



## Mini Review

# Drowning Prevention should be a Public Health Issue in Nepal

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## Abstract

Nepal is prone to a range of natural disasters; earthquakes being the most widely recognised one. However, many people are at risk of drowning as the floodings in the autumn of 2024 showed, but this is not recognised enough as a serious public health risk in Nepal. Drowning relates to everyday activities such as bathing and swimming and should be treated as a social and public health problem. The United Nations, particularly the World Health Assembly, has called its member states for accelerating action on drowning prevention.

This mini review paper considered literature covering drowning in children in Nepal and Bangladesh over the past decade. It outlines some of the key drowning risks and the need for active prevention with reference to some tested drowning prevention interventions in neighbouring countries in South Asia. Many of such interventions have been designed and implemented in Bangladesh, a densely populated country with a lot of water. It has one of the highest rates of drowning, especially among children in the world. Next, the paper highlights some on-going research in this field, especially our newly started research project in Bangladesh, which is aimed at the prevention of drowning in children under two. Finally, the paper concludes with some of the lessons Nepal can learn in this area from its neighbours.

## Introduction

The World Health Organization (WHO, 2023a) estimates about 236,000 drowning deaths occur across the globe every year, and this number is likely to underestimate the

actual number of deaths. Water brings risks that can cause death and other losses. Drowning is frequently linked to routine activities, and it is a leading cause of death for children and young people in large parts of Asia (WHO

Regional Office for South-East Asia, 2021). Lack of awareness about the risks of water and water safety measures are recognised to be the major causes behind the incidents of drowning, globally (Franklin et al., 2020). Drowning is also something that can be prevented through education, supervision, and training (WHO, 2017 & 2021). A review on the incidence of drowning in LMICs (Low- and Middle-Income Countries) reported that most studies on drowning were from selected countries, many from the following South Asian countries: Bangladesh, India, Pakistan, and Sri Lanka (Tyler et al., 2017).

We searched the recent literature of aspects of drowning in Nepal. There is limited information about the risk of drowning in Nepal as statistics are poor (Sedain & Pant, 2018; WHO, 2020). Since the Himalayas are so dominant in Nepal's topography, drowning is not seen as key public health problem, but Nepal has the highest deaths per 100,000 population in the region (WHO Regional Office for South-East Asia, 2021). In the Terai, the low-lying flatland in southern Nepal, the part of the country that neighbours India, drowning cases are on the rise. The latter problem has been picked up in several media reports (*Nepali Times*, 2021; *OnlineKhabar*, 2023). In a recent review using autopsy reports of 53 drowning cases from a hospital in Gandaki province in Nepal, Baral and Subedi (2021) reported that the most common drowning deaths were in people younger than 20 years (41.5% of all cases) and most were male (77.4%). In this hospital, suicidal drowning (64.2%) was far more common than accidental death (28.3%), and most deaths (64.1%) occurred on lakes (Baral and Subedi, 2021). Rivers, natural or human-made ponds, lakes, pits at brick kilns and roadside ditches are reported to be among the most common places of drowning (*Nepali Times*, 2021), whilst children may also drown in water stored at home for domestic purposes (Pant, 2023). More and more newspapers reports appear like this one from July 2024 'Two people drowned while swimming in Harpan River in Pokhara Metropolitan City' (*The Kathmandu Post*, 2024a), or this one from August 2024 'Flood in Solukhumbu destroys 12 houses' (*The Kathmandu Post*, 2024b). Sedain and Pant (2018) concluded that although the burden of drowning in Nepal is considerable, this is mostly unknown to the public. This lack of public perception of the risk of drowning is hopefully changing after the recent autumn 2024 floods that took place across the country. One newspaper reported that 'Death toll from recent floods and landslides reaches 233, 169 missing' (Samiti, 2024). Nepalese people also drown abroad (Pyakurel, 2021), for example, 19 people of Nepalese origin have drowned in Australia alone between 2013 and 2020 (Aryal, 2020).

In April 2021, the United Nations (2021) adopted a historic resolution calling for urgent action to prevent drowning. More recently, the World Health Assembly has adopted a "Resolution on drowning prevention requesting

governments and their partners, in collaboration with WHO, to accelerate action on drowning prevention through 2029. The resolution was sponsored by the Governments of Bangladesh and Ireland and adopted by Member States to address this public health concern." Nepal is also a sponsor of this resolution (WHO, 2023b). In this context, drowning prevention interventions gradually accelerated in South Asia (Business 360, 2023), especially Bangladesh has pioneered child drowning prevention (Global Health Advocacy Incubator, 2022). In Bangladesh several interventions, such as community day-care centres have been proven to help reduce the risk of children drowning (Rahman et al. 2012; Alonge et al. 2020), however, to date such reduction in drowning deaths among newly-mobile children, i.e. those younger than two, has been much more difficult. We, therefore, outline a project called *Sonamoni* in the case study below.

### Case Study: Drowning Prevention in Under Two-Year Olds in Bangladesh

Our recently started project which aims to reduce the number of very young children drowning deaths in Bangladesh is being co-ordinated by Bournemouth University in collaboration with the University of the West of England, Bristol, the University of Southampton and the Royal National Lifeboat Institution (RNLI) in the UK, Design Without Borders (DWB) in Uganda, and the Centre for Injury Prevention and Research, Bangladesh (CIPRB). The *Sonamoni* project is funded by the UK National Institute for Health and Care Research (NIHR) using aid from the UK government to support global health research. The £1.6m project has been made possible thanks to a NIHR grant through their Research and Innovation for Global Health Transformation programme (see the [NIHR website](#)).

The background this project is that drowning is the leading cause of deaths in children over the age of one in Bangladesh (BDHS, 2020). Globally, the country has one of the highest rates of drowning, especially among children. The risk of drowning in rural areas is twice that in cities, because there are significant numbers of ponds and ditches, creating natural drowning hazards for very young children (Rahman et al., 2019). Parents and caregivers have the constant challenge of supervising small children while working, preparing food, or doing household chores. This means that toddlers are often cared for by older siblings.

CIPRB has implemented several effective drowning prevention solutions focused on children over the past 15 years, including a successful daycare model to keep young children (aged 1-5) safe when they are most vulnerable, teaching swimming to six-to-ten year olds, and train bystanders first aid, including how to perform cardiopulmonary resuscitation (CPR).

These are the proven interventions to tackle child drowning. The WHO (2022) endorsed these three interventions as best practices to reduce child drowning in low-resource settings, such as Nepal. However, enrollment and attendance rates for children under two years, those at the highest risk of accidental drowning, have been low. CIPRB identified that children under two do not stay in day-care centres for over two hours for social and cultural reasons which makes them vulnerable to drowning.

The team is working with communities with risks of drowning deaths in the north and south of Bangladesh to cover different geographical areas to better understand what might work for different circumstances and environments. The project will employ a Human-Centred Design (HCD) approach. The project team will: (1) explore the challenges and gaps of the existing drowning prevention interventions; (2) identify and prioritise potential solutions; (3) develop the ideas into prototype interventions; and (4) assess the acceptability and usability of the interventions with communities in two regions of Bangladesh. In the longer term, the research findings will guide the design of a study to test the best intervention/s in a future trial. If the intervention/s prevent drowning, they can be rolled out nationally.

## **What Nepal Can Learn from Other South Asian Countries**

Bangladesh is more economically developed than Nepal (The World Bank, 2023) and as a landlocked country, exposure to water in Nepal is quite different. Furthermore, Bangladesh, like other South Asian countries, has Life Saving Societies working for the prevention of drowning and water safety, but this is absent in Nepal. Rivers are reported to be the most frequent places of drowning; religiously, many people in Nepal regard water as sacred places to get purified before or after certain rituals, sadly many people die during these events in absence of safety measures (Koirala, 2016; Samiti, 2016). Similarly, some common /recreational activities (bathing, washing clothes, playing near rivers and swimming) are associated with drowning in Nepal's rivers (Sedain and Pant, 2018). Due to some seasonal variation in the amount of rainfall, surface water is mostly neglected except during a few months of monsoon. Anecdotal reports mentioned that many cases of drowning succumbed on their way to hospital after being found at the site of drowning or they died in the hospital. This is perhaps due to a lack of awareness of the importance of clearing airways and lungs of the victims or delayed resuscitation.

Southeast Asia comprises 30% of all global drowning deaths (WHO Regional Office for South-East Asia, 2021) and different countries in the region have different public health approaches to the problem. Hence, there is a lot that these countries can learn from each other. For the

convenience of all, the World Health Organization has recently published a practical guideline for drowning prevention (WHO, 2021 & 2022), which incorporates proven effective interventions from South Asian countries. Recommendations from the WHO can be adopted in Nepal, and these could include:

- Developing national and local water safety strategies with implementation plans;
- Train sufficient numbers of certified swimming trainers to teach swimming skills;
- Ensure swimming instructors have with lifesaving skills i.e. first aid and CPR;
- Involving local governments and communities to teaching swimming and water safety skills to school-age children;
- Providing day-care for preschool children to ensure supervision when parents are working outside the house;
- Expand the existing ECD (Early Childhood Development) framework in Nepal;
- Train the general public and bystanders in rescue and resuscitation;
- Remind those in charge of the National Disaster Risk Reduction and Management programme of the importance of prevalence of drowning.

## **Final Thoughts**

Most incidents of drowning, especially deaths in children, are preventable. Making authorities responsible and individuals aware about prevailing risks and developing water safety skills can prevent many drowning-related deaths. Community needs and risks can be addressed mobilizing local governments (palikas). For very young children, the best way to do this is to separate them from water. In Bangladesh, this is particularly challenging, especially during the monsoon season when there are full ponds and ditches everywhere. Nepal has also similar situation in monsoon season exacerbated by frequent natural disasters induced by the effects of climate change. Therefore, application of tested safety precautions/measures as well as innovative ideas will be the vital in preventing drowning deaths in Nepal.

## **Conflict of Interest**

The authors declare no conflicts with the present publication.

## **Authors' Contribution**

Hossain is overall responsible author, Pant and Sedain contributed and edited the Nepal-based content, Rahman and Hossain contributed to the Bangladesh-based content, van Teijlingen had the initial idea and wrote the first draft. All authors have edited various versions of the draft and all agreed the final submission.

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