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A comparative analysis of dextromethorphan abuse in Thailand and the United States from 2010-2017

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Objective: To describe and compare characteristics, co-abuse substances, clinical effects, treatments, and outcomes of reported dextromethorphan (DXM) abuse exposures in the United States and Thailand. DXM is sold over-the-counter in the United States (U.S.), while purchasing is restricted in Thailand. DXM abuse exposure in adolescents has been a public health concern in both countries.

Methods: This is a retrospective cohort study of DXM abuse exposures reported to the National Poison Data System (NPDS) of the United States and to the Ramathibodi Poison Center (RPC) of Thailand during 2010 to 2017. Characteristics, co-abuse substances, clinical effects, treatments, and outcomes of intentional abuse exposures were described, and compared between cases reported to the RPC and to the NPDS. NPDS was used as the reference in comparative analyses. Multivariate analyses determining association between death and factors, including, co-ingestion substances, country, age, and gender were performed.

Results: There were 34,357 (74% single-substance) DXM abuse cases reported to the NPDS and 98 (49% single-substances) cases reported to the RPC. The most common age groups in both countries were 6-19 years (56.9% in the U.S.; 70.4% in Thailand). Common co-ingested substances were ethanol (7.8%), a second medication containing DXM (4.4%), and marijuana (4.1%). In Thailand, there were more reports of co-abuse with opioids (OR 10.83, 95% CI 5.98-18.55) and stimulants (26.37, 16.00-42.42). Common clinical effects were tachycardia (53.2%), drowsiness/lethargy (31.1%), and hypertension (25.7%). In Thailand, there were more reports of seizures (OR 14.83, 95% CI 8.64-24.28), coma (6.35, 1.97-15.3), and fever/hyperthermia (3.09, 1.12-6.67). Tachycardia (0.35, 0.21-0.55) and mydriasis (0.12, 0.01-0.43) were more commonly reported in the U.S. than Thailand. The majority of medical outcomes were minor effects (97.6% of U.S. cases; 89.8% of Thai cases). There were 30 deaths total: 29 deaths (0.1%) in the U.S. and 1 death (1.0%) in Thailand. From multivariate analyses, co-abuse substances associated with death were opioids (21.85, 9.14-52.25), serotonin reuptake inhibitors (18.69, 5.36-65.25), and stimulants (7.63, 2.76-21.11). Gender and country were not associated with death. Older ages were associated with more frequent deaths (OR 1.05 for every 1 year, 95% CI 1.03-1.09).

Conclusion: There were more reports of multiple substance exposures, seizure, coma, and fever/hyperthermia in Thai dextromethorphan abusers than in U.S. abusers. Specific factors associated with death were age and co-abuse with opioids, serotonin reuptake inhibitors, and stimulants. Thai patients were more likely to experience serious clinical effects, which may be explained by the higher proportion of multiple-substance abuse.