

Drowning incidents among foreign nationals in Okinawa: a retrospective study using helicopter emergency medical service data

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Background: Drowning remains a major cause of accidental death worldwide, particularly in coastal and tourist regions. Previous studies have suggested that foreign nationals may be disproportionately affected by drowning incidents; however, analyses based on systematic prehospital emergency medical data are limited, and no such studies have been conducted in Japan.

Methods: We retrospectively reviewed drowning-related helicopter emergency medical service (HEMS) dispatches in Okinawa Prefecture, Japan, between April 2016 and March 2025. Only completed dispatches were included. Patient characteristics included age, sex, nationality (Japanese or foreign national), and cardiopulmonary arrest (CPA) status. To evaluate the impact of international travel restrictions, cases were categorized into three periods: pre-COVID (April 2016-January 2020), COVID period (February 2020-May 2023), and post-COVID (June 2023-March 2025).

Results: During the study period, 226 drowning-related HEMS dispatches were recorded, of which 170 were accepted and analyzed. The median patient age was 43 years (interquartile range 25-59), and 65.3% of patients presented with CPA. Among the analyzed cases, 122 (71.8%) involved Japanese nationals, 36 (21.2%) involved foreign nationals, and 12 (7.1%) had unknown nationality. The proportion of foreign-national drowning cases declined markedly during the COVID period (8.3%) compared with the pre-COVID period (28.1%), corresponding to restricted international travel. In the post-COVID period, the proportion increased again (23.1%), although it did not clearly return to pre-pandemic levels. Among patients transported to the hospital, over one-third died during or shortly after emergency care, while survivors demonstrated a wide range of neurological outcomes at discharge.

Conclusion: This study is the first in Japan to analyze drowning incidents among foreign nationals using prehospital HEMS data. The findings suggest that international travel volume strongly influences drowning risk in Okinawa. As global tourism continues to recover, targeted multilingual prevention strategies, visitor education, and enhanced coastal safety measures are essential to reduce preventable drowning deaths in tourist regions.

Keywords: Drowning, foreign nationals, helicopter emergency medical services (HEMS).