Epidemiological profile of drowning in Nepal. Preliminary data from the Kathmandu region

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\textbf{Background}

Unintentional drowning rates in low- and middle-income countries, especially in South-East Asia, are higher than in high-income countries. In Nepal, no injury surveillance system exists and WHO data as well as national or regional statistic data on drowning are not currently available. However, medico-legal autopsies are generally performed for all non-natural deaths, including drowning.

\textbf{Aim}

To describe the epidemiological profile of unintentional drowning death in the Kathmandu district (pop. ca. 1,300,000), November 2005 to October 2010.

\textbf{Methods}

All bodies found in water during the study period and referred by the police authorities to the Department of Forensic Medicine, Kathmandu, for medico-legal autopsies were included in the study. All medico-legal records were screened to extract available demographic and circumstantial data.

\textbf{Results}

During the study period 205 bodies (166 males, 39 females) were found in water and were investigated at the Department of Forensic Medicine, Kathmandu. Among these, 163 were found in the Kathmandu district, which include the capital metropolitan area, and 42 bodies in six adjacent districts, which include popular picnic spots along rivers. The most common certified cause of death was drowning (n=144). In 50 cases, the cause of death was not specified, mainly because of the delayed recovery of the body from water with advanced decomposition changes. However, in most of the latter cases too, drowning was likely the cause of death. The manner of death was unintentional in 144 cases, undetermined in 58 cases, suicide in six cases and homicide in one case. Overall, 79 (38.5\%) of victims were less than 18-years old and 49 (23.9\%) less than 11-years old. The number of victims among those older than 50 years was 18 (8.8\%). The most common site of death was river (n=118; 57.6\%) followed by well (n=31; 15.1\%), water reservoir tank (n=19; 9.3\%), ditches (n=12; 5.9\%), ponds (n=9; 4.4\%), swimming pools (n=6; 2.9\%), bucket or other small water containers (n=6; 2.9\%) and canal (n=4; 1.9\%). Most deaths (n=115; 56.1\%) occurred during the rainy season, i.e. from May to August. Concerning the circumstances and pre-drowning activities, four main patterns of drowning accidents were identified: a) drowning while crossing a river during the rainy season in areas with no bridges, b) children drowning while bathing and swimming in unattended and potentially dangerous bodies of water, c) infant and children drowning as a consequence of fall in water reservoir tanks, buckets or ditches while playing, d) drowning of drunken people or non-swimmers while attempting to swim in rivers, near picnic spots.

\textbf{Conclusions}

In Nepal, medico-legal autopsy rates in drowning cases are high compared with other low- and middle-income countries. Medico-legal reports represent a potentially reliable tool to monitor basic information on drowning deaths. However, in Nepal, drowning is still a neglected public health issue and so far no procedures for the systematic collection and analysis of in-depth data on drowning accidents exist and no specific countermeasures are being developed. The high rates of drowning deaths in the Katmandu district, especially among children, and their specific circumstantial profiles, suggest that drowning deaths could greatly beneficiate, also in Nepal, from basic prevention programs.

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