

INVESTIGATING WATER SAFETY EDUCATION IN CHINA: DISCOVERIES AND DIRECTION FOR GLOBAL IMPROVEMENT

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Abstract

This review aims to understand how Chinese pupils participate in physical activity in and around water, and determine best practices for administering water safety education programs in primary schools. A survey was distributed to capture descriptive statistics and prompted the preparation and implementation of water safety education programming. Findings from the survey and researcher notes indicate pupils in Chinese elementary schools are highly susceptible to accidents while in various aquatic physical activities. The article shares findings from data collected in China, presents best practices globally in water safety, and suggests processes for more formalized, intentional training in water safety education worldwide.

Keywords: aquatic physical activity (APA); water safety education

The Chinese landscape features a variety of aquatic environments, with long and complicated coastlines, with inland rivers, lakes, and tributaries. Aquatic physical activity (APA) is a popular recreational pursuit among young people in China, and includes activities such as snorkeling, diving, walking in streams, competitive and instructional swimming, aquatic fitness, aquatic sports, and water aerobics among others (Yang, Nong, Li, Feng, & Lo, 2007). Evidence has shown that the application of APA can not only improve an individual's physical fitness but also establish a framework for a lifetime of physical activity and wellness (Beale & Lynn, 2011). Many young people are drawn to APA as fun and novel leisure but do not possess the skills to manage accidents around water (e.g. drowning, falling in water, disorientation). While APA is able to help offer fun leisure experiences it could bring about potential risk of drowning. As the ancient Chinese proverb says, "water can carry a boat, but it can also overturn it." While many developed countries have consistent, comprehensive methods for water safety education, practices in China lack uniform plans and recommendations for implementation.

Review of Water Safety

Aquatic Readiness (or Water Competence) is the sole category on drowning prevention in water safety education. Impact of drowning on public health has been greatly reduced, shown by the history of drowning statistics in many high-income countries. Van Beeck (1998) attributes these decreases to preventive measures and improved swimming ability. As suggested by the World Health Organization (WHO), a series of evidence-based measures were meant to reduce key causes of drowning-related deaths. These include: (1) installing barriers controlling access to water, (2) providing capable child care for pre-school children in safe places away from water, (3) teaching school-age children basic swimming, water safety and safe rescue skills, (4) training bystanders in safe rescue and resuscitation, and (5) wearing personal flotation devices (WHO, 2014). Development of water safety skills includes skills such as swimming, entry and exit, skills, and knowledge of safe behaviors (Australian Water Safety Council (AWSC), 2008, 2012). Pharr and colleagues (2014) highlight the complex, but very real cyclical familial pattern between encouragement to swim, fear of drowning and swimming frequency which might reveal a generational pattern that either encourages or discourages children and parents from swimming. As such, there is no definitive set of core water safety skills and knowledge. The AWSC endorses the Water Safety Education Competency Framework as a guide to the minimum level of skills and knowledge children should achieve at each significant milestone of their life (i.e., infant and preschool, before starting formal schooling, end of primary school, and prior to leaving secondary school) (Franklin, 2015). In schools, the delivery of water safety education is considered an

important aspect in health and physical education curricula, and should address impactful issues such as access to qualified staff, access to proper facilities, use of alternative aquatic environments, and understanding best practice for risk management (Peden, Franklin, Richard, & Larsen, 2009).

For the range of water activities, safety and security should consider all wading activities and their potential toward trauma and drowning accidents. Water activities encompass more than life-saving and swimming, and the concept of water rescue is a consideration only after the need for rescue. The use of "Water Safety Education" is the most appropriate term moving forward. In order to improve water safety education, Wen developed the Water Safety Education Project (WSEP) (Wen & Mu, 2014). Implementation was on a small scale at a single primary school in a rural area of the Kunming province. Wen's efforts were executed in an attempt to initiate consistent recommendations for implementation. As water safety skills are mainly learned in childhood, it is important that these skills are acquired and a minimum level achieved before an age where young people are independently choosing recreational physical activity.

Water Safety Education Project

Water safety education is framed and addressed differently by country. In China, few scholars use the concept of water safety education and research on water safety education is concerned mostly with water rescue and swimming safety. The Water Safety Education Project (WSEP) is a conscious educational program which helps individuals to monitor risk, discuss more controlled action, and improve decision-making in and around APA (Wen & Mu, 2014; Wen & Wang, 2013; 2011). It includes accident control and looks to minimize risk taken and survival knowledge and skills in the APA, increased awareness, and predictive behavior to prevent drowning. However, the fact lies in that WSEP efforts in developing countries are almost non-existent, and drowning is not yet recognized by policy makers as a major cause of child mortality. Moreover, there is no successful model for borrowing the known and effective interventions from developed countries. In China, WSEP implementation relies mainly on passive measures such as prohibiting swimming and fencing around designated swimming areas and pools. Currently, most of the schools have not administered WSEP in China. Only a small number of schools have implemented a full program of water safety education, and even fewer include swimming courses as part of their WSEP (Wen & Mu, 2014).

The progress of WSEP is relevant for school administrator, school curricula, teachers, students, parents and facilities. In order to promote water safety of Chinese pupils, WSEP should be listed as one part of school syllabus, and WSEP should be emphasized (Wen & Mu, 2014). School administrators are currently assuming indefinite liability over students in water accidents, shouldering a limitless amount of responsibility because tragedy has not yet occurred locally. In order to maintain stability, the higher authorities and school administrators have accepted more responsibility – albeit empty – as water safety training for young people continues to trail its need and relevance. Unfortunately, due to the lack of legal protection school administrators have both stopped WSEP and forbidden students to participate in APA (Wen & Wang, 2013).

The Chinese Ministry of Education has released "Sports and Health Course Standards", that provides limited detail on WSEP-related content (Ministry of Education, 2011). *Level Two* basic swimming movements for students in grades (3 -4 grade) is breaststroke and is evaluated by a distance swim. *Level Four* in grades 7-9 grade is to learn different swimming styles and evaluated by the students' completion of freestyle technique, evidence of increased safety awareness and prevention, and an understanding of drowning emergency treatment methods. Such minimally developed methodologies have exposed some flaws in the general preparation of the country's younger population with respect to safe recreational behaviors in and around water. While China's swimming teaching has been based on competition swimming teaching, the methods have ignored the necessary survival skills for the general public (Yang & Zhang, 2005). This is believed to be the primary reason to the high drowning rate of students in China, and cause for further action to development improved training methods.

Wen and Wang (2013) conducted a study with an intervention effect in water safety knowledge, attitude and behavior using different modes of WSEP to Chinese pupils in grade three at a Chinese primary school. Each weekly training session was 90-minutes (i.e. 10-weeks, 15 hours) and integrated in the primary school's physical education and health curriculum. The study investigated differences in water safety KAB between four groups enrolled in the WSEP. Group A used direct instruction and practical demonstration of recently learned strategies, as well as simulated drowning episodes and land rescue practice. Water safety awareness included risk analysis activities in the pool and open water and a critical review of dangerous situations in different APA environments. Water rescue included indirect and direct rescue and calling for help from a lifeguard onshore, responding to serious drowning quickly, and administering first aid and cardiopulmonary resuscitation (CPR). Group B included more direct, verbal instruction for its training - including the form and content of water safety lectures to students, water security topics,

knowledge quiz of water safety, an issued letter to parents of students on water safety precautions. Group C was the swimming group - the intervention content included water walking, floating, gliding, and elementary breaststroke skill. Group D served as the control group with no intervention of the WSEP. Results showed that Group A scores improved - reaching the very significant level between pre and post intervention, the best effect from all four experimental groups (Wen & Wang, 2013). As such, implanting the WSEP would play a vital role in improving children's water survival skills, enhance their ability to rescue others, and promote more APA and physical fitness in daily routines. The authors concluded WSEP should be one of the essential parts of modern education and should be a required course to students.

To this end, the purpose of this study is to address the following questions:

What are current conditions for WSEP, and how are Chinese pupils involved in APA?

What considerations should be made among decision makers in physical education settings with WSEP programming?

Methodology

This investigation will provide an understanding of APA among Chinese pupils in Chinese primary schools and assist in making comparisons and recommendations to build a safe and progressive aquatic environment within a physical education and health program. Informed by the work of Wen & Wang (2013), a survey distributed to Chinese primary schools to most efficiently represent next steps with respect to water safety education among young people in schools and communities.

Participants and Survey

Participants came from two separate groups. One included 78 education leaders, including principals and directors from 30 schools among three provinces (e.g. Yunnan, Hubei, Zhejiang). The other group included pupils in grades 1-6 (N=2554) from 18 schools conveniently sampled to represent the unbalanced economic and social conditions. Three urban and three rural schools were identified per province. The survey was designed based on the inquisition and suggestions from professionals of physical education from four elementary schools in Zhejiang, Hubei and Yunnan respectively. All surveys were categorized and filed numerically. All statistics were collected and entered in a database via SPSS 17.0 for analysis, including frequency distribution, percentages and averages analysis, and other descriptive methods to help understand the distribution of the survey sample and their variants.

Results

Participants in the survey selected a range of activities, with the most popular being boating (53.5%) followed by swimming (51%), fishing (47.8%), diving (13.6%), surfing (10.5%) and other (9.6%). Students were engaged mostly in the afternoon (39.8%), near the noon hour (33.2%), in the morning (14.9%) and in the evening (8.5%). Pupils APA often occurred in the swimming pool (63.5%), followed by the river (22.6%), and near the beach (11.4%), pond (10.4%), other places (9.6%), and the lake (5.2%).

Of the 78 schools reporting Fifty-six (71.8%) reported not having a water safety incident, and 20 schools (25.6%) had an occasional occurrence. Just two schools reported a water incident happening often, and the cumulative percentage of the total water accidents reported was 28.2%. Forty-five schools (57.7%) have implemented the WSEP, while thirty-three schools (42.3%) have not implemented the WSEP. Of the 45 schools implementing the WSEP, 36 of those schools have opened the WSEP to all grades. Four schools are open to primary grades only, and five schools are open to just senior grades.

Twenty-one schools take the WSEP in their physical education curriculum while 21 schools do not. Twelve schools (26.7%) take WSEP into after-school activity and 33 schools (73.3%) do not. Forty-three schools (95.6%) have no educational programs on practice water safety skill in water, while two schools in the survey have initiated the program. In the survey of approaches in 45 schools that have initiated WSEP program, 38 of those schools reported utilizing class meetings as the primary delivery method, followed by video training and traditional face-to-face blackboard approaches. Twenty-four schools prohibit students from swimming without adult supervision, ranking third. Others adopt safety education in the form of watching movie, taking a safety quiz, doing self-help exercises, playing simulated games, and completing regular lectures by professionals.

Twelve of the 78 participating schools (15.4%) reported having a pool on campus. Twenty-two schools (28.2%) have swimming pools near campus, and 56 schools (71.8%) have no pools near campus. Despite funding challenges, 45 schools have initiated WSEP and 36 schools possess their own funding resources. Five schools' funding came from government subsidies, and schools with professional PE teachers accounted for 44.4% while 11 schools (24.4%) hired part-time teachers. Schools with specifically appointed teachers for WSEP take up 11.1%. Of those

who reported, only five schools hired professional lifeguards with professional certification, while 40 schools have less professional lifeguards (88.9%).

Following recent investigations of a WSEP on a relatively small scale, the following recommendations are meant to guide further programming and inquiry in the area of water safety education globally. Observations and practical experience of suitable WSEP include an understanding of contextual (e.g. social, economic, political) differences.

On a national scale, China should consider deliberate practices to confront drowning hazards. Nonfatal drowning has occurred over 17.5% of the time involving Chinese primary students. One-fourth (25.6%) of all schools reported incidents concerning drowning, and 2.6% schools report frequent drowning accidents. According to a report issued by the Chinese Ministry of Education in 2007, drowning has been the primary reason of all outdoor fatalities (31.25%). Based on the information from campus security incidents reports in 2006, 43.75% of all drowning occurred in primary schools, 34.82% in junior high schools, and 9.82% in high schools. Primary students drowning rate was significantly higher than middle school students (Tian-Jiao Chen, Cheng-Ye Ji, Yi Xing, et al, 2007).

Rural areas in China address water safety differently. The dangers are very common: students inexperienced or unskilled around water swim after school or over the weekend unsupervised. Their schools do not deliver formal swimming training or water safety education programming, and in most cases pupils are just told of the dangers without resources for future improvement and empowerment. Even though swimming is largely prohibited in these environments, many children will still hide in remote places to play in the water because the temptation of water is too great. There are insufficient, safe places to enjoy aquatic physical activities. The Chinese countryside, with high winds and waves, fast-flowing rivers and lakes, also presents significant risks of underwater reservoirs, ditches and other dangerous areas. In towns and cities, the degree of risk of unsafe waters may not be so clear, but implicit danger exists - with no barriers or rescue ponds, rivers, and other waters.

Despite students choosing swimming, boating, fishing, diving, surfing from high to low as their frequent water activities, the frequency of their activities is not regular or guaranteed. Their activity may not be well organized or have plentiful safety instruction in advance. Students participating in APA of the timing will choose to engage at noon and in the afternoon, suggesting that these two periods of time are the peak of their APA time. Teachers and parents need to attach importance on the supervision and management during this time frame.

Primary students residing in cities usually choose swimming pools for their APA. Risks are higher in open water than pools due to complicated and unforeseen factors; proper supervision and building up non-entrance barriers is of great importance in decrease the risk. But, as inland rivers and lakes and some outdoor ponds have been polluted increasingly, fewer students are choosing these areas. In contrast, since waters of the swimming pool environment are somewhat standardized and serviced by trained lifeguards, the probability of the occurrence of drowning accidents is reduced.

Effective WSEP requires facility upgrades. For schools that intend to initiate WSEP for students, indoor and outdoor swimming pools should be built for use and teaching appropriate behaviors during APA. Based on the survey, most of Chinese school buildings do not provide qualified swimming pools, and few schools are equipped with swimming pools on campus. Nearly one-third of schools who intend to carry out WSEP note that using public resources for school-sponsored WSEP could be an alternative. However, problems lie in the concern that financial aid for using off-campus swimming pools could be a challenge for school management if the course is not one part of its syllabus. From the funding analysis of implementation in WSEP, the main source of funding is from school (80%), followed by governmental grants (11.1%), and student tuition (6.7%). The survey indicates a long way to go in the process of planning and implementing a comprehensive WSEP in schools across China. Schools have been developed unevenly and government financial support to most schools is limited.

Current programming in water safety education varies across contexts. Only half of schools surveyed have implemented WSEP, with more than 40% of primary schools not having any form of WSEP. In the schools that have implemented WSEP, 80% of schools offer programming for all-grades, while the remaining 20% schools carry out WSEP for certain grades. The survey illustrated holes in coverage of WSEP evidence for improved practice. In fact, many schools do not intend to initiate WSEP due to the high-risk of APA. Other factors that discourage WSEP implementation include the examination-oriented education system, lack of funding, untrained professional staff, and perceived relevance from parents.

Nearly half (46.7%) of schools have not included WSEP into the regular curriculum, and less than a third of schools (26.7%) have taken WSEP into after-school activities. In the survey of approach of waters safety education, the top three are class meetings, radio and propaganda messaging, and instructional videos. Few programs reported a more applied and integrated approach to teaching water safety practices. Just 11% schools have integrated games in the water practice classes. Less than nine percent of schools hire professional working part-time to conduct WSEP seminars. The majority of Chinese primary schools still use simple, low-cost methods that are largely ineffective.

The complex skills are best learned through long and arduous practice. In that case, preaching alone cannot help students master the skills of water safety. It has also verified the work of Zhang Xian (2007), listing common problems in Chinese primary students' safety education as being too simplistic, impractical, short and isolated, and too reliant on lecture.

A Process for More Intentional Water Safety Education Practices

Drowning prevention and reduction of water accidents is a social responsibility and worthy of more attention as an issue of public health. A national approach to safeguarding pupils through WSEP is recommended to afford students the opportunity to broaden their WSEP in and out of school. While formal schooling can offer relevant examples and provoke important discussion, young people engage in the activities away from, and after the normal school day. Increasing and promoting practical, educational experiences in water would help WSEP's progress if Chinese government intervene and subsidize the progress. Looking ahead, these efforts include more publicly funded and monitored spaces, such as newly constructed public swimming facilities, and remodeling and re-conceptualizing these spaces as venues for physical activity across the lifespan. In more rural areas, communities and schools are required to find alternatives to aquatic environments such as beaches, lakes, rivers, and dammed up streams. In these cases, there is a greatly susceptibility to hazards and risks in open environments. As such, a tailored risk management assessment should be conducted before undertaking any WSEP in alternative/ complex environments.

An integrated WSEP in primary schools' physical education and health curriculum system would move programming to a more regular and structured schedule. Previous iterations implemented in China on a smaller scale (Wen & Mu, 2014; Wen & Wang, 2011) could be reinstated on a larger scale with curricula shaped by current practices and newer text. An immediate step in this direction includes teacher training of WSEP with materials. Teachers should encourage students to understand local water systems and focus on teaching and training students in adapted environments, basic lifesaving (self-help and rescue) activities and risk identification, and risk control and management of high-risk behavior and other skills. Instructions should cover swimming and effectiveness lifesaving skills (e.g. jellyfish float, tread water, dog paddle, etc.). A proposed path to increasing awareness and increasing implementation involves an expectation among practicing physical education teachers to assume the lead and teaching WSEP. Such training could be folded into initial teacher training at degree-granting institutions as well as specialized, regional offerings to update practicing teachers of the best practices among WSEP experts and the specific needs for young people in and around water.

The effectiveness of long-term WSEP includes involvement of communities, families, and schools. Communities invoke public involvement led by multiple stakeholders and volunteerism in the name of healthy choices for others in and around water environments. Communities can hold educational forums and distribute educational materials on drowning prevention. In addition, communities could work with schools and community planning agencies about the risk of specific locations and how to convey educational messaging across both entities. While it is the responsibility of communities to protect all citizens from unsafe public spaces (e.g. dangerous reservoirs, high-risk waterways), it is necessary to reinforce a consistent message in both public and school settings. Community-based interventions are more likely to increase APA and swimming among children and their parents (Pharr, Irwin, & Irwin, 2014). Strategies include establishing no swimming zones, labeling spaces with warning signs and high-risk areas, implementing observed and patrolled water zones by trained professionals, and continuing to advance the professional training for water safety education in rural areas.

The essential measure for the professional to keep in mind is to instruct children to swim in safe areas and master self-help skills through WSEP education and cultivate their strong awareness of safe swimming and water-related activities. This study can serve as reference for less-developed countries as to next steps for improving WSEP efforts and APA to benefit children worldwide regardless of nationality and socio-economic background.

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