Journal of Affective Disorders 148 (2013) 147–160

Contents lists available at SciVerse ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Review

Body mass index and suicidal behaviors: A critical review of epidemiological evidence

Jian Zhang [a,*], Fei Yan [b], Yanfeng Li [c], Robert E. McKeown [d]

[a] Division of epidemiology, Jiann-Ping Hsu College of Public Health, Georgia Southern University, PO box 8015 Statesboro, GA 30465, USA
[b] Department of social medicine and community health, School of Public Health, Fudan University, Shanghai, China
[c] Division of information system, Northrop Grumman, Atlanta, GA, USA
[d] Department of Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, SC, USA

ARTICLE INFO

Article history:
Received 28 March 2012
Received in revised form
2 May 2012
Accepted 5 May 2012
Available online 21 September 2012

Keywords:
Body mass index
Suicide
Mortality

ABSTRACT

Introduction: Obesity has been associated with an elevated risk of depression and other mental health symptoms. An increasing number of robust prospective studies, however, counter-intuitively and consistently suggested that body mass index (BMI) was inversely associated with the risk of completed suicide in a dose-response fashion. The current contribution appraised the epidemiological evidence and examined the nature of the purported relationship.

Method: We conducted a systematic review of English publications of original studies using the terms "obesity", "overweight", "body mass index", "BMI", "attempted suicide", "completed suicide", "suicide ideation", "suicidal behaviors" and "suicide". Data were extracted primarily through MEDLINE and PUBMED databases.

Results: Almost all cohort studies reported an inverse relationship between BMI and the risk of completed suicide irrespective of region of origin and the gender of study participants. Overall, among men, a high BMI was associated with a low risk of attempted or completed suicide. There was a paradox among women, namely, a high BMI was associated with an elevated risk of attempted suicide but a low risk of completed suicide.

Limitations: As a narrative review, the current report was interpretive and qualitative in nature.

Conclusion: Consideration of observational data, methodological issues stemmed from the rarity of deaths by suicide, homogeneity of study populations, heterogeneity of suicide methods, and the corresponding neurobiological changes made interpretation difficult. Intercultural cohort observations across countries may help to weigh the contributions from biological and socio-cultural factors. The purported association not only represents a scientific challenge, it's also an opportunity potentially leading to important insights into prevention of suicide death.

Published by Elsevier B.V.

Contents

Abbreviations: BMI, Body mass index; UW, Underweight; NW, Normal weight; OW, Overweight; OB, Obesity; FFAs, free fatty acids (FFAs); Trp, tryptophan; MDD, major depression disorders; HR, Hazard ratio; PR, prevalence ratio; OR, odds ratio; SES, Socioeconomic status; PA, Physical activity; NHIS, National Health Interview Survey; NHANES, National Health and Nutrition Examination Survey; YRBSS, Youth Risk Behavior Surveillance System; HUNT study, Nord-Trøndelag Health Study; BRFSS, Behavioral Risk Factor Surveillance System; ICD8, International Classification of Diseases, Eighth Revision; CDC, Centers for Disease Control and Prevention (USA); IOM, Institute of Medicine

* Corresponding author. Tel.: +1 912 478 2290; fax: +1 912 478 2479.
E-mail address: jianzhang@georgiasouthern.edu (J. Zhang).

0165-0327/$ - see front matter Published by Elsevier B.V.
http://dx.doi.org/10.1016/j.jad.2012.05.048

1. Introduction

Increased prevalence of obesity has been identified in a vivid manner as "a massive tsunami headed toward the United States", and "the war on obesity" is getting contentious worldwide (Zhang, 2006). Paramount evidence has consistently demonstrated that excess body weight, being overweight or obese, has a detrimental effect upon physical health, including cardiovascular diseases and cancer (Zunzunegui et al., 2011; Sexton et al., 2011; Cao and Ma, 2011). The psychosocial burden of obesity is also considerable, and it has been repeatedly observed that obesity is associated with depression and other mental health symptoms from studies around the world (Roberts et al., 2003; Onyike et al., 2003; Zhang, 2006; Luppino et al., 2010). One might intuitively assume that overweight and obese individuals would have a high risk of suicide. However, an increasing number of robust prospective studies published recently have consistently suggested exactly the opposite. Studies of Swedish conscripts (Magnusson et al., 2006), US health professionals (Mukamal et al., 2007), dwell-living men and women of Norway (Bjerkeset et al., 2008), and US cohorts of general population (Carpenter et al., 2000; Zhang, 2006; Kaplan et al., 2007b; Mukamal et al., 2010) have all shown that body size, measured by body mass index (BMI), was inversely and significantly associated with the risk of death by suicide (completed suicide). On the other hand, numerous studies also concluded otherwise when examining the association between BMI and the precursors of completed suicides, namely, suicidal ideation and attempted suicides (Falkner et al., 2001; Eaton et al., 2005; Brunner et al., 2006; Dong et al., 2006; Whetstone et al., 2007; Mather et al., 2009; Swahn et al., 2009; Kim, 2011).

The aim of this contribution is to critically review and synthesize the epidemiological evidence on the association between BMI and suicidal behaviors. Efforts are made to explain the discrepancies from previous studies. Possible neurobiological and epidemiological plausibility for the association between a high BMI and an elevated risk of completed suicide, consistently observed from robust studies, is also presented. The paper concludes by discussing the directions and methodological challenges for future investigations.

2. Search strategy, data extraction and quality assessment

A systematic search was conducted within the computerized bibliographic database PubMed for the reports published from year 1980 until the April of 2011. The search terms included one or all of these four terms "obesity", "overweight", "body mass index", "BMI", plus one or all of these "attempted suicide", "completed suicide", "suicide ideation", "suicidal behaviors" and "suicide". The study must be reported in English-language journals. No specific limits of ethnicity, the type of suicide behaviors, and the definitions of overweight and obesity (Changes in terminology for childhood overweight and obesity occurred in around 2005 (Ogden and Flegal, 2010)) were set. The titles and abstracts were scanned to exclude studies that were clearly irrelevant, and the reference lists from retrieved full-text articles were also scanned for additional studies. For studies with same population resources or overlapping datasets, the most complete one was included (Kaplan et al., 2007b). The reports excluded were reviews, conference abstracts, and commentaries. Data were extracted using a standardized data extraction form and the information of studies was assessed independently by three