Non-Communicable Diseases Watch

August 2020

衞生防護中心 Centre for Health Protection

衞生署 Department of Health

Drowning:

A Highly Preventable Public Health Challenge

Key Messages

※ Every hour, about 40 people across the globe lose their lives to drowning. Epidemiological studies have implicated a number of risk factors and behaviours in the occurrence of drowning.

※ In Hong Kong, the Department of Health conducted a review of 193 records of unintentional drowning deaths in Hong Kong registered by the Coroner's Court during the 2012 to 2016 period with an aim of understanding the demographic characteristics and risk factors contributing to drowning incidents. The review showed that risky behaviours associated with drowning included performing water activities under adverse weather conditions; performing water activities alone; swimming in the absence of a lifeguard; consuming alcohol before water activities; and taking drugs before water activities.

※ To prevent or reduce the risk of drowning, the Hong Kong Drowning Report made various recommendations for the general public and persons engaging in water activities. The general public are urged to enhance knowledge and skills on water safety (such as learn how to swim and perform cardiopulmonary resuscitation for drowning victims), know the hazards, be alert and pay attention to family members (especially children, elderly persons and family members who need special care). For persons engaging in water activities, they should be prepared (such as acquire the skills required for specific water activities, be accompanied, avoid consuming alcohol and do not take illicit drugs), know the environment (such as avoid water activities during adverse weather conditions and perform water activities in the presence of a lifeguard), and take care of companions.

※ For access to the Hong Kong Drowning Report and more information, please visit www.change4health.gov.hk/filemanager/common/pdf/HK%20Drowning%20Report%20(Eng).pdf.

This publication is produced by the Non-communicable Disease Branch, Centre for Health Protection of the Department of Health

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Drowning: A Highly Preventable Public Health Challenge

Drowning is an important public health issue.[1, 2] Every hour, about 40 people across the globe lose their lives to drowning. They can be toddlers slipping unnoticed into a pool, pond or bathtub when they are left unsupervised; adolescents engaging in water-based activities under the influence of alcohol or psychotropic drugs; adults swimming or diving alone at locations without lifeguards or during adverse weather conditions; passengers on overcrowded or poorly maintained vessels that capsize; or residents of coastal communities stuck by flood disasters from storm surges, cyclones or tsunamis.[2] Despite substantial declines in the global number and rate of unintentional drowning deaths in the past three decades (Table 1),[3] drowning ranks third among the leading causes of unintentional injury death worldwide after road traffic injuries and falls (drowning ranked second after road traffic injuries in the 1990s).[2, 4, 5] In 2017, almost 300 000 people died from unintentional drowning, exclusive of drowning in natural disasters and due to water transport incidents.[3] More importantly, for every drowning death, there are about one to four non-fatal drowning incidents serious enough to warrant hospitalisation,[6] some with profound disabling consequences (such as brain damage from drowning with hypoxia).[6, 7]

Risk Factors of Drowning

Epidemiological studies have implicated a number of risk factors and behaviours in the occurrence of drowning. While drowning affects all age groups, young children are the most vulnerable one because of their low awareness of water dangers and limited swimming skills.[2] Globally, the highest drowning rates are among children aged 1–4 years, followed by children aged 5–9 years.[3] When child drownings occur, very often there is a lapse or absence of parental or adult supervision. In Australia, lack of caregiver supervision was identified as a contributory factor in 72% of child drowning deaths.[8] Compared with females, males are twice as likely to drown partly because of increased access to water (such as through fishing which is a male-dominated occupation) and risky behaviours (such as swimming alone).[2, 4] Primarily due to the adverse effects on psychomotor function and cognition, alcohol is an important risk factor in drowning for adolescents and adults in many countries.[2] Independently or in association with alcohol, drugs (especially psychotropic drugs) increase drowning risk by hampering the ability to swim and reducing survival in water.[9] Moreover, certain underlying medical conditions are associated with an increased risk of drowning, such as epilepsy and heart disease. Compared with the general population, the risk of drowning is reported to be 15–19 times greater in people with epilepsy.[10] In Sweden, a study reported that 14% of unintentional drowning deaths were found to have a heart disease as a possible contributory factor.[11]

Table 1: Global burden of unintentional drowning

	2017	Percentage change between 1990 and 2017
Number of deaths	295 210	⇩ 45%
Age-standardised mortality rate (per 100 000)	4.0	⇩ 57%
Years of life lost ('000)	1 656.3	⇩ 56%
Age-standardised years of life lost rate (per 100 000)	228.3	⇩ 64%

Local Situation

In Hong Kong, drowning is not uncommon. In 2018, there were 36 registered deaths attributed to 'accidental drowning and submersion'.[12] To assess the epidemiology of unintentional drowning injuries in Hong Kong, the Department of Health (DH) conducted a review of 193 records of unintentional drowning deaths registered to the Coroner's Court during the 2012 to 2016 period in Hong Kong. The review revealed that the cases involved 142 males and 51 females, aged 5 to 90, with the median age being 57. While persons aged 65 and above (35%) accounted for the largest proportion of drowning cases, 55% of the fatalities had pre-existing medical conditions including cardio-vascular disease, epilepsy, hypertension, mental/ behaviour disorder etc (Table 2).[1]

The drowning cases happened in many different locations or settings. As shown in Figure 1, the highest number of drowning fatalities occurred in offshore and beaches with 131 deaths (68%), followed by public or private swimming pools with 24 deaths (12%). There were 14 (7%) drowning fatalities occurred at the victim's home or in a domestic environment (such as drowning in a bathtub). For activities undertaken immediately prior to drowning, swimming (46%) and underwater activities including snorkeling and diving (5%) accounted for around half of the drowning fatalities. Moreover, 18 drowning fatalities were resulted from fishing and food gathering (such as clam collection), representing about 9% of all drowning deaths.[1]

Table 2: Unintentional drowning fatalities by sex, age group and presence of pre-existing medical condition, 2012-2016

		Number (%)
Sex	Male	142 (74%)
	Female	51 (26%)
Age group	14 or below	4 (2%)
	15-29	20 (10%)
	30-49	41 (21%)
	50-64	59 (31%)
	65 and above	67 (35%)
	Unknown	2 (1%)
Pre-existing medical condition	Evidence of pre-existing medical condition	107 (55%)
	No evidence of pre-existing medical condition	86 (45%)

Figure 1: Unintentional drowning fatalities by location and activity immediately prior to the event, 2012-2016

Location	Number (%)	Activity immediately prior to the event	Number (%)
Offshore	72 (37%)	Swimming	89 (46%)
Beaches	59 (31%)	Accidental immersion	42 (22%)
Private pools	15 (8%)	Domestic activities	13 (7%)
Domestic setting	14 (7%)	Underwater activities	10 (5%)
Public pools	9 (5%)	Water-based fishing	9 (5%)
River/ stream	8 (4%)	Land-based fishing	5 (2%)
Inland still water	5 (3%)	Water-based food gathering	4 (2%)
Others	4 (2%)	Others	12 (6%)
Unknown	7 (4%)	Unknown	9 (5%)

Base: All 193 drowning fatalities.

Source: Hong Kong Drowning Report, Department of Health.

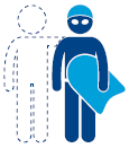
The review also identified a number of risky behaviours in drowning victims (Figure 2),[1] such as

- Of all the 193 drowning fatalities, 104 (54 %) of deaths were known to be alone at the time of drowning.
- Among 59 drowning fatalities took place while the victims were swimming at a beach, 39 deaths (66%) occurred in the absence of lifeguard.
- Among 177 drowning fatalities occurred out-door, 84 (47%) of deaths occurred on a day with adverse weather condition.
- Among 136 drowning fatalities with autopsy and alcohol level analysis performed, 38 (28%) victims had alcohol detected in their bodies.
- Among 154 drowning fatalities with autopsy and drug analysis performed, 57 (37%) victims were found to contain some kind of drugs in their bodies.

Drowning is Preventable

Once someone starts to drown, usually the process from submersion to cardiac arrest merely takes few minutes and the outcome is often fatal. Survival from drowning is determined almost exclusively at the scene of the incident, and depends on how quickly the person is removed from the water and how swiftly proper resuscitation is performed.[13] Studies show that more than 85% of drowning cases can be prevented through public education, swimming instruction, sufficient supervision (such as of young children from parents and other adults), technological equipment (such as drowning detection system for swimming pools and early warning systems for floods), rules and regulations (such as for swimming pool and ferry safety).[7]

Figure 2: Unintentional drowning fatalities by risky behaviours, 2012-2016

Risky behaviour		Number (%)
Performed water activities alone*		104 (54%)
Swam in the absence of a lifeguard@		39 (66%)
Performed water activities under adverse weather conditions#		84 (47%)
With alcohol detected in the body^		38 (28%)
With drugs detected in the body+		57 (37%)

Bases: *All 193 drowning fatalities;
@59 drowning fatalities who swam at a beach;
#177 drowning fatalities occurred outdoor;
^136 drowning fatalities with autopsy and alcohol level analysis performed;
+154 drowning fatalities with autopsy and drug analysis performed.
Source: Hong Kong Drowning Report, Department of Health.

While drowning prevention demands efforts and coordination across various sectors, the Hong Kong Drowning Report made 15 recommendations on drowning prevention (Box 1) for the general public and also for persons engaging in water activities.[1]

Box 1: Recommendations on drowning prevention for the general public and persons engaging in water activities



Source: Hong Kong Drowning Report, Department of Health.

For access to the report and more information, please visit www.change4health.gov.hk/filemanager/common/pdf/HK%20Drowning%20Report%20(Eng).pdf.



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