Griffith UNIVERSITY

Early-years swimming

Annual Report

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Executive Summary

In 2009, 26 swim schools from the Australian Swim industry contributed financial and in-kind resources to support the conduct of an external research project aimed at indentifying the possible effects of engagement in swimming for children under 5 years of age. The project is conducted by researchers at Griffith University (Professor Robyn Jorgensen and Dr Peter Grootenboer). The project is a four year investigation that explores longitudinally two key questions:

1) In what ways, if any, does early years swimming enhance the development of under 5s?

2) What factors impact on the development of young children in early years swimming – namely

   a. the exposure to swimming (i.e. the number of lessons and duration of swimming)

   b. the pedagogy used by swimming schools.

The research was initiated by the swim industry as there was a strong perception among stakeholders that children who participated in swimming over an extended period of time seemed to better developed and coordinated than their same age peers. As there has been no systemic and holistic study of the impact of early years swimming on the participants, this study is unique.

The first year of the study has been completed with two key sources of data – the first is a large survey with over 2000 respondents, the second is interviews with parents. This first set of data provides some insights into the possible impact of early years swimming on young children's development across a range of capabilities. Some results from the first data set are listed below.

Survey Results:

- 59% of respondents attended swimming lessons once a week all year around
- 15% of children who attend swimming lessons aged 6 months are able to perform motor development tasks beyond their developmental age
- 6% of children aged 0-1 years, 23% of children aged 1-2 years, 15% of children aged 2-3 years, and 5% of children aged 3-4 years, have all reached the cognitive developmental milestones beyond their reported age
- around 10% of children reached social developmental milestones beyond their reported age
- over 8% of children 0-1 years, 12% of children aged 1-2 years, and 10% of children aged 2-3 years surpassed the language developmental milestones identified for their specific age
- Interview Results:
- age when started swimming: 70% before 1 year old, 30% 2-2.5 years old
- number of lessons per week: 87% one lesson/week, 13% two lessons/week
- parents perceived benefits of sending their child to swimming lessons: enhanced socialisation; engagement in a physical activity to develop healthy habits and strong healthy bodies; increased confidence; increased physical strength; body awareness; improved coordination; improved emotional stability and better coping with separation.
- Positive enrolment influences: cost; adequate space in change rooms; range of teaching resources; teachers.
- Negative enrolment influences: lesson make-up policy; enrolment procedures; lesson availability.

As this is the first phase of the research, some caution must be taken with regard to the data. At best, the outcomes can be seen as trends only. It is envisaged that over the next four years, as data are analysed, the new data will either confirm or refute these outcomes, thus making the emerging trends over time much more robust. However, we note that the early trends suggest that there appears to be some confirmation that, in some areas, participating in early swimming may enhance development in some areas and in some age groups.

Background

The swim industry has sponsored external research to investigate the impact of early swimming on young children's development. The team from Griffith University is working as an external body to examine in what ways, if any, does swimming at an early age impact on the social, intellectual, language and other forms of development of preschool children. The study aims to explore the possible effects of swimming on a range of measures. A large study of this nature was conducted in Germany in 1982 (Diem, 1982) but there has been no other study conducted of this nature. As a nation that has strong connections with the ocean and swimming lifestyle, the impact of early swimming may have profound outcomes if taught correctly on the development of the nation's young. Most of Australia's cities and towns are situated on the coast within a few kilometres of the ocean. Due to the fact that, 85% of Australia's population lives within one hour's drive of the coastline, the importance of swimming is of national significance. With baby drowning being the biggest killer of young children, the swim industry is keen for parents to undertake measures to reduce these figures.

Without a strong corpus of research to inform the swim industry and policy makers, Australia needs to have some rigorous research conducted that identifies the ways in which swimming impacts on the development of young children but also what methods of teaching may be best suited for the enhancement of student learning in the swim environment. This research project aims to investigate two key questions:

1) In what ways, if any, does early years swimming enhance the development of young children?

2) What factors seem to be important in the swimming protocols that may enhance learning including:

   a. the attendance patterns of young children
   b. the swimming environment

At best at this point in time, research in this area can only rely on fragmented studies that indicate particular outcomes. A more holistic research study requires systematic investigation of the factors that potentially impact on learning and development. In the following sections we draw on a number of studies that seem to suggest that physical activity, including swimming, may offer benefits to learners.

The developmental benefits of physical activity in children are not widely documented. Butcher and Eaton (1989) reported a significant positive relationship between fundamental movement skills and participation in vigorous activity in preschool children. However, these authors used free play behaviour as their single measure of physical activity, and running speed and agility were the only movement skills assessed. Other researchers have identified modest positive effects in the population or subsamples of children on such health outcomes as aerobic fitness, blood lipids, blood pressure, body composition, glucose metabolism, skeletal health, and psychological health (Bungum & Vincent, 1997 ; Butcher, 1983).

Research (Buss, Block & Block, 1980) focusing on the affect of physical activity on children, identified that physical activity can potentially cut across traditional personality distinctions. Results found that low levels of motor activity in children affected their levels of achievement striving, less approach behaviour toward intellectual tasks and less compliance towards adults. Similar evidence was found as it was concluded that motor development has been assumed to be important to the development of intelligence in children (Piaget, 1936), and learning potential has been assumed to vary in accordance with physical fitness level (Clarke, 1958). Gruber (1975), on the other hand, noted that fitness-oriented programs have led to improved academic performance in children (e.g., Ismail, 1967).

Similarly, research into the benefits of early years swimming lessons is limited. It is perceived that benefits of early years swimming lessons are unique and that they contribute to the positive development of the whole child. Swimming teachers have noted that swimmers are more confident, display greater physical development, and engage more socially than other children the same age that don’t attended swimming lessons. Sigmundsson & Hopkins (2010) found children that participated in swimming lessons for two hours a week continuously between the age of 3 months to 7 months had better balance and ability to reach for objects than other non-swimming children of the same age.

However aside from this study conducted in Iceland, to date there has been no substantial research to support claims of enhanced development, the degree to which development is enhanced, and what the critical factors might be for enhancing the development (e.g. frequency and regularity of lessons.) The only large-scale studies were conducted in Germany (Diem, 1982) and Norway (Weidle & Aagaard, 1990) some decades ago, and they identified swimming as an important activity for early motor stimulation, affecting children's motor, social and individual development.

Further study in the field of swimming has been conducted in a range of areas. Gladish, Washington, & Bull (2002) identified that early experience in swimming lessons provides an important key for improving the foundational quality of how movement skills are performed. They also noted that early swimming experiences over an extended period of time improves the swimming skills of children. More recent studies have focussed on swimming and learners with physical disabilities (e.g., Getz, Hutzer & Vermeer, 2005). These studies indicated that the water environment enables greater mobility for learners, which, in turn, creates greater opportunity for development than is possible in non-water environments. It has also been indicated that swimming and hydrotherapy are beneficial activities for children with neuromotor impairments as they provide an opportunity to improve physiological and psychological achievements (Adams & McCubbin 1991 ; Cole & Becker 2004 ; Routi, Morris & Cole 1997). Children with disabilities including autism spectrum disorder and cerebral palsy, that participated in group aquatic activities had improved cardiorespiratory endurance after participating in an exercise program with a high adult:child ratio (Broach & Datillo 1996). Aquatic programs have also been found to improve the baseline lung capacity of children with cerebral palsy by 65%, as opposed to an improvement of 23% in children in a control group (Hutzler, Chacham, Bergman, & Szeunberg 2008).

Studies in the area of asthma and swimming in children have also been conducted. Researchers found that children who participated in swimming showed significant improvement in all clinical variables relating to asthma including symptoms, hospitalizations, emergency room visits, and school absenteeism compared with their previous medical history or to those of age-matched controls (Mak, Johnston, Abbey & Talamo 1982; Huang, Veiga, Sila, Reed, & Hines 1989). Rosimini (2005) highlighted that when swimming is compared to other sports in the scientific literature it has a lower occurrence of asthma attacks and swimming also decreases the severity of asthma symptoms. Finally, there have been links made between the incidents of children drowning and participation in formal swimming lessons (e.g., Brenner & Trumble, 2009). According to Brenner & Trumble, participation in formal swimming lessons was associated with an 88% reduction in the risk of drowning in children between the age of 1 – 4 years old.

Despite a wide range of studies being conducted in the area of swimming and early childhood, there has been little research focussed purely on the developmental benefits of early years swimming instruction. The objective of this research is to document whether early years swimming lessons increase childhood development in the areas of: intelligence; concentration; social, emotional, physical and motor development. In addition, researchers aim to define effective swim pedagogy, and to explore parent perspectives on the benefits of lessons and motivations for attending swimming.

Method

A multipronged approach has been developed for the conduct of this research. The approach uses a funnelling technique where a large scale has been developed. The survey seeks to develop baseline data that will highlight parents' accounts of their children's development against norm-referenced developmental milestones. This first phase will identify whether or not there is some authenticity to the possibility that early swimming lessons may enhance development. However, such an approach is limited by the 'self reporting' of parents. To alleviate this possibility, interviews are conducted with parents, swim coaches and managers of swimming schools. These data will be triangulated (compared) with the swim survey data. If there are strong correlations between the survey data and the interview data, then it suggests that the data may be reliable. A further method to confirm or challenge the data is observations of lessons and children by the external review team. This method allows for a non-biased observer to watch swimming lessons and the children participating to see if development is advanced or not.

These three key data collection tools will provide the means through which the research team is able to see whether or not there is enhanced development of young children in swimming lessons. These data collection methods are constrained by external factors that also are considered in the research design. These include the amount of lessons children undertake (lessons per week), the amount of time they have been taking lessons (short term, longer term), and the time when lessons were started. It is also recognised that the pedagogy employed by the swim school may influence the areas of development of children. To include these potential variables, the study is designed to include these variables in the design and selection of case studies. These factors will be considered in the analysis.

Surveys

The method for the survey data collection included the distribution of over 15,000 surveys to participating swim schools throughout Australia and selected swim schools in New Zealand and the United States of America. The objective of this distribution was for the parents of children aged 6 months to five years to complete a checklist of the developmental milestones reached by their child. Parents were also required to indicate: the age of their child when they commenced lessons; the duration they have been attending lessons and number of lessons per week; whether their child is involved in other physical activity; and, the perceived swimming

ability level of their child. This information once collected was inputted into a software package and statistically analysed. An external statistician is employed to undertake this quantitative analysis to ensure the analysis is not skewed or biased. The results of this data sought to identify areas where engagement in early years swimming enhanced (or not) the development of pre-school learners, and identify the ways that engagement in early years swimming enhanced the physical, social, cognitive and linguistic development of pre-school learners.

Interviews

The method employed during this data collection phase included a total of 48 parents being interviewed in two Brisbane swim schools. The objective of this data collection was to paint a picture of the 'typical' swimmer and to ascertain parents' views of the benefits of swimming lessons; the social, intellectual, emotional and physical developmental affects of swimming lessons; the differences between swimmers and non-swimmers; and, factors that affect participation in swimming lessons. Specific questions included in the interview are listed below:

1. How old is your child?
2. How long have they been attending swimming lesson?
3. How many times a week do they attend lessons?
4. Do they come to lessons all year round?
5. Why do you bring your child to swimming lessons?
6. Have you noticed a difference in your child since they started lessons?
7. What do you believe the benefits of swimming lessons are?
8. Have you notice a difference in the development of your child as a result of swimming (social, emotional, physical, intellectual)?
9. Have you noticed a difference in your child's confidence level both inside and outside the aquatic environment?
10. Do you know other children that don't attend swimming lessons?
11. Can you see any differences between your child and the other child?
12. Have you noticed a difference in any developmental aspect between your child and the other child?
13. Is there anything that would make the experience of coming to swimming lessons more enjoyable both for your child or yourself?
14. What influenced you to enrol in this swimming school?
15. Do you socialise with other parents that attend this swimming school?

The interviews were recorded on a voice recorder with the informed consent from the parents. This data was then transcribed and the results documented. Once all of the data was collated, the relevant themes were extracted from the data. Accordingly, analysis of this data presented a picture of the typical swimmer and factors that influence continued participation. (Refer to 'Outcomes' for the results from the interviews).

Budget

Budget Specifics	7/2009-6/2010	7/2010-6/2011	7/2011-6/2012
Income	**93,437.00**		
Expenses			
Salaries			
• Research Assistant	44,376.37		
• Data entry	4300.58		
Data analysis			
Travel expenses	1,871.06		
Administration			
• Publications			
• Printing/postage/phone/fax	1,127.97		
Equipment			
Consumables			
Focus groups/ catering/hospitality	166.46		
University on-cost			
Total Expenditure	**51,842.44**		
Balance	**41,594.56**		

Outcomes

Survey outcomes

The survey included questions pertaining to specifics of the children including the child's age, when they started lessons and frequency of lessons. The following table (Table 2) provides a breakdown of the specifics of the children involved in the survey process.

Table 2 - Characteristics of Children from the Interview Data Collection

Specifics	Results	
Average Age of child		
0-1 years	89	
1-2 years	185	
2-3 years	323	
3-4 years	494	
4-5 years	382	
5+ years	181	
TOTAL	**1654**	
Frequency of lessons	Number	Percent
Once per week for approx 3 months	290	18%
Once per week for approx 6 months	478	11%
Once per week for approx 9 months	109	7%
Once per week for approx 1 year	967	59%
More frequently than above (at least twice a week)	88	5%

Results from Table 2 indicate that of the 1654 surveys analysed, the largest age group was 3-4 years of age totalling 30% of respondents, followed by the 4-5 years age group, then 2-3 years age group, with the smallest cohort of respondents being 0-1 years of age. Another important aspect of the data outlined in Table 2 is the frequency of attendance at swimming lessons. A total of 59% of the respondents indicated they attended swimming lessons once a week all year around. Further notable general information collected from the surveys not outlined in the table include that 25% of respondents own a pool at home, 77% of parents swim, and on a scale of 1-5, 50% of parents rate their child as having an 'average' swimming ability.