



**UNIVERSITI PUTRA MALAYSIA**

***EFFECTIVENESS OF MOBILE SHORT MESSAGING SERVICES TO  
IMPROVE PARENTS' KNOWLEDGE, ATTITUDE AND PRACTICES ON  
DROWNING PREVENTION IN CHARGHAT UPAZILA, BANGLADESH***

**MD. MOSHARAF HOSSAIN**

**FPSK(P) 2017 27**



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By

**MD. MOSHARAF HOSSAIN**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra  
Malaysia, in Fulfillment of the Requirements for the Degree of  
Doctor of Philosophy**

**May 2017**

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## **DEDICATION**

This work is dedicated to my beloved parents, wife and my baby.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the Degree of Doctor of Philosophy

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May 2017

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**Introduction:** Drowning contributes to injury and early death in many countries. Over 50% of global drowning deaths occur among children aged under 15 years old with children aged between 1 and 4 years of age being most at risk. Drowning is the third leading cause of death for children aged 0–4 years in many Asian countries, and is a serious but neglected health problem in low and middle-income countries (LMICs) like Bangladesh. In Bangladesh, drowning rates are 10 to 20 times more than those in other developed countries. The aim of the qualitative part of this study was to develop a mobile SMS (short messaging services) intervention to prevent children from drowning, while the quantitative part was to test the effectiveness of a mobile SMS intervention to improve the knowledge, attitude, and practices of parents of children aged under five concerning the prevention of drowning.

**Method:** A mixed method was used. Qualitative part: *Design:* focus group discussions (FGDs) were conducted. *Setting:* a rural community in Bangladesh. *Participants:* Four FGDs were conducted with mothers and fathers of children aged under five years, and two group local community leaders. One FGD was conducted for each group. Out of 45 participants, 13 were women. Three in-depth interviews (IDIs) were conducted with parents who had children who had drowned, of which two were female. Quantitative part: *Design:* a cluster randomized community trial with 788 parents of children aged under five in a rural community of Bangladesh. *Intervention:* Mobile SMS intervention for parents of children under five years concerning the prevention of drowning. *Outcome:* differences in knowledge, attitude and practices of parents concerning the prevention of drowning between the baseline and immediate follow-up after the intervention, and after three months.

**Results:** A total of 45 respondents participated in the qualitative part of this study, of which 32 (71.1%) were male, and 13 (28.8%) were female. The risk factors for drowning included the time (11:00am-2:00pm), gender, especially male, lack of swimming ability, parents who were not aware about childhood drowning, unwanted ditches that were not filled in, lack of medical facilities, and lack of information through mass media for the prevention of childhood drowning. There was a significant improvement in knowledge in the intervention group compared to the control group at different time points [baseline:  $F(1, 787) = 0.33$ ,  $\rho$ -value = 0.56; immediately after intervention:  $F(1, 772) = 2989.25$ ,  $\rho$ -value = 0.001; 3-months after intervention  $F(1, 761) = 4591.33$ ,  $\rho$ -value = 0.001]. Similarly, there was an improvement in the positive attitude and good practices of parents on prevention of drowning. There were significant main effect for group [ $F(1, 379) = 5084.81$ ,  $\rho$ -value = 0.001], time [ $F(1, 379) = 5786.11$ ,  $\rho$ -value = 0.001], and group and time interaction [ $F(1, 331) = 2425.33$ ,  $\rho$ -value = 0.001] in terms of the drowning prevention knowledge of parents. Similarly, the main effects for group, time, and group and time interaction for drowning prevention attitude and drowning prevention practices of parents were also significant.

**Conclusion:** The mobile based SMS intervention developed was effective in improving the knowledge, attitude, and practices of parents of children aged under five concerning drowning prevention in a rural community of Bangladesh.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia  
sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

**KEBERKESANAN KHIDMAT PESANAN RINGKAS (SMS) UNTUK  
MENINGKATKAN PENGETAHUAN, SIKAP DAN AMALAN IBU BAPA  
TERHADAP PENCEGAHAN LEMAS DI CHARGHAT UPAZILA,  
BANGLADESH**

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**Pengenalan:** Lemas menyumbang kepada kecederaan dan kematian awal di kebanyakan negara. Lebih 50% daripada kematian sejagat akibat lemas berlaku di kalangan kanak-kanak berusia di bawah umur 15 tahun dan kanak-kanak berumur antara 1 dan 4 tahun adalah merupakan kumpulan umur yang paling berisiko. Lemas adalah punca ketiga utama kematian kanak-kanak berusia 0-4 tahun di kebanyakan negara Asia, dan lemas merupakan masalah kesihatan yang serius. Walaubagaimanapun masalah lemas masih tidak mendapat perhatian sepenuhnya di negara-negara berpendapatan rendah dan sederhana (LMIC) seperti Bangladesh. Di Bangladesh, kadar lemas adalah 10 hingga 20 kali lebih berbanding di negara-negara maju yang lain. Tujuan kualitatif kajian ini adalah untuk membangunkan satu intervensi melalui SMS telefon mudah alih (perkhidmatan pesanan ringkas) untuk mengelakkan kanak-kanak dari mati lemas, manakala bahagian kuantitatif adalah untuk menguji keberkesanan intervensi SMS telefon mudah alih bagi meningkatkan pengetahuan, sikap dan amalan ibu bapa kepada kanak-kanak berusia bawah lima tahun mengenai pencegahan lemas.

**Kaedah:** Penyelidikan ini adalah menggunakan kaedah campuran iaitu kaedah kualitatif dan kuantitatif. Bahagian kualitatif adalah menggunakan teknik perbincangan kumpulan fokus (FGDs). Tetap kawasan yang dipilih adalah daripada masyarakat luar bandar di Bangladesh. Perbincangan kumpulan fokus (FGDs) yang telah dilaksanakan adalah terdiri daripada empat kumpulan ibu dan bapa kanak-kanak berusia bawah lima tahun, dan dua kumpulan pemimpin masyarakat tempatan. Satu perbincangan kumpulan fokus (FGD) telah dijalankan bagi setiap kumpulan. Daripada 45 peserta, 13 adalah wanita. Tiga temu bual

mendalam (IDIs) telah dijalankan dengan ibu bapa yang mempunyai anak yang mati lemas, yang mana dua perempuan. Bahagian kuantitatif pula menggunakan kaedah kelompok rawak percubaan masyarakat yang telah melibatkan 788 ibu bapa kanak-kanak berusia bawah lima dalam komuniti dari kawasan luar bandar di Bangladesh. Intervensi yang dilaksanakan adalah intervensi khidmat pesanan ringkas (SMS) melalui telefon mudah alih untuk ibu bapa kanak-kanak di bawah lima tahun mengenai pencegahan lemas. Keputusan: terdapat perbezaan dalam pengetahuan, sikap dan amalan ibu bapa mengenai pencegahan lemas di kalangan peserta kajian semasa di dalam peringkat kajian asas/ dasar, peringkat susulan serta-merta selepas intervensi dan juga selepas tiga bulan susulan kemudian.

**Keputusan:** Seramai 45 responden telah mengambil bahagian di peringkat kualitatif kajian ini, di mana 32 (71.1%) adalah lelaki, dan 13 (28.8%) adalah wanita. Faktor-faktor risiko untuk lemas termasuk masa (11:00am-02:00pm), jantina, terutamanya lelaki, kekurangan keupayaan renang, kurang kesedaran ibu bapa terhadap lemas dalam kalangan kanak-kanak, parit terbiar yang tidak ditimbus, kekurangan kemudahan perubatan, dan kekurangan maklumat melalui media massa berkaitan pencegahan lemas terhadap kanak-kanak. Terdapat peningkatan yang ketara dalam pengetahuan dalam kumpulan intervensi berbanding kumpulan kawalan pada masa yang berbeza [kajian dasar:  $F(1, 787) = 0.33$ ,  $p$ -nilai = 0.56; selepas intervensi:  $F(1, 772) = 2989.25$ ,  $p$ -nilai = 0.001; 3 bulan selepas intervensi  $F(1, 761) = 4591.33$ ,  $p$ -nilai = 0.001]. Terdapat juga peningkatan dalam sikap positif dan amalan baik ibu bapa kepada pencegahan lemas. Terdapat kesan ketara yang utama bagi kumpulan [ $F(1, 379) = 5084.81$ ,  $p$ -value = 0.001], masa [ $F(1, 379) = 5786.11$ ,  $p$ -value = 0.001], dan kumpulan dan interaksi masa [ $F(1, 331) = 2425.33$ ,  $p$  nilai = 0.001] dari segi pengetahuan pencegahan lemas ibu bapa. Begitu juga, kesan utama bagi kumpulan, masa, dan kumpulan dan interaksi masa untuk sikap dalam pencegahan lemas dan amalan pencegahan ibu bapa juga didapati signifikan.

**Kesimpulan:** Intervensi berasaskan khidmat pesanan ringkas (SMS) daripada telefon mudah alih yang dibangunkan adalah berkesan dalam meningkatkan pengetahuan, sikap dan amalan ibu bapa kanak-kanak berusia bawah lima tahun, mengenai pencegahan lemas di dalam masyarakat luar bandar di Bangladesh.



## ACKNOWLEDGEMENTS

All praise are due to ALLAH, the Lord of the universe, the benevolent, the merciful, by whose blessings, mercy and grace we are able to actualize our dreams. I bear witness that there is no God worthy of worship but ALLAH and that MUHAMMAD (SAW) is his messenger. May the peace and blessing of ALLAH be upon the noble prophet, the best of all creations, the exalted and of noble character, MUHAMMED (SAW) his pure progeny, his righteous companions and all those who follow their footsteps with sincerity and monotheism up to the end of time. Most importantly, I want to give unreserved glory and praise to ALMIGHTY ALLAH, for giving me this noble opportunity to improve myself and achieve my dreams.

Let me begin by expressing my immeasurable, deep-seated feeling of gratitude and appreciation to my amiable supervisor and chairman of my supervisory committee, Associate Professor Dr. Kulanthayan KC Mani for providing me with his revered guidance, impeccable advice and invaluable assistance and encouragement throughout the period of my study in Malaysia. His continuous and unrelenting drive for excellence has rubbed off on me and set me in the path of greatness as I begin a new life as an independents researcher. For these and the opportunity he granted me to improve myself under his watch, I say a big THANK YOU.

I equally wish to thank my co-supervisors: Professor Dr. Sherina Mohd Sidik, Dr. Hayati binti Kadir@Shahar and my external supervisor Professor Dr. AKM Fazlur Rahman, for their relentless guidance and support throughout my study. Without their support, I would have been unable to surmount some of the critical challenges that I faced during the course of my data collection and analysis. For these and every assistance you provided to me, I remain grateful and may the good ALLAH continue to bless you all.

I would like to specially acknowledge the enormous support of Md. Mozaffar Hossain for the strategic role he played in the course of my data collection. His selfless contribution to ensuring the successful completion of my research work will not be forgotten in a hurry. I am also grateful to the entire personnel of the Via-luxmipur village leaders for support, encouragement and guidance throughout the period of my data collection.

More importantly, I am grateful to my beloved parents, brothers, sisters, uncles and aunts for their unfailing love, prayers, care and empathy during these challenging years. Most of all, my deepest appreciation and gratitude goes to my beloved wife for her patience, endurance, unwavering support, love and thoughtfulness during these crucial years of my study. I am particularly humbled by their encouragement, sense of responsibility and motivation upon which I leveraged to achieve this feat. Indeed, you all made my study in Malaysia not only memorable but worthwhile. May the ALMIGHTY ALLAH continue to keep us together in love and good health?

It will remain evergreen in my mind the immeasurable knowledge and skills imparted in me by members of staff of the Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. Indeed, you have all equipped me with the requisite capacity to excel in the challenging world of scientific research. I am grateful to Ministry of Science and Technology, Bangladesh Government for providing necessary funding (Bangubandhu Fellowship).

Finally, I would like to thanks all my friends, colleagues and all those individuals who in one way or the other assisted me in life but their names do not appear in this text.



I certify that a Thesis Examination Committee has met on 11 May 2017 to conduct the final examination of Md. Mosharaf Hossain on his thesis entitled "Effectiveness of Mobile Short Messaging Services to Improve Parents' Knowledge, Attitude and Practices on Drowning Prevention in Charghat Upazila, Bangladesh" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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## LISTS OF ABBREVIATIONS

BDTAKA	Bangladeshi Taka
CI	Confidential Interval
CIPR,B	Centre for Injury Prevention and Research of Bangladesh
DF	Degree of Freedom
FGDs	Focus Group Discussion
GO Code	Post Office Code
IDIs	In-depth Interviews
NGOs	Non-governmental Organization
OR	Odd Ratios
SE	Standard Error
SD	Standard Deviation
SMS	Short Messages Services
SPSS	Statistical Package for Social Sciences
UPM	Universiti Putra Malaysia
USD	US Dollar
WHO	World Health Organization

# CHAPTER 1

## INTRODUCTION

This chapter provides a brief overview of the context of the study, its objectives, problem statement, research questions as well as the significance of the research. The research hypotheses and outcomes are also explicitly itemized.

### 1.1 Background

The following definition was adopted by consensus of the conference attendees in 2002: "Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid." Furthermore, drowning outcomes should be classified as: mortality, morbidity, and no morbidity (Van Beeck *et al.*, 2005).

In the Bangladesh Health Injury Survey (2005), the definition used for drowning was: death resulting from suffocation within 24 hours of submersion in water; victims of near-drowning survive for at least 24 hours. Thus, drowning is always a fatal event while near drowning may or may not be. If the drowning occurred due to direct exposure to water not involving water transport, it was a drowning. If it occurred as a result of a water transport mishap, then it was a water transport death. Drowning during a flood was considered to be drowning, but drowning related to a ship sinking was considered a transport fatality (BHIS, 2005).

Water plays an important role in children daily life. They like to play with water, make fun and sometime much adventurous. Children are always being excited with water, no matter it from pond, pool, lake, in open field or simply on or beside the road after rain fall. It is impossible to grow up without water for children, besides playing they need it to clean them, get comfort and cooled by it. Although water considered as an important element to survive for children, hence, it could a hazardous if we have the lack of awareness. A small children can drown only a few centimeters of water, at beneath of a bucket, in a field or in the bath tub. Drowning causes injury which shows an epidemiological pattern. However, the pattern change according to type of water bodies, age group and activity. Drowning ranks among the top three death causes from accidental injury in most countries all over the world. The death rates are highest among children under five years old (Peden *et al.*, 2008).

Drowning is the leading cause of death in children aged one year and over in Bangladesh. Based on the rate reported in the BHIS (2005), in the year preceding the survey, almost 17,000 children drowned or about 46 per day, and there were nearly four times as many near drownings (over 68,000). This is the equivalent of approximately 188 child near drownings per day. Drowning rates in Bangladesh are 10 to 20 times the rates of child drowning in developed countries (BHIS, 2005).

There is an issue of whether drowning is always fatal, or can be survived. Many people think of drowning as an always fatal event that cannot be survived, while others think of near-drowning as an outcome that is never fatal (BHIS, 2005).

As a consequence, injury is now the leading cause of fatality, disability and severe morbidity for children in low-and middle-income countries (LMICs) in Asia like Bangladesh. This threatens the gains previously achieved at such high cost for preventing further causes of disease and casualty among children, and jeopardizes sustained advances in continued survival and security. One conclusion is that injuries by drowning are so important that they need to be addressed as a matter of importance (Rahman *et al.*, 2005).

Drowning reduces the impact of other childhood interventions, as children who die through drowning have often previously received conventional immunizations, vitamin A supplementation and other dietary assistance. They have frequently benefited from early childhood growth programmes and major education. Such investments are wasted when a child drowns. There are effective drowning interventions for all stages of childhood that are of parallel cost-effectiveness as the traditional interventions for children (BHIS, 2005).

## **1.2 Statement of Problem**

Drowning is a public health problem as well as a social problem. An estimated 372 people died from drowning in a year the globally. Drowning is one of the 10 leading cause of unintentional injury death for people aged 1-24 years. Most (90%) cases of child drowning mortalities occur in low-income and middle-income countries. Lack of water safety knowledge and awareness and risky behavior around water and uncover or unprotected water supplies and lack of safe water crossings (WHO, 2015).

In Bangladesh drowning is the leading cause of death among children's between the ages of 1 and 4 years, accounts for 43% of deaths among children aged under five years (WHO, 2015). Drowning risks are everywhere, with 80% of drowning's occurring in natural water bodies in Bangladesh (BHIS, 2005). Every year, more than 12000 children's between under five years of age die due to drowning-more than 32 drowning deaths per day in Bangladesh. Lack of or inadequate supervision, high exposure to water hazards and lack of education/knowledge due to poverty are some of the major risk factors for childhood drowning in Bangladesh. (ICDDR,B, 2014).

Parents are often not aware: 67% of parents were involved in household activities, 16% were working outside, and 17% were involved in other activities (BHIS, 2005). Busy parents with a large family, a home and many children to care for are often unable to watch over the little ones. At the day time of the drowning incident, most parents or caregivers were involved either in household activities or were working

outside. In view of this study was found prevention how to decrease of prevalence drowning injury among children's under five years.

### 1.3 Significance of the Study

The findings of this research will contribute to the existing information concerning the factors associated with the socio-demographic, and environmental issues pertaining to children under five years drowning in Bangladesh. The results will also provide baseline information about the effectiveness of mobile-based interventions in respect of childhood drowning, and prevention outcomes on drowning, which have not previously been studied in Bangladesh.

A better understanding of the mortality of children under five years arising from drowning in Bangladesh, would provide useful information and knowledge about the issues that present danger, and would enable parents to recognize the issues that contribute to drowning and be familiar with how to prevent or at the very least reduce such occurrences. Through public grounded interventions and successful parental organization practices, mortality by drowning in Bangladesh of children aged under five years could be reduced (Callaghan *et al.*, 2010). Improved intervention agendas in the rural areas of Bangladesh would help reduce children's mortality as a result of drowning (Rahman *et al.*, 2011).

Although drowning is one of the main factors affecting children's lives, there is a lack of information concerning the drowning of children in Bangladesh. Sadly, this specific aspect of children's well-being has not been deemed to be an important subject. In the developed world, there is abundant evidence that drowning is avoidable. However, there is no indication that the deterrence trials in the developed countries could be effective in low-income countries such as Bangladesh.

As there are noticeable socio-cultural, economic and environmental differences, it is understandable that the interventions in developed countries may not be effective in a low-income country setting. Therefore, in that drowning is the leading cause of death of children in Bangladesh, there is a need to develop and investigate child drowning interventions that are suitable for the socio-cultural, economic and environment of Bangladesh.

One of the plan's main purposes is to identify effective interventions that can be replicated and introduced to prevent unnecessary disruption to the country. The knowledge from this research can profit other countries with similar stages of growth and problems pertaining to child drowning.

## **1.4 Research Questions**

- i. What are the socio-demographic, environmental factors, and associations with the knowledge, attitude, and practice of parents of children under five concerning child drowning ?
- ii. What is the difference in the mean scores of knowledge, attitude, and practice of parents of children under five years concerning child drowning prevention for the intervention and control groups ?
- iii. What is the impact of Mobile SMS intervention on knowledge, attitude, and practice of parents on child drowning ?

## **1.5 Objectives**

### **1.5.1 General Objective**

To develop, implement and assess the effectiveness of the mobile SMS intervention to improve the knowledge, attitude, and practices of parents with children aged below five years concerning childhood drowning prevention in Bangladesh.

### **1.5.2 Specific Objectives**

#### **Qualitative Part:**

- i. To assess the community's initial response to mobile SMS intervention in terms of acceptability, feasibility, and sustainability.
- ii. To develop mobile SMS intervention for childhood drowning prevention.

#### **Quantitative Part:**

- i. To identify factors associated with the willingness to read text messages on childhood drowning prevention in rural areas of Bangladesh.
- ii. To determine the socio-demographic and environmental factors, level of knowledge, attitude, and practice of parents on drowning prevention.
- iii. To develop and implement a Mobile SMS childhood drowning prevention intervention to improve in knowledge, attitude and practices of parents of children under five years.
- iv. To determine the association among the socio-demographic factors and environmental factors with knowledge, attitude and practices of parents of children under five years on childhood drowning prevention at the baseline and post interventions.
- iv. To compare the mean scores of knowledge, attitude, and practices among parents of children under five years between the intervention and the control group at baseline and post intervention (within group and between groups).
- v. To evaluate the effectiveness of Mobile SMS intervention among parents to improve in knowledge, attitude and practices concerning drowning.

## **1.6 Research Hypothesis**

- i. There is an association between the willingness to read text messages and childhood drowning in the rural areas of Bangladesh
- ii. There is no significance in the socio-demographic and environmental factors, level of knowledge, attitude, and practice of parents on drowning prevention.
- iii. There is an association between the social-demographic, and environmental factors, and the knowledge, attitude, and practice of parents of children under five years concerning drowning prevention at baseline and post-interventions.
- iv. There is significance difference in the mean scores for knowledge, attitude and practices of parents of children under five between the intervention and control group at the baseline and post-interventions (within and between groups).
- v. The application of Mobile SMS intervention to improve impact drowning prevention knowledge, attitude and practices among parents, intervention compared to control group.

## **1.7 Outcomes of the Study**

- i. Development of mobile SMS based intervention for prevention of childhood drowning with FGDs.
- ii. Identification of implementation process for mobile SMS based intervention for prevention of childhood drowning.
- iii. Development of tools for measuring the effectiveness of Mobile SMS based intervention for prevention of childhood drowning.
- iv. Development of an effective intervention for parents of children under five years in a low resources setting to improve in knowledge, attitude, and practices on drowning prevention.
- v. Assessment of the effectiveness of Mobile SMS based intervention program on drowning prevention knowledge, attitude and practices of parents of children under five years.

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