

# Mathematical modeling of the suicidal risk growth of the Spanish population: a qualitative and quantitative dynamic approach

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## ***Abstract***

Suicide is one of the leading causes of death for all ages of the general population, but its relevance seems to be hidden by several reasons (Hawton, Casañas I Comabella, Haw, & Saunders, 2013; Leadholm, Rothschild, Nielsen, Bech, & Stergaard, 2014). In fact, western media coverage minimizes their writing about the subject and calls the public attention to alternative issues; this pattern tries to prevent “social contagion” (Werther effect), but also it responds to an initial lack of evidence about the problem.

Contrary to popular assumption, suicidal behavior does not only occur in countries with bad weather, or limited sunshine; it also takes place in countries such as Spain, where international media links us to tourism and happiness, ignoring an increasingly hidden problem (Miret et al., 2014). In fact, in Spain the suicide is the second non-natural death, beneath the traffic mortal accidents.

One of the reasons that explains the hidden nature of the problem is the undetermined level of suicidal intend cases that leads police investigations and medico-legal examinations to non-conclusive results for a large number of deaths (by poisoning, drawings...), which are classified as accidents.

In recent years, associations preventing from suicide have emerged, but they have not captured massive public attention. This social problem has in common characteristics with other mental disorders such as drugs addiction, depression; thus, suicidal behavior is a kind of mental disorder, (Gea et al., 2013).

In fact, the fatal event of a person taking his/her own life, affects their close neighborhood (family and friends) by the experienced loss as well as society due to the loss of productivity and health care costs (Dias de Mattos Souza, Lopez Molina, Azevedo da Silva, & Jansen, 2016)

The neglect of this phenomenon stems from a lack of measure, which is uncontrolled and hence can not be improved. Thus, sizing the population at risk of suicide has an undoubted social interest.

The quantification of the general population to the risk of attempting suicide is not an easy task. It is also controversial due to the multidisciplinary nature of the problem. In fact, previous studies

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tackling the suicidal behavior have not agreed on an approach to determine the magnitude of the problem.

In this paper we address the quantification of the Spanish population at risk of attempting suicide aged among the interval [14, 78] during the period of time July 2015 to December 2020. Thus, a discrete mathematical model will be created to quantify the level of risk of attempting suicide of Spanish population by taking into account demographic, cultural, and socio-economic factors.

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