear of drowning as a possible variable associated with limited swimming ability. Results confirmed that there were significant racial differences concerning the fear of drowning, and adolescent African American females were notably more likely to fear drowning while swimming than any other group. The "fear of drowning" responses by parents/caregivers of minority children were also significantly different from their White counterparts.

Keywords

drowning, swimming, fear, youth, parents

¹University of Memphis, TN

Corresponding Author:

Carol C. Irwin, 220 Fieldhouse, Department of Health and Sport Sciences,
University of Memphis, Memphis, TN 38152

Email: cirwin@memphis.edu

Drowning is a complex public health issue in the United States that is especially life threatening for racially underrepresented youth. African American children in the United States aged 5 to 14 years encounter fatal unintentional drowning at more than three times the rate as compared to White peers (Centers for Disease Control and Prevention [CDC], 2010). Also, the CDC confirms both gender and race differences when examining compressed data concerning fatal drowning events in the United States (CDC, 2008a). For adolescents aged 15 to 19, African American males show a fatal drowning rate of 4.5 per 100,000 as compared to White males with a rate of 2.4 per 100,000. Conversely, the African American female fatal drowning rate is 0.3 as compared to White females with a nearly identical 0.2. Obviously, the drowning discrepancy between African American and White adolescent males is sizeable, but the disparity between adolescent African American males (4.5) and the African American female rate (0.3) is alarming and confusing. Regrettably, research uncovering why this deadly situation occurs at elevated levels for African American youth as well as for other racially underrepresented groups has been limited (Wood, 2006).

One possible cause for this drowning disparity is actual swimming ability. In the only U.S. adult swimming ability study, Gilchrist, Sacks, and Branche (2000) found that 62% of African American respondents had limited swimming ability (not able to swim at all or could swim less than one pool length—24 feet) as compared to 32% for White participants, a 47% rate for Asian, and a 44% rate for Hispanic respondents. A recent nationwide investigation found that children of color face swimming ability challenges and found an alarming number of children (4–17 years) reporting to be “at risk for drowning” swimmers, to be unable to swim, or to feel comfortable only in the shallow end of a pool (Irwin, Irwin, Ryan, & Drayer, 2009). Overall, 51.2% of the targeted underserved participants from this study indicated that they were “at-risk swimmers,” with 54.7% female and 47.5% male respondents rating their ability to be at risk. Disaggregating the data by race showed that 57.5% of African American children were at-risk swimmers, the Hispanic/Latino at-risk rate was 56.2%, and White respondents scored a 30.9% at-risk swimmer total. African American and Hispanic/Latino female respondents in this study reported the highest at-risk swimming ability of all groups measured, 64.6% and 61.1%, respectively, which compares to their male counterparts with rates of 49.9% and 53.0% in that order.

It has been noted that racially underrepresented parents deny their children swimming experiences out of their own fear of water and the fear that their child will drown (Scott & Perskie, 2009). Fear of water, or aquaphobia, is considered to be a “specific phobia” by the American Psychiatric Association

(APA, 2000) that is “a marked and persistent fear that is cued by circumscribed or clearly discernible objects or situations” (p. 429). The etiology of a person’s specific phobias, such as aquaphobia, typically originates during childhood and intensifies through adulthood (Becker et al., 2007). The depth of the fear is determined by how predictable the situation is and how individuals view their ability to control circumstances surrounding the phobia (Armfield, 2006). Marginalized populations exist in dangerous and unpredictable environments and trust that they have little control over daily events (Buka, Stichick, Birdthistle, & Earls, 2001). Therefore, parents of these youth may seek to control their situation by avoiding water, which includes preventing their children from learning how to swim.

There is a gap in the literature that details specifically what is preventing racially underrepresented children from learning how to swim. However, numerous studies have confirmed parental involvement to be critical for children’s positive experiences with organized physical activities like swimming (Blackshear, 2008; Dukes & Coakley, 2002; Ornelas, Perreira, & Ayala, 2007). Racially underrepresented parents typically encourage their children to participate in activities, but they filter their interactions with messages of racial socialization that are unique common beliefs and values that affect how that particular racial group conducts themselves day to day (Caughy, O’Campo, Randolph, & Nickerson, 2002). Further, research has shown that African American adolescents significantly listen to and value advice given by their relevant others (e.g., parents, guardians) as compared to White peers (Katz et al., 2004). This process of racial socialization highlights explicit cultural principles, which have been found to shape acceptance of laws, consumer behaviors, as well as health knowledge and attitudes (Glanz, Rimer, & Viswanath, 2008), which include cultural viewpoints about aquatics. Thus, racially underrepresented parents may be unknowingly socializing their children away from swimming and placing them at risk for drowning.

To complicate matters, there is plentiful historical evidence linking economic, gender, and racial segregation with swimming facility access. According to Wiltse (2007), toward the end of the 1800s, municipal pools in the United States were being built at a great rate in many urban centers. Due to the accepted Victorian-era philosophy, it was taboo for females of any race to swim. On the other hand, males of all races were welcome to swim in these pools at this time. Then, toward the early to mid-1900s, these same facilities changed the rules and prohibited the very poor and people of color from swimming and allowed White affluent females to swim. Therefore, African American females experienced historical double jeopardy—thorough institutional segregation from swimming not just once, but twice, within 50 to 75 years.

The American Academy of Pediatrics (AAP) recommends that all children, starting by the age of 4 years, be exposed to formal swimming instruction (AAP, 2010; Brenner & the Committee on Injury, Violence, and Poison Prevention, 2003), and a recent study confirmed that children who have had swimming lessons by a qualified aquatics instructor experience fatal and non-fatal drowning events at a lower rate (Brenner et al., 2009). Further exploration of cultural differences concerning fear associated with drowning and/or injury while swimming might uncover reasons for this drowning disparity and would assist urban communities to better plan more effective water safety programming, which could positively affect fatal and non-fatal drowning rates for marginalized populations. Therefore, the purpose for this research was to explore levels of fear associated with drowning or injury while swimming among underserved youth and their parents/caregivers, specifically looking at differences between racial identity groups as well as differences between boys and girls.

Method

The methodological protocol for this study included design and validation of the study's survey instrument, planning and execution of data collection processes, and data analysis. Institutional research approval for this study was granted. This study was initiated and funded by the USA Swimming Foundation.

Instrument Development

An original survey instrument, drawn from previous physical activity constraint studies, was designed in collaboration with representatives from USA Swimming. This 50-question survey contained three parts: 33 affirmation statements with a 4-point Likert-type scale concerning potential swimming barriers, a yes/no segment (6 questions) about swimming facility access, and 11 demographic questions. Also, there were optional open-ended questions at the end that asked for the primary reason that they did or did not know how to swim.

An expert panel composed of specialists in the areas of adolescent education and development, survey design, and aquatics reviewed the proposed survey instrument. Similarly, a pilot sample of respondents aged 12 to 17 ($n = 100$) was used to determine the reliability of specific instrument items. A slightly altered version of this adolescent survey was created for parents of young children aged 4 to 11 to complete in the place of their child. The parent

survey had 31 affirmation statements that were modified to fit parental situations, and some of the demographic questions were changed to better determine adult characteristics. As with the adolescent survey, a panel of experts reviewed this altered instrument as well as several African American parents/caregivers ($n = 25$) for face and content validity. Suggestions for modification from this panel and parents/caregivers were applied.

Data Collection

The research participants came from six metropolitan areas randomly chosen by USA Swimming, which included Chicago, IL, Houston, TX, Memphis, TN, Miami, FL, Oakland, CA, and Philadelphia, PA. This targeted sample was composed of underrepresented youth residing in impoverished areas of each city, and ages ranged between 4 and 17 years. Parents/caregivers of young children aged 4 to 11 were asked to complete the survey in the place of the child. Within each survey market, research staff worked with representatives from the Young Men's Christian Association (YMCA) to identify appropriate data collection sites. The YMCA was chosen as the primary data collection source due to the organization's access to diverse youth populations (swimmers & non-swimmers) and keen interest in the topic under investigation. Only non-swimming YMCA programs (i.e., basketball, fitness, school-site before/after school care programs) were used to access adolescents and parents of very young children.

Site visits were scheduled for data collection and staff training. Trainings included actual survey administrators and supervisors of these survey administrators. An established protocol was communicated that included methods for gaining personal and parental consent. Each participating metropolitan YMCA organization was offered an incentive of \$500 for complete and accurate survey supervision.

Approximately 2,000 surveys were distributed in both English and Spanish nationwide. Completed surveys that were used in the analysis accounted for a total of 1,680: 1,116 adolescent surveys and 564 parent surveys. Both parent and adolescent respondents completed the survey instrument under the supervision of at least one trained research team member. The average age of respondents who completed the adolescent survey was 13.5 years with a standard deviation of 2.5 years, meaning that a majority of the respondents were between the ages of 11 and 16. The average age of respondents whose data were provided by a parent or guardian was 8.5 with a standard deviation of 1.8, indicating that a majority of respondents were between the ages of 5.7 and 9.3 years of age. Also, a majority of the respondents (64%) noted that

they were registered for either free or reduced-price lunch programs at their school.

Statistical Analysis

All data were entered systematically into the Statistical Package for Social Sciences (SPSS) version 15. The data set was checked and cleaned to ensure accurate results prior to analysis, resulting in a usable sample of 1,680 surveys. Level of significance was set ($p < .05$) and methods for obtaining effect size were applied. Descriptive statistics, including frequencies, means, standard deviations, and standard error, were used to report the findings as well as inferential, multivariate statistics where appropriate and applicable.

Results

Descriptive statistics for selected affirmation statements from the survey that reflected fear of drowning and injury while swimming were calculated. Additionally, one-way and two-way analysis of variance (ANOVA) tests for significance with follow-up Fisher's least significance differences (LSD) post hoc tests were used to compare groups on their fear of drowning and/or injury while swimming. The survey statements used in the analysis were, "I am afraid of drowning/being injured while swimming," for the adolescent respondents, and "My child is afraid of drowning/being injured while swimming," and "I am afraid that my child will drown/become injured while swimming," for the parent/caregiver participants. All respondents used a 4-point Likert-type scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*).

Racial identities were chosen based on categories used for the most recent Youth Risk Behavior Survey (YRBS), which is a nationwide surveillance system used by the CDC since 1990 to measure U.S. adolescent health behaviors (CDC, 2008b). The different race categories used were African American, American Indian/Alaska Native, Asian, Hispanic/Latino, Multi-Racial, Native Hawaiian/Pacific Islander, White, and Other. Due to low numbers, the American Indian/Alaska Native, Asian, Multi-Racial, Native Hawaiian/Pacific Islander, and Other (write-in) race categories were merged into one category called Other. Therefore, a total of four racial identities was employed in this analysis: White, African American, Hispanic/Latino, and Other.

The Levene test for homogeneity of variance was conducted on all ANOVA tests. According to Pallant (2007), if the Levene statistic is significant for

Table 1. Descriptive Results for “Afraid of Drowning/Injury” Statement by Race and Sex (youth only)

Race/Sex Category (all ages)	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>
White	219	1.62	0.80	.05
Male	100	1.68	0.89	.10
Female	117	1.55	0.70	.09
African American	777	2.05	1.05	.04
Male	379	1.93	0.89	.05
Female	360	2.18	1.07	.05
Hispanic/Latino	353	2.09	1.05	.06
Male	170	2.12	1.04	.08
Female	171	2.09	1.09	.08
Other	209	2.15	1.04	.07
Male	105	2.11	1.02	.10
Female	97	2.18	1.05	.10

an ANOVA analysis, that specific test result should reach a high level of significance ($p < .001$) to overcome the violation of this assumption. All ANOVA results within this study that scored a significant Levene statistic also achieved a significant alpha level of 0.001 or higher. Additionally, effect size was calculated using eta squared (η^2) for the one-way ANOVA test results and partial eta squared (η_p^2) with the two-way ANOVA results. Using suggested levels of these effect size statistics by Cohen (1988), an estimated degree of power, or meaning, was observed.

Afraid of Drowning and Injury—Youth

Descriptive results are found in Table 1 regarding the statement dealing with the fear of drowning and injury by age group, racial identity, and gender. When observing all ages, White youth reported a low 1.62 mean as compared to African American children with a 2.05. The Hispanic/Latino response mean was 2.09, while Other respondents noted a 2.15. Although the mean score for all race categories was within either the strongly disagree or the disagree range of being afraid of drowning/injury while swimming, differences by racial identity emerged as the ANOVA test result was significant [$F_{(3, 1554)} = 13.554; p = .000$]. The effect size, using eta squared (η^2), was 0.03, which is considered small for behavioral sciences (Cohen, 1988).

Post hoc analysis was conducted and verified that White respondents were the only significantly different group ($p = .000$) when compared to the other three racial identity groups. African American, Hispanic/Latino, and Other categories were not significantly different from each other. This result confirms that White youth responded with less fear of drowning/injury while swimming than other children of color.

Further analysis introducing the variable of sex was conducted on responses regarding fear of drowning and injury when swimming. Descriptive results (Table 1) highlight responses to the statement by both race and sex. A two-way between-groups ANOVA was conducted to explore the influence of sex and race on fear of drowning and injury while swimming. Findings based on youth responses confirmed a significant interaction difference for both sex and race [$F_{(3, 1498)} = 2.87; p = .035$], however, partial eta squared calculation indicated that the effect size was small ($\eta^2 = 0.01$).

Analysis of the “Afraid of Drowning/Injury” statement by sex after splitting the data by racial identities found that there were no significant differences between boys and girls who were White, Hispanic/Latino, and Other. However, there were significant differences between African American boys who scored a mean of 1.93 and African American girls with a mean of 2.18. Results verified that African American girls noted significantly more fear about drowning and injury while swimming as compared to their male counterparts [$F_{(1, 737)} = 11.190; p = .001; \eta^2 = 0.02$].

Afraid of Drowning and Injury—Parent/Caregiver

Parent/caregiver responses to the statement, “My child is afraid of drowning/being injured while swimming,” are descriptively reported in Table 2. Results from the ANOVA analysis confirm significant race differences with parents/caregivers concerning fear of drowning/injury while swimming for their child [$F_{(3, 532)} = 8.801; p = .000; \eta^2 = 0.05$]. Consistent with previous results, post hoc analysis found that African American, Hispanic/Latino, and Other parents/caregivers noted that their child was significantly more afraid of drowning/injury while swimming than their White parental counterparts.

Parent/caregiver responses to the affirmation statement, “I am afraid my child will drown/become injured while swimming,” were analyzed by racial identity and were found to be significantly different [$F_{(3, 532)} = 5.195; p = .002; \eta^2 = 0.03$]. Post hoc analysis found that African American and Hispanic/Latino parents/caregivers noted significantly more fear of their child’s drowning/injury while swimming than their White and Other parental counterparts. These results indicate that White and Other parents/caregivers were significantly

Table 2. Descriptive Statistics for Parent/Caregiver Responses to “My Child Is Afraid of Drowning/Injury” and “I Am Afraid That My Child Will Drown/Be Injured”

Racial Identity	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>
My child is afraid of drowning/ becoming injured while swimming				
White	135	1.64	0.85	.07
African American	208	2.04	0.98	.07
Hispanic/Latino	120	2.14	1.11	.10
Other	73	2.29	1.14	.13
Total	536	1.99	1.02	.04
I am afraid that my child will drown/ become injured while swimming				
White	134	1.91	0.88	.08
African American	208	2.30	1.03	.07
Hispanic/Latino	119	2.35	1.10	.10
Other	75	2.15	1.10	.13
Total	536	2.19	1.03	.05

more likely to not fear death/injury for their child when swimming as compared to African American and Hispanic/Latino parents/caregivers.

Discussion

The purpose for this research was to examine demographic variables, specifically race identity and sex, and their association with fear of drowning/injury while swimming. Results from this study confirm that sex and racial identity are significant variables with disenfranchised youth that impact their level of fear regarding drowning and/or injury while swimming. For the most part, parents/caregivers within this sample also reported a higher degree of fear when asked about their child’s fear of drowning/injury as well as their own fear that their child would drown/be injured while swimming. Overall, White children in this sample reported a lower level of agreement with the statement, “I am afraid of drowning/being injured while swimming,” as compared to African American, Hispanic/Latino, and other children of color. More in-depth analysis found that African American girls were the most fearful group on this issue when swimming. This result corresponds with other results that show that African American females report the highest at-risk swimming ability (Irwin et al., 2009).

Interestingly, African American females experience some of the lowest fatal drowning rates of all groups measured in this study (CDC, 2008a). Therefore, can this culturally specific “fear” be decoded as appropriate “respect” for the hazards that can be faced when swimming? Or is it abnormal fear that could evolve into an anxiety disorder or phobia, which could then explain why these girls are not acquiring valuable swimming skills? In contrast, African American adolescent boys experience the highest fatal and non-fatal drowning rates, but they have lower levels of fear for drowning/being injured while swimming than African American girls. This finding matches research that found that African American adolescent males adopt a “tough guy” attitude in order to avoid depression and anxiety that typically emerges when living in a dangerous environment (Hall, Cassidy, & Stevenson, 2008). This hard exterior persona and lower levels of fear may explain why African American adolescent boys drown at such high rates. More research is needed to better understand this noticeable inconsistency.

Parent/caregiver responses in this study confirmed that there are significant race differences when queried about their child’s fear of drowning/injury while swimming as well as their own fear of their child drowning/being injured. Parents/caregivers are fundamental transmitters of knowledge, attitudes, and beliefs concerning life in general to their children and have been found to be even more important in this regard for African American youth (Katz et al., 2004). Positive parental guidance has been noted to be a main ingredient for the successful development of children (Hill & Tyson, 2009). However, it seems from parental responses within this sample that faulty racial socialization may be taking place within certain racial groups on the topic of swimming and may possibly be an unintentional barrier to recommended swimming instruction for their children.

Based on the consistent results, it can be argued that a general fear of water, or aquaphobia, was verified among African Americans within this sample. Although results are not representative of all racially underrepresented populations, anecdotal evidence supports that the fear of water is a relentless reality among most. Armfield (2006) illustrated in his recent theoretical model, the Cognitive Vulnerability Model, how phobias develop, persist, and sometimes fade away. Learning experiences are a key part of becoming more confident to better encounter a fearful situation (Armfield, 2006). A conventional strategy to treat people with specific phobias is to empower the individual with a sense of control and, thus, create a more consistent expectation of the situation so as to alleviate fear (Bare & Dundes, 2004; de Jongh, Adair, & Meijerink-Anderson, 2005; Milgrom, Vignehsa, & Weinstein, 1992). Therefore, using this

rationale, it would be beneficial to be exposed early in life to formal water safety/swimming instruction.

Limitations

Since this research employed a convenience sample, results cannot be regarded as representative. However, convenience samples are typically used when conducting exploratory research, and respondents were assembled from six different large cities in geographically diverse areas across the United States. Additionally, participants met conditions set by the research objective, which was to examine swimming participation barriers among poor, disenfranchised urban children, specifically populations that have high drowning rates.

Research protocol employed self-report data, which sometimes produce inaccurate findings. Nevertheless, self-report studies score high validity and reliability measures as long as there is a large number of research participants (Brenner, Billy, & Grady, 2003; CDC, 2004). While time limitations associated with collecting data limited the number of completed surveys, the total number of surveys collected ($n = 1680$) was appropriate for robust statistical analyses.

On the other hand, effect sizes, using eta squared and partial eta squared, were typically small to medium and should be considered when observing significant differences found within this research. One reason for the low estimates might be the low number of respondents within some of the groups measured. Additionally, these diminished levels indicate that there are other variables impacting the fear that the participating parents/caregivers and youth have concerning swimming participation. Further research is suggested to help uncover factors that are hindering racially underrepresented youth from learning how to swim and becoming more knowledgeable about water safety, thus transforming these children into more confident swimmers.

The questionnaire used in this exploratory research was an original, newly constructed survey. It is possible that some factors influencing swimming participation were not included within the survey. Still, great care was taken to ensure the validity of the instrument. A pilot study was accomplished with adolescents ($n = 100$) that demographically matched the final sample. Survey statements were based on previous physical activity constraint questionnaires (Fahlman, Hall, & Lock, 2006; Johnson, 2000; Romero, 2005) and included specific swimming dilemmas suggested by aquatics professionals. Reading experts from elementary and middle school levels and swimming specialists reviewed the survey. Their suggested modifications were applied to ensure readability levels and relevance to swimming concerns.

Conclusions

The American Academy of Pediatrics, the Centers for Disease Control and Prevention, the National Institutes of Health, and the International Life Saving Federation (ILSF) all concur that quality swimming lessons from a certified water safety instructor for every child are highly recommended as a protective step toward drowning prevention (AAP, 2010; Brenner et al., 2009; CDC, 2010; ILSF, 2007). However, there seems to be an inconsistency between what White parents/caregivers are conveying to their children and the messages that racially underrepresented parents/caregivers are passing on to their children concerning learning how to be safe in and around the water and actual swimming instruction. These counterintuitive messages could be segregating children of color from receiving water safety instruction. Empowering children to learn how to swim is recommended by numerous health organizations, and formal swimming instruction has been found to a possible beneficial agent to prevent drowning events (Brenner et al., 2009). Marginalized children encounter fatal and non-fatal drowning events at a much higher rate than their White peers. Understanding and paying attention to the fear associated with drowning might help communities assist their affected populations.

One of the first steps in dispelling fear, specifically fear of water and drowning, is education. Formal swimming instruction is important for the child, but transmitting the importance of these swimming lessons to the parents/caregivers and to the entire community is paramount. Communities in the United States with high drowning rates would be resourceful to target disenfranchised groups with this vital information, educating parents/caregivers to understand that not allowing their children to partake in these lessons is counterproductive to ensuring their children's safety. Public service announcements using radio, print media, and television could be the first step to delivering this information to affected groups.

School programming that includes water safety information would be another effective strategy. Children are in school approximately 180 days per year in the United States, and many children attend after-school care programs. Swimming instruction is required within the school curriculum in the United Kingdom (Qualifications & Curriculum Authority, 2008), and their fatal drowning rate is 0.6 per 100,000 as compared to the U.S. rate of 1.3 (ILSF, 2007). Delivering just a small amount of information concerning how to be safe around the water might save several families from the tragedy that drowning can bring.

Swimming is a physical activity that should be available to all children. Hindering children of color from the sport of swimming precludes this group from financial opportunities that swimming can bring (i.e., college scholarships,

summer pool jobs, aquatic careers). Also, it prohibits disadvantaged children from experiencing various water activities and sports (i.e., water polo, competitive team swimming and diving). Understanding the barriers, both physical and psychological, is imperative to overcoming these obstacles for these children. Most importantly, a more deep comprehension of why racially underrepresented children are not learning how to swim could possibly decrease fatal and non-fatal drowning events, which suggests additional research on this critical question.

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Bios

Carol C. Irwin, PhD, is an assistant professor in the Department of Health and Sport Sciences at the University of Memphis. Her research focus is the public health issue of swimming participation rates and drowning.

Richard L. Irwin, PhD, is a professor in the Department of Health and Sport Sciences at the University of Memphis. His research focus is sport marketing and promotional issues.

Timothy D. Ryan, PhD, is an assistant professor in the Department of Health and Sport Sciences at the University of Memphis. His research focus is work-family conflict and coaching.

Joris Drayer, PhD, is an assistant professor in the Department of Health and Sport Sciences at the University of Memphis. His research focus is secondary ticket sale patterns.