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Prevalencia de la ideación suicida en estudiantes de Medicina en Latinoamérica: un meta análisis

Prevalence of Suicidal Ideation in Medical Students of Latin America: a Meta-analysis

Prevalência de ideação suicida em estudantes de medicina na América Latina: uma meta-análise

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Resumen

Hablar de conductas suicidas es hablar de diferentes etapas o fases que la persona puede llegar a presentar; generalmente inicia con un pensamiento suicida, después una planeación del suicidio y, finalmente, la búsqueda de los recursos para llegar al suicidio. Es importante señalar que la secuencia de estas fases no es una regla general; sin embargo, cada una de ellas pone en riesgo a la persona. El objetivo es realizar una revisión de los pasos que se han dado para constituir en objeto de investigación la ideación suicida y el suicido consumado en estudiantes de medicina. Es una investigación documental de tipo meta-análisis. El meta análisis es una integración estructurada y sistemática de la información obtenida en diferentes estudios, en este caso sobre la ideación suicida y el suicidio. Este tipo de revisión da una estimación cuantitativa y sintética de todos los estudios disponibles. En esta revisión se destacan los instrumentos utilizados para medir esta problemática, como son: el Inventario de Depresión de Beck, Inventario de Orientaciones Suicidas de Casullo, la Escala de Personalidad de Catell, el Cuestionario Multimodal de Interacción Escolar, escala de Zung, entre otros. El suicidio es un problema de salud pública, responsable de más de 800 000 defunciones anuales en todo el mundo y es la segunda causa de muerte en individuos entre los 15 y 29 años de edad; este fenómeno ha comenzado a ser estudiado en Latinoamérica en fecha reciente. A partir de lo observado en este meta-análisis, basado en estudios incluidos en los buscadores Medline, Cochrane y Scielo, la prevalencia media de ideación suicida en Latinoamérica es 13.85 %, ligeramente por debajo de lo observado en Europa y Estados Unidos. La prevalencia media observada en México es 8.76 % aunque este valor es poco confiable dado que es producto de 3 estudios en los que la metodología usada fue distinta y en dos de ellos se incluyeron residentes médicos en vez de estudiantes de pregrado. En conclusión, deben realizarse estudios metodológicamente bien planeados para valorar la ideación suicida en estudiantes de medicina, analizando variables como el sexo, el año escolar, el abuso de sustancias tóxicas, psicopatologías asociadas y otras características sociodemográficas que nos permitan explicar la razón por la que la ideación suicida pudiera ser más elevada en estudiantes de medicina, hecho que sugieren diversos estudios realizados en el mundo en poblaciones heterogéneas.

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Palabras clave: ideación suicida, suicidio, estudiante de medicina.

Abstract

Introduction.- Talking about suicidal behavior includes different stages an individual may present; usually begins with a suicidal thought, then a suicide plan and finally, the search for resources to commit suicide. It is important to note that the sequence of these phases is not a general rule; however, each of them puts the person at risk. **Objective.-** To perform a review of the steps that have been taken to constitute suicidal ideation and consummated suicide in medical students. It is a documentary research of meta-analysis type. **Method.-** The Meta Analysis is a structured and systematic integration of the information obtained in different studies, in this case based on suicidal ideation and suicide. This type of review gives a quantitative and synthetic estimate of all available studies. This review highlights the instruments used to measure this problem, such as the Beck Depression Inventory, Suicidal Guidance Inventory, the Catell Personality Scale, the Multimodal School Interaction Questionnaire, Zung Scale, among others. **Results.** Suicide is a public health problem, responsible for more than 800,000 deaths annually worldwide and is the second leading cause of death in individuals between 15 and 29 years of age; this phenomenon has been studied in Latin America until recent years; based on studies found in Medline, Cochrane and Scielo databases, the average prevalence of suicidal ideation in Latin America is 13.85%, slightly below that observed in Europe and the United States. The average prevalence observed in Mexico is 8.76%, although this value is unreliable since it is the product of 3 studies in which the methodology used was different and in two of them medical Residents were included instead of undergraduate students. **Conclusions.** Methodologically well-designed studies should be carried out to evaluate suicidal ideation in medical students, analyzing variables such as sex, school year, substance abuse, associated psychopathologies and other sociodemographic characteristics that allow us to explain why suicidal ideation could be higher in medical students, a fact that seems to be suggested by several studies conducted in the world, including heterogeneous populations.

Key words: Suicidal ideation, suicide, medical student.

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Resumo

Falar sobre o comportamento suicida é falar sobre diferentes estágios ou fases que a pessoa pode apresentar; geralmente começa com um pensamento suicida, depois o planejamento do suicídio e, finalmente, a busca de recursos para alcançar o suicídio. É importante notar que a seqüência dessas fases não é uma regra geral; no entanto, cada um deles coloca a pessoa em risco. O objetivo é realizar uma revisão das etapas que foram tomadas para constituir ideação de suicídio e consumar suicídio em estudantes de medicina. É uma pesquisa documental de meta-análise. A meta-análise é uma integração estruturada e sistemática da informação obtida em diferentes estudos, neste caso sobre ideação suicida e suicídio. Este tipo de revisão fornece uma estimativa quantitativa e sintética de todos os estudos disponíveis. Esta revisão destaca os instrumentos utilizados para medir esse problema, como: o Inventário de Depressão de Beck, o Inventário de Orientação Suicidal de Casullo, a Escala de Personalidade de Catell, o Questionário de Interação de Escola Multimodal, Escala de Zung, entre outros. . O suicídio é um problema de saúde pública, responsável por mais de 800 mil mortes por ano em todo o mundo e é a segunda principal causa de morte em indivíduos entre 15 e 29 anos de idade; Esse fenômeno começou a ser estudado na América Latina recentemente. Com base no que foi observado nesta meta-análise, com base em estudos incluídos nos motores de busca Medline, Cochrane e Scielo, a prevalência média de ideação suicida na América Latina é de 13,85%, um pouco abaixo da observada na Europa e nos Estados Unidos. A prevalência média observada no México é de 8,76%, embora este valor não seja confiável, pois é o produto de três estudos em que a metodologia utilizada foi diferente e em dois deles os residentes médicos foram incluídos em vez dos estudantes de graduação. Em conclusão, estudos metodologicamente bem planejados devem ser realizados para avaliar ideação suicida em estudantes de medicina, analisando variáveis como sexo, ano escolar, abuso de substâncias, psicopatologias associadas e outras características sociodemográficas que nos permitem explicar o porquê a ideia suicida poderia ser maior nos estudantes de medicina, fato que sugere vários estudos realizados em todo o mundo em populações heterogêneas.

Palavras-chave: ideação suicida, suicídio, estudante de medicina.

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Introduction

Suicide, according to the World Health Organization, has become a major cause of death in the world, being already the second leading cause of death in individuals between 15 and 29 years of age, and being responsible for the death of more than 800,000 people each year (WHO, 2017).

However, although the statistics of consummate suicides are alarming, it is of greater concern that suicidal ideation is on the rise worldwide (Raeisei, 2015), in relation to various factors including depressive disorders, anxiety disorders, family problems, socioeconomic limitations and substance abuse, among other factors (Córdoba et al., 2007).

For this reason, it has been tried for several years to determine the prevalence of suicidal ideation in different population groups, as well as the differential factors that determine their greater or lesser prevalence by geographic region, by socioeconomic sector or even by educational activity or (MacLean, 2016).

Suicidal ideation must be differentiated, on the one hand, which consists in the thought and the recurrent planning that an individual performs to commit a suicide, but that does not get to realize it at any moment; on the other hand we have the suicide attempt, which is that act performed by an individual, voluntarily and planned, with the goal of ending his life, in case of not succeeding it remains as a failed suicide attempt, but in case of achieving its mission then we speak of consummate suicide (Pérez, 1999).

The differentiation of the above terms is of the utmost importance given that we can apply scales in which the suicidal ideation of an individual is measured over a certain period of time (for example, in the 12 months prior to the application of the scale) or at some point

during his whole life. We can apply scales that determine if the person with suicidal ideation has made a suicide attempt and finally, we can establish the statistics of the suicides finally consummated, the factors that motivated them and the means used by the suicide to achieve their end (Roziek et al., 2016).

There is still some doubt in the concept that suicidal behavior is a continuous line where suicidal ideation is the beginning and consummate suicide is the end; for this purpose, it has been attempted to explain that suicide is a phenomenon associated with external and internal factors, through which people perceive and adapt to their environment (Córdoba et al., 2007). In general, some authors (Pérez, 1999, Cordova et al., 2007) argue that suicidal ideation consists of four stages: the desire to die, suicidal representation (passive fantasies of suicide), suicidal ideation without a certain method (idea of self-destruction without action) and the planned suicidal idea (planned suicide). It is clear that from this last factor the arrival of the suicide attempt becomes imminent and, if it were to be achieved, would be considered a consummate suicide.

Suicidal ideation in medical students

For more than 15 years (Tyssen et al., 2001), medical personnel and medical students of any level who experienced high rates of depression and anxiety have become notorious, above that observed in the population in general (Mavor et al., 2014).

One of the aspects of greatest concern at the time was the possibility that the tendency toward suicidal ideation, suicide attempts and consummate suicides were higher in that academic sector (López et al., 2009).

It is well known that in most medical educational institutions in the world, the level of demand for learning extensive knowledge and mastery of diagnostic and surgical treatment techniques make medical students exposed to anxiety levels and stress that may be higher than those observed in other disciplines (Slavin, 2016). Medical students are faced with

broken class schedules, complicated assessments, high levels of competitiveness, excessive workload, few hours of sleep and uncertainty about the application of their theoretical knowledge in real situations and their future achievements (Martínez et al. al., 2016).

Early medical students present psychological or psychiatric disorders of similar prevalence to that observed in other careers (Mackenzie, 2011); however, apparently this situation is changing as the student progresses in their preparation, especially before entering the undergraduate and then in the medical residency, especially if it is a surgical type (Cruzado, 2016).

The most frequently used suicide ideation scale is the Roberts Suicidal Ideation Scale (1995), followed by Beck's Suicidal Ideation Scale (1979); both scales seek to determine the prevalence of suicidal ideation through items that analyze the possibility of suicide, the frequency of suicidal ideation, and the time elapsed since the suicide ideation began (Rudd, 2000). These instruments allow to determine if an individual has suicidal ideation and, with that, to determine frequency percentages in different populations (Córdova et al., 2013).

The first studies were carried out especially in the population of economically advanced countries, especially in the European continent, the United States and Canada; however, soon afterwards the prevalence and associated demographic factors in other parts of the world, including Latin America (Fan et al., 2011), began to be studied.

It has been difficult to conduct a comparative or meta-analysis of the observations made in various parts of the world (Rottenstein, 2016), since the suicide measurement scale has been variable, the medical student population has been heterogeneous and the methods of statistical analysis and presentation of results are highly variable and can not be extrapolated to other parts of the world (Puthran, 2016).

In the countries of the European continent, as well as in the United States and Canada, studies have yielded disparate values, in part because of the size and type of population studied and the parameters and instruments used to measure them. Table 1 lists the results obtained in the

studies carried out from the year 2000. As can be observed, the size of the population studied was 11 506 students of all grades (mean 921.33, 200-4287); the mean percentage of suicidal ideation was 14.85% (1.4 - 43%), although this conclusion is not valid since the measurement methodology was different. It is noteworthy that the average percentage of attempted suicide was 1.63%, a value established from three studies in which it was determined.

Table 1. Prevalencia de ideación suicida en países desarrollados.

Autores	Año	País o ciudad del estudio	Número de estudiantes	Porcentaje de Ideación suicida	Otros valores estudiados
Coentre et al.	2016	Portugal	236	3.9 %	Depresión 6.1 %
Matheson et al.	2016	Canadá	381	15.6 %	Ansiedad 40 %
Gignon et al.	2015	Francia	255	10 %	Abuso de alcohol 25 %
Miletic et al.	2015	Bulgaria	1298	13.5 %	
Allrogen et al.	2014	Alemania	714	14.3 %	Intento suicida 1.3 %
Schwenk et al.	2010	Michigan EU	505	1.4-7.9 %	Depresión 14.3 %
Eskin et al.	2011	Austria	320	37.8 %	Intento suicida 2.2 %
Curran et al.	2009	Dublín, Irlanda	338	5.9 %	Depresión 13.9 %
Goebert et al	2009	Hawaii, EU	2000	6 %	Depresión 12 %
Dyrbie et al.	2008	Minnesota, EU	4287	11.2 %	
Martinac et al.	2003	Bosnia	200	9.16 %	Aumenta a 13.6 % en 6º año de Medicina
Tyssen et al.	2001	Noruega	522	43 %	Intento suicida 1.4 %

Source: elaboración propia.

As of 2010, some studies have been carried out in developing countries (not counting Latin America) where there have been differences that are relatively similar to those in developed countries. Making a difference in the analysis between developed and underdeveloped countries does not have a discriminatory purpose in itself, but the factors associated with suicidal ideation and belief systems about suicide as such are extremely different, especially

in Asian countries of Muslim religion the Buddhist. As shown in Table 2, a total of 22,041 medical students were included in the studies (mean 1836.75, 115-10297); the mean percentage of suicidal ideation was 18.25% (7.5 - 35.6%) and the mean suicide attempt percentage was 4.27% (1.47 - 6.9%). It is noteworthy that the average percentage of suicidal ideation in underdeveloped countries was higher than that observed in developed countries (18.25% vs. 14.85%), similar to the average suicide attempt (4.27% vs. 1.63%).

Table 2. Prevalencia de la ideación suicida en países en vías de desarrollo.

Autores	Año	País o ciudad del estudio	Número de estudiantes	Porcentaje de Ideación suicida	Otros valores estudiados
Ahmed et al.	2016	Egipto	672	12.75 %	
Sobowale et al.	2014	China	348	7.5 %	Depresión 13.5 %
Osama et al.	2014	Pakistán	331	35.6 %	Intento suicida 4.8 %
Yang et al.	2014	China	10,297	16,52 %	Intento suicida 1.47 %
Amiri et al.	2013	Emiratos Arabes	115	17.5 %	Intento suicida 1.8 %
Fan et al.	2011	Singapur	345	12.4 %	
Van Niekerk et al.	2012	Sudáfrica	874	32.3 %	Intento suicida 6.9 %
Menezes et al.	2012	Nepal	206	10 %	
Eskin et al.	2011	Turquía	326	27.3 %	Intento suicida 6.4 %
Jeon et al.	2009	Corea del Sur	6986	34 %	
Liu et al.	2011	Beijing, China	1204	13.2 %	
Inam et al.	210	Arabia Saudita	340	11.4 %	Depresión 66.6 % mujeres, 44.4 % hombres

Source: elaboración propia.

Suicidal ideation in medical students in Latin America

From the studies conducted since the beginning of the century in European and North American countries, the interest arose to know the prevalence of suicidal ideation, suicide attempt and consummate suicide in medical students in the rest of the world. In Table 2 we present the evidence in Asian and African countries. We will analyze what has been studied in Latin American countries, with special emphasis on Mexico.

According to statistics provided by PAHO (Latin American Health Organization) for Latin America, consumed suicide rates are lower than those reported in other latitudes (Derive,

2017). The adjusted rate for Latin America and the Caribbean is 5.2 per 100,000 inhabitants, although in some countries this rate is higher (Cuba, Guyana, Suriname and Uruguay, especially in men whose suicide rate is higher than that of women 11.5 vs. 3.0 per 100 000 population) (OPS, 2014).

The studies carried out in university students in Latin America focus mainly on suicidal ideation, the instruments or scales used to measure it, as well as the sociodemographic factors that surround it. As in studies in other parts of the world, some of them study the relationship between suicidal ideation and factors such as depression, anxiety, substance abuse and other less important factors (Franco, 2017).

Based on the literature review, it is evident that in Latin American countries, including Mexico, the number of studies carried out to measure suicidal ideation, suicide attempt and consummate suicide in medical students is low compared to those registered in other parts of the world, especially in Europe and the United States.

Latin American countries, except Mexico

In most Latin American countries, the prevalence of various psychiatric pathologies in health sciences students, especially in medicine (Pérez, 2008) has been sought; most of them analyze the frequency of depressive disorders, anxiety disorders and, of course, suicidal behavior in all three manifestations (suicidal ideation, suicide attempt and consummate suicide).

In Chile, a study of the frequency of depression in medical students was made through the Goldberg Questionnaire and the Beck Depression Inventory, finding a rate of 21% of 569 students included (Santander, 2011). In the same country, a study was conducted to assess the prevalence of anxiety disorder in medical students, finding a rate of 38.7% in 326 students (Meyer, 2013). However, none of them analyzed the frequency of suicidal ideation, but it is clear that depressive and anxiety disorders have been linked to suicidal ideation.

In Venezuela, a study was conducted to determine the frequency of depression in medical students through the Beck Depression Inventory, finding a rate of 23.31% in 223 students; observed that living alone or having lost a parent may be predisposing factors to depression in the sample studied. They do not analyze the frequency of suicidal ideation (Arias, 2004).

In Panama, a study was conducted to determine the prevalence of depressive disorder in medical students, using the Zung scale. They found a mild prevention rate in 14.8%, moderate depression in 5.7%, and severe depression in 0.8% in a sample of 122 students; did not rate the frequency of suicidal ideation (Phillips, 2006).

In Argentina two studies have been conducted to determine the frequency of depression and anxiety in medical students. In one, depression rates of 36% and anxiety of 63% were found in 159 students (Motta, 2006). In the other study, the Zung scale was used to determine the prevalence of depressive disorder in fifth year medical students, finding a depression rate of 35.18% in males and 26.36% in females; none of the two studies specifically assessed suicidal behavior in all three manifestations (Hidalgo, 2003).

In Paraguay, a study was carried out to assess the frequency of neuropsychiatric disorders in 91 medical students, using different scales. They found that 58.2% of the sample had some mental disorder, including hypomanic episodes (21%), generalized anxiety disorders (16.5%) and depressive disorders (23.1%). Although not the purpose of their study, they analyzed that a third of the patients with depressive disorders presented suicidal risk, without specifying the form of manifestation or the criterion of measurement (Barrios, 2015).

In Ecuador, a study was carried out analyzing suicidal ideation in 89 students of Medicine and Psychology, two careers that have frequently been linked to high rates of suicidal ideation in the world. They used the ISO-30 (Inventory of Suicide Orientations) finding a risk of severe suicide in 4.5%, moderate in 19.1% and mild in 76.4%, similar in both races; observed that anxiety disorder, current depressive disorder and male gender were risk factors for severe suicidal ideation in the sample studied (Cordero, 2009).

In Colombia, several studies have been carried out related to the topic. One of them did not analyze suicidal ideation as such, but rather focused on the frequency of bullying in medical students, suggesting that the anxiety generated could contribute to depression and suicidal ideation. The authors found that 18.7% of the population studied (n = 375) had been subjected to some kind of bullying, whether physical (14.1%), verbal (14.9% %) or cybernetic (8.8%), which could affect their subsequent performance (Millán, 2015).

Likewise, in Colombia, a total of five studies specifically analyzed suicidal ideation, but the sample used were university students from other careers and one of them in the adolescent population. In one study, the suicide risk, determined by Plutchik's suicide risk scale, was 6.7% and the Suicidal Ideation Inventory was 19.7%, in a population of 255 students from various careers (Alzate, 2015). In a similar study, using the Beck Depression Inventory, a suicide ideation rate of 41% was found in 625 students of various careers (Amézquita, 2003). Siabato et al. assessed the risk of suicidal ideation in 258 university students using the Positive and Negative Suicidal Ideation Inventory (PANSI), especially related to living in free union, stressful life events, emotional dependence, impulsivity and depression (Siabato, 2015). The same authors found a suicide ideation rate of 30% in 289 adolescents between the ages of 14 and 17, using the same metric scale (Siabato, 2017). Finally, Suárez et al. (2016) found a suicide ideation rate of 7.5% in a sample of 186 non-medical university students, using Beck's Suicidal Ideation Inventory.

In Colombia, suicidal behavior in medical students has been specifically studied; in a study of students from three medical schools (n = 963), suicide ideation rate was 15.7% and suicide attempt was 5%, statistically related to variables such as severe depression, drug abuse and poor school performance in the last year (Pinzón, 2013). In a case study, 45 cases of consumed suicide were reported between 2004 and 2014 among medical students, where 69% were men; it is noteworthy that 16% of the cases were carried out in their own faculty, usually by strangulation (Franco, 2017). Sánchez et al. analyzed in a sample of 197 medical

students that the rate of suicidal ideation was 17.75% and a suicide attempt of 2.5% (Sánchez, 2005).

Suicidal ideation has also been studied in Peru. In a study of 159 medical students in which the Mini-International Neuropsychiatric Interview (MINI) was applied, 22% had some neuropsychiatric disease, while 11.2% of the sample had suicidal ideation (León, 2012; , 2014). The same test was used in a population of 70 students in the third year of medical school, finding evidence of a neuropsychiatric disorder in 41.8% of the sample, anxiety in 27.8% and suicidal ideation in 12.6% of the students (Rodas, 2009). In a study of 90 nutrition students, using the Paykel instrument for suicidal ideation, the average of the latter was 8.9% (Viru-Loza, 2013). Perales et al. (2003) conducted a self-administered mental health survey in 1623 medical students, finding disorient disorder in 17%, depression in 29.6%, anxiety in 17.7%, suicidal ideation in 22.9%, suicide attempt in 4% and homicidal ideation in 14.4 %. The same authors, applying the Zung scale of depression and anxiety in a sample of 131 students of the race of nutrition, found suicidal ideation in 35.2% and suicide attempt in 9.4%, observing that living with a dysfunctional family and social behavior are statistically related factors (Perales, 2014).

Suicidal ideation in medical students in Mexico

The phenomenon of suicidal behavior has been extensively studied in Mexico, although the prevalence of this behavior in medical students is an aspect that is not analyzed (Osornio, 2009). The studies carried out in relation to this can be classified into three categories:

a) Studies that analyze the presence of psychological and psychiatric disorders in medical students, but without addressing the suicidal ideation;

b) Studies on the prevalence of suicidal ideation, but in samples other than medical students, and

c) Studies on suicidal ideation in medical students.

Within the first category, a study was recently carried out in 163 medical students, in which the most frequent personality factors were identified, using the Catell Personality Scale: they observed that the most frequent personality patterns were sensitivity , impetuosity and tension (Torres, 2017). Derive et al. (2017) conducted a survey of 107 questions in a group of 143 residents of a hospital in Mexico City, with the aim of detecting mistreatment and burnout, previously reported in other parts of the world (Chavez, 2016); (78%), punishment guards (50%), denial of education (40%), physical maltreatment (16%) and maltreatment and food deprivation (35%). Although not talking about suicidal ideation, residents surveyed expressed anxiety and decreased quality of care provided to their patients. Another study used the CES-D instrument to detect depression and the STAI instrument to measure anxiety in a group of 4 545 medical students, finding depression in 39.3% and anxiety in 36.8%, but they do not talk about suicidal ideation (Guerrero, 2013). In a study of 192 medical residents aged 24-36 years, 41.2% reported frequent alcohol use, 23.2% said they had used drugs at least once, and in relation to that the anxiety rate was 14% and in depression of 47.5% (Martínez, 2005). Also in residents (n = 162), Rosales et al. (2005), using the Beck Depression Inventory, determined a prevalence of depression in 16% of the sample, observing that being married, being atheists, being in the first year of residence and being rotating in Intensive Care were statistically related with depressive prevalence. Finally, Heinze et al. (2008) conducted a study of 370 medical students at the UNAM (220 high-performance, NUCE group and 150 low-performance, subject repeaters), noting that low-performing students had a higher psychiatric symptomatology compared to high performance, with statistically significant difference in the variables: phobia, interpersonal sensitivity, somatization, anxiety, obsessive compulsive disorder and psychoticism.

In the second category we can speak of the studies carried out in university students (non-medical) in which suicidal ideation was measured, as a parameter of comparison. In one of them, the Suicidal Guidance Inventory of Casullo was applied to a group of 141 students from the health area, mainly Psychology, finding that the prevalence of suicidal ideation was 40.7% (Coffin, 2009). The same authors carried out a study two years later in which they applied the Beck Depression Inventory and the Suicidal Guidance Inventory of Casullo to a

sample of 251 students from the health area (25.9% of them medical students), finding rates of suicidal ideation of 56%, especially in Psychology and Biology (Coffin, 2011). Cordova et al. (2013) carried out a study in 340 university students (non-medical), finding a rate of suicidal ideation of 11.37% in men and 18.3% in women. The same authors applied Beck's suicide ideation scale in a sample of 591 Psychology students, finding a suicide ideation prevalence of 59.9%, observing that the variables: lack of family support and personal problems were statistically related to suicidal ideation (Córdoba, 2007). One study analyzed the viability of Beck's suicide ideation scale in a sample of 122 university students, finding a suicide ideation rate of 18.9% with a Cronbach's alpha of 0.90 (Gonzalez, 2000). Carrillo et al. in 2010 analyzed the prevalence of suicidal ideation in 438 university students in Saltillo, Coahuila, finding a rate of suicidal ideation of 22%. In another study, the suicide risk instrument designed by FES Iztacala of UNAM was used in a sample of 500 students in Tlaxcala, Mexico, finding a suicide ideation rate of 7.2% (Rosales, 2013). Mondragón et al. (2001) conducted a meta-analysis of suicidal ideation in Mexico and although the measurement scales were different, they found that the rate of suicidal ideation is 11-40% in adolescents and 5.7-10% in adults, while the prevalence of suicide attempt is 1.4-10.1% in adolescents and 1.7-6.1% in adults.

The third category are studies conducted exclusively in medical students and were designed to determine the prevalence of suicidal ideation, attempted suicide and / or consummate suicide. López et al. (2009), observing that the dropout rate of medical students at the Autonomous University of Mexico (UNAM) is close to 50%, studied the sociodemographic and psychological variables that could explain it; found that the prevalence of depression, anxiety, and suicidal ideation was higher in deserters, even though they did not perform adequate statistical analysis (López, 2009). In a study carried out in Puebla, a number of psychological variables were analyzed in 63 students in the fifth year of medicine, finding major depression in 31.27%, chronic fatigue in 88.8%, sleep disturbance in 63.4% and suicidal ideation in 12.69% (Martínez, 2016). The undergraduate internship is a stage of the medical career that is complicated for many of the students, reason why a study was recently carried out to determine certain psychological variables in students who were about to enter

the boarding school (n = 479) , finding anxiety in 27.55%, depression in 4.17% and suicidal ideation in 5.6% with suicidal intent in 0.2% (Reyes, 2017). Finally, Vargas et al. (2015) carried out a study in 981 residents of a public hospital in Mexico City, finding a rate of suicidal ideation of 8%, while Jiménez et al. (2016) found a rate of suicidal ideation of 7.4% in a sample of 108 residents of Hospital la Raza.

It is clear that the number of studies carried out on suicidal ideation in medical schools in Mexico is limited, which is why it would be advisable to carry out studies on large samples, especially comparative with other careers, to determine whether medical students have a profile psychological suicide other than students of other careers.

Table 3 shows the prevalence of suicidal ideation in Latin American countries, including Mexico. A total of 4,715 medical students (mean of 471.5) with a mean prevalence of suicidal ideation of 13.78% (5.6-23.6%) were included in the studies, and the mean prevalence of suicide attempt was 2.92% (0.2-5 %).

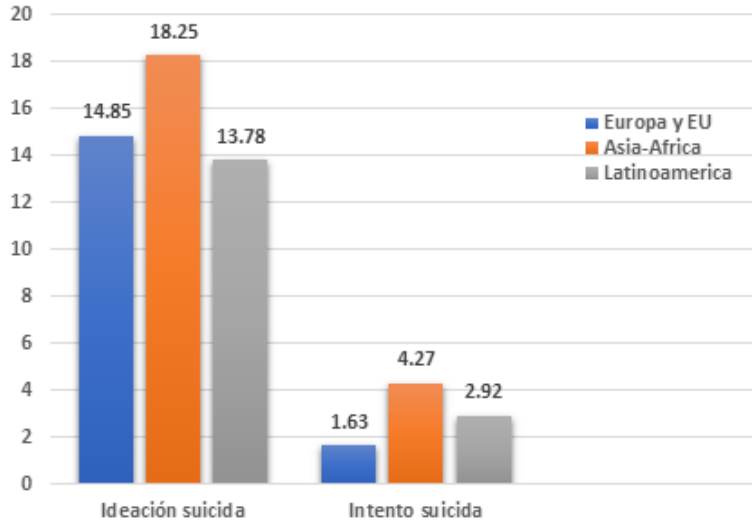
Table 3. Prevalencia de la ideación suicida en Latinoamérica (incluyendo a México).

Autores	Año	País o ciudad del estudio	Número de estudiantes	Porcentaje de Ideación suicida	Otros valores estudiados
Barrios et al.	2015	Paraguay	91	7.8 %	Ansiedad 16.5 %, depresión 23 %
Cordero et al.	2009	Ecuador	89	23.6 %	
Pinzón et al.	2013	Colombia	963	15.7 %	Intento suicida 5 %
Sánchez et al.	2005	Colombia	197	17.75 %	Intento suicida 2.5 %
León et al.	2012	Perú	159	11.2 %	
Rodas et al.	2009	Perú	70	12.6 %	Ansiedad 27.8 %
Perales et al.	2003	Perú	1623	22.9 %	Intento suicida 4 %, depresión 29.6 %
Martínez et al.	2016	Puebla, México	63	12.69 %	Depresión 31.27 %
Reyes et al.	2017	Ciudad de México	479	5.6 %	Intento suicida 0.2 %, ansiedad 27.5 %
Vargas et al.	2015	Ciudad de México	981	8 %	

Source: elaboración propia a partir de la revisión de los resultados de investigación realizadas por los autores señalados en ella.

Figure 1 shows a comparison of the mean prevalence of suicidal ideation and suicide attempt by geographic region.

Figure 1. Prevalencia de ideación suicida e intento suicida por región geográfica.



Source: elaboración propia.

Method

Documentary research. It consists primarily of the selective presentation of what experts have already said or written on a particular topic. In addition, it can present the possible connection of ideas between several authors and the ideas of the researcher.

Method. Meta analysis. It is the structured and systematic integration of the information obtained in different studies on a given problem. This type of review on a question must give a quantitative and synthetic estimate of all available studies (Laporte, 1983, pp. 41-82).

Process. It was based on the suggestions of Spilker (1991), L'Abbé, Detsky AS, O'Rourke K. (1988). The steps that were carried out were as follows: A protocol was planned and

developed as a guide to the meta analysis, which allowed to identify the objectives and methodology to be followed during the investigation. We identified the sources and bibliographic materials that were thoroughly reviewed, including the database CONRICyT, Medline through Pubmed and Scielo, and repository of the University Veracruzana (UV), in which thesis was found of undergraduate degree, masters, UV magazines, catalogs, and other documents that have not been published. Care was taken to ensure that the documents were reliable and up-to-date. A guide was elaborated that allowed to evaluate the quality of the work, which included the criteria of inclusion and exclusion of the reviewed materials. Another guide was developed for the data to be collected and chosen to be processed in the meta-analysis, on the prevalence of suicidal ideation, as well as on suicide. This review highlights the instruments used to measure this problem, such as the Beck Depression Inventory, Suicidal Guidance Inventory, the Catell Personality Scale, the Multimodal School Interaction Questionnaire, Zung Scale, among others. Another researcher was asked to give feedback on this work. The results of this meta-analysis were analyzed and interpreted. The conclusions were described, and this concludes this report which is now presented. Collection techniques. Different techniques of locating and fixing data such as tabulation, summary and test.

Objective. Make a review of the steps that have been taken to constitute suicide ideation and suicide ideation in medical students.

Discussion

Suicide is a social phenomenon that involves all the countries of the world; according to WHO statistics (2017), is the second leading cause of death in individuals between the ages of 15 and 29 and accounts for at least 800 000 deaths per year.

Suicide can be interpreted as the final stage of a process that begins with suicidal ideation, that is, that state in which a person has recurring thoughts associated with the desire to die,

either because he or she is considered a burden to his family or surroundings or lack of a sense of belonging to the group or society to which it belongs.

As evidenced from the studies presented in this review, more than 80% of individuals with suicidal ideation only reach this stage; however, a small percentage of them reach the second stage, called suicide attempt, defined as any act performed by an individual in order to end their life. If he does not succeed, he is only in the category of suicide attempt, but if he succeeds then it is considered to be consummate suicide.

For more than twenty years there has been a warning that some college students may have higher rates of suicidal ideation, attempted suicide or consummate suicide compared to the general population; it has been established that careers such as Psychology, Medicine, Nutrition Sciences and Law may have prevalence of suicidal ideation higher than the general population or students of other careers.

In the present review, we analyzed the suicide ideation and suicide attempts in medical students, focusing mainly on Latin America, although we also analyzed the most recent statistics obtained in other parts of the world.

The reason that medical students may have higher rates of suicidal ideation than the general population may be related to a number of factors: their class schedules are often mixed and with more hours per day, evaluations are often complicated and sometimes theoretical and practical, the level of demand of their teachers is usually high, the uncertainty of knowing that their study will depend in the future on the life or health of a person is a particularly heavy burden and, finally, the final periods of the preparation of a doctor (undergraduate, social service and medical residency) are often strenuous experiences in which they have working hours of up to 36 hours without sleep, with few hours of sleep, expectations of high results, as well as phenomena of physical, psychological and academic maltreatment.

In Latin America and Mexico dozens of studies have been done on suicidal ideation, but little has been studied in medical students; in Mexico, only three studies have measured the suicidal ideation in medical students and two of them, those of the largest population studied, were carried out in medical residents who are medical graduates who are carrying out their studies of specialization and who, depending on the selected area, could be subject to more or less stress, which makes it difficult to interpret the results.

We consider that methodologically well-planned studies should be carried out to evaluate suicidal ideation in medical students, analyzing variables such as sex, school year, substance abuse, associated psychopathologies and other sociodemographic characteristics that allow us to explain the reason why ideation suicide could be higher in medical students, evidence that seems to suggest several studies conducted in several regions of the world with heterogeneous populations.

Conclusions

Suicidal behavior in its different manifestations is a global health problem in the general population, although recently it has been observed that its prevalence is higher in certain sectors of the population. In this meta-analysis we observe that the prevalence of suicidal ideation, suicide attempt and consummate suicide in medical students seems to be higher than the statistics reported in the general population; this conclusion is obtained from the realization of numerous epidemiological studies carried out in medical students from all over the world. In this review, we made a special emphasis on what happens in medical students from Latin American countries, including Mexico, where the prevalence of suicidal ideation is relatively similar to that observed in Europe and the United States, but less than that observed in Asia and Africa.

Specifically in Mexico, the rate of suicidal ideation seems to be lower than that of the rest of the Latin American countries, although this can not be statistically validated since few studies have been done and the samples have been different. A prevalence of 12.69% in fifth-year students (Martínez et al., 2016), 5.6% in undergraduates (Reyes, 2017) and 8% and 7.4% in

medical residents was found (Vargas, 2015, Jiménez, 2015). It is evident that both the figures and the samples studied are heterogeneous, which prevents the establishment of statistically valid conclusions in Mexico.

Based on what was analyzed in this study, it is evident that in Mexico, epidemiological studies should be carried out to measure, in a methodologically adequate way, the prevalence of suicidal ideation, suicide attempt and consummate suicide in medical students, ideally comparing with students from other careers who have not documented an increase in the prevalence of suicidal behavior.

In case of a higher prevalence of suicidal behavior in medical students in Mexico, a thorough analysis of the study programs, the academic load, the psychological profile of the student before and during their studies, as well as any other sociodemographic factor which could influence this prevalence.

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