"Earthquakes in Europe"

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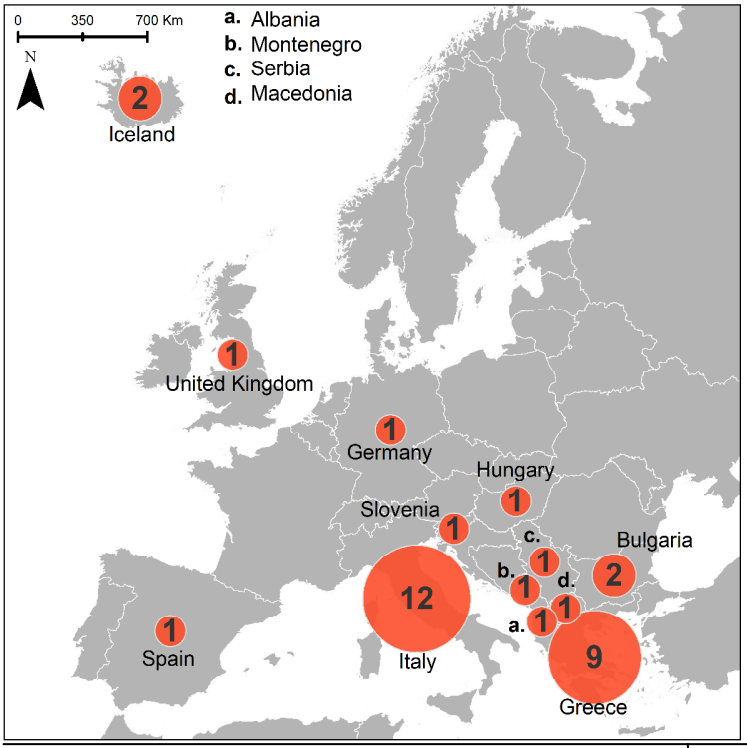
A) Number of reported earthquakes in Europe by country 2000-2017



34 earthquakes

701 deaths

257,373 affected

US$ 29 billion damages

Amongst natural disasters, earthquakes are one of the most lethal kinds due to their unpredictable nature and devastating impact they can have in a matter of seconds. They can occur anywhere, at any time and impact differently depending on their magnitude, the season, the built environment, the time of day, causing a wide range of potential consequences on population. This make them a matter of political and humanitarian concern for health practitioners, policymakers and the hazard management community.

EM-DAT data indicates that 504 earthquakes occurred worldwide between 2000 and 2017 (5). In Europe[a], in the same range of time, among 891 natural **disasters**[b], **34** are earthquakes (average magnitude 5.7) affecting 13 different countries, mainly Italy and Greece (A). The impact of which resulted in **701 deaths**, **257,303 people affected** (including **95,189 homeless and 3,103 injured)** and almost **US$ 29 billion** in economic damages. In 34 earthquakes captured, 15 had a magnitude higher than 6.0.

The year with the highest economic losses was 2012, at 2017 US$ 16 billion, mainly due to the earthquake in Emilia Romagna - Italy[c].

[a] *This CRED CRUNCH issue focused on Europe continent. Several events occurred in border countries, such as Turkey and Russia, that for geographical reasons were excluded from our analysis.*
[b] *The CRED CRUNCH newsletter does not include epidemics and insect infestations as natural disasters unless explicitly stated.*
[c] *EM-DAT contains data on disasters from 1900 to the present day*

The second costliest year was 2016, reflected in the impact of three earthquakes affecting the centre of Italy (Amatrice). Finally, 2009 and 2002 are respectively the third and fourth costlliest years in consequence of L'Aquila (US$ 2,8 billion) and San Giuliano (US$ 1) earthquakes (B).
In terms of human impact, Italy witnessed the highest burden of earthquakes with 679 deaths and 124,000 people affected followed by Greece, Serbia and Spain (C).

Earthquakes are not only responsible for many casualties, but also for protracted health problems. The main immediate medical needs are rescue, triage, evacuation and emergency care of major, minor and fatal trauma due to building collapse, entrapment, falls, burns. In addition to this, entrapment under debris and collapsing building are the most common cause of death.
On the other hand, population displacements and crowded shelters, may induce health hazards and lead to communicable or other diseases among the survivors, as well as nutritional problems which can raise and persist even after the emergency is over.

Over the years, scientists and researchers have detected how much an earthquake could potentially damage an area and subsequently they have increasingly focused, in a public health perspective, their attention on the human impact of earthquakes. While there is a predominance of research focused on earthquake-associated mortality, less is known on earthquake-related morbidity.

All figures presented in the CRED CRUNCH come from "EM-DAT: The OFDA/CRED International Disaster Database"
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B) Economic impact in 2000-2017 in Europe

In absolute amounts (2017 US$ million)	
Italy	27,665
Greece	648
Spain	217
Serbia	148
United Kingdom	71
Iceland	34
Germany	15
Slovenia	12
Macedonia	10

C) Human impact in 2000-2017 in Europe

	No. of affected	No. of deaths
Italy	124,000	679
Greece	82,701	8
Serbia	27,030	2
Spain	15,300	10
United Kingdom	4,501	-
Hungary	1,800	-
Bulgaria	737	-
Slovenia	605	1
Iceland	199	-
Albania	150	-
Germany	150	-
Macedonia	100	-
Montenegro	100	1

In this perspective, recent epidemiological studies have shed light on the disease patterns following earthquakes aiming at the identification of the characteristics of vulnerable populations. Care of survivors and long-term follow-up are essential in affected areas: particular attention has been addressed to some diseases, such as mental health disorders, cardiovascular conditions or other chronic diseases.

Loss of relatives or friends, damaged housing and a disrupted access to internal medicine and psychiatry services are associated with a higher risk of posttraumatic stress disorder symptoms (1). Negative mental health consequences were found in children in terms of significantly lower verbal intelligence quotient (IQ) after a natural disaster (2). On the other hand, a study in 2009 found a higher mortality due to cardiovascular disease after an earthquake both in men and women, in comparison to the pre-earthquake phase, confirmed by a recent study (3). The increased blood systolic pressure or worsening of glycemic control might have caused an increase in the risk of cardiovascular disease after the disaster (2).

This gives the best chance in both current and future risk to significantly reduce earthquake-related mortality and morbidity by means of prevention strategies. They are more effective when populations, the health sector emergency planners and responders, and public infrastructure are prepared.

Hence, preventive measures to promote the adjustement of healthcare systems to treat cardiovascular diseases after natural disasters could be implemented with the purpose of reducing the amount of damage caused by a future disaster.

To improve knowledge on this topic, CRED is performing a research study in collaboration with L'Aquila University in Italy on consequences of 2009 L'Aquila earthquake aiming to assess its impact on population in terms of hospitalization and mortality patterns. Outside of European borders, CRED is undertaking a research project in partnership with the Tribhuvan University Teaching Hospital in Nepal, which aims to study the impact of the devastating 2015 earthquake on the hospital admissions and its functioning.

References

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2. Tsuboya et al. Perspectives acquired through long-term epidemiological studies on the Great East Japan Earthquake. Environmental Health and Preventive Medicine (2017) 22:3
3. Nakagawa I, Nakamura K, Oyama M, et al. Long-term effects of the Niigata-Chuetsu earthquake in Japan on acute myocardial infarction mortality: an analysis of death certificate data. Heart 2009;95:2009-2013.
4. Nakamura M, Tanaka K, Tanaka F, et al. Long-Term Effects of the 2011 Japan Earthquake and Tsunami on Incidence of Fatal and Nonfatal Myocardial infarction. Am J Cardiol 2017;120:352e358
5. EM-DAT: The Emergency Events Database - Université Catholique de Louvain (UCL) - CRED, D. Guha-Sapir - www.emdat.be, Brussels, Belgium. As of the date of the 20th of July 2018

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♦Recent publications:

→ Heudtlass P., Guha-Sapir D., Speybroeck N. (2018) A Bayesian hierarchical model for mortality data from cluster-sampling household surveys in humanitarian crises. International Journal of Epidemiology; 9p.

→Rodriguez-Llanes,JM. Guha-Sapir D., Schluter B-S., Hsiao-Rei Hick M. (2018) Epidemiological findings of major chemical attacks in the Syrian war are consistent with civilian targeting: a short report. Conflict and Health; 12: 16

Please note that disaster data are subject to change as validation and cross-referencing of the sources is undertaken and as new information becomes available. For any enquiries please contact contact@emdat.be or visit www.emdat.be