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Original article

Citation classics: Top 50 cited articles in bariatric and metabolic surgery

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Abstract

Background: The number of times an article has been cited reflects its influence in a specific field. The aim of this study was to identify and characterize the most highly cited articles published on bariatric and metabolic surgery.

Methods: The 50 most frequently cited articles in bariatric and metabolic surgery were identified from the Scopus database in December 2013.

Results: The median number of citations was 383.5 (range 275–2482). Most of the articles were published from 2000–2012 (n = 35), followed by 1990–1999 (n = 12), then before 1990 (n = 3). These citation classics came from 8 countries, with the majority originating from the United States (n = 34), followed by Sweden (n = 4) and Australia (n = 4). The 50 articles were published in 20 journals, led by New England Journal of Medicine (n = 9) and Annals of Surgery (n = 9). Only 10 of the articles were published in obesity-specific journals. The level of evidence of the 49 clinical publications and 1 animal study consisted of level I (n = 5), II (n = 11), III (n = 9), IV (n = 19), and V (n = 6). Meta-analyses were 16% of the total citations. Metabolic (n = 12) and survival (n = 6) effects of surgery were among the most common fields of study.

Conclusion: Extending from the early 1950s through the voluminous growth period of the early 2000s, the field of bariatric and metabolic surgery led to the emergence of many top-cited scientific articles. These articles have provided the scientific basis for the only currently effective treatment for severe obesity. Articles published in high-impact journals, innovative observational studies, meta-analyses, survival analyses, and research on postoperative metabolic changes are most likely to be cited in the field of bariatric surgery. (Surg Obes Relat Dis 2014;▮:00–00.)

Keywords: Bariatric surgery; Metabolic surgery; Morbid obesity; Weight loss; Citation; Citation classics; Reference; Gastric bypass; Sleeve; Gastric band; Gastroplasty

In scientific literature, a citation is reference to a specific book or article previously published on the subject being discussed. One barometer of the success of a manuscript is the number of citations it has garnered; the number of times an article has been cited typically reflects its influence in a specific field. Scientific and biomedical journals are evaluated by their " impact factor", a numerical value that is driven by overall numbers of citations, and journals aim to attract manuscripts with high citation potential. The study of these associations aims to not only gauge the success of individuals or institutions, but also to aid in the exploration of the evolution of peer-reviewed opinion in a given field or specialty [1,2].

There have been numerous publications listing "classic" or "top" citations in various medical fields [1–7]. Many

This study was presented at Obesity Week 2013.

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surgical specialties, including general surgery [1], now have top citation publications addressing influential works in their respective fields. To our knowledge, no such assessment exists in the field of bariatric and metabolic surgery, which has its roots in the early 1950s with the first report of a jejunoileal bypass for severe obesity [8]. Obesity surgery is currently one of the most studied fields in surgery, especially since the groundbreaking realization that bariatric surgery has the potential to cure diabetes and metabolic syndrome. Obesity surgery has gone through many changes in its turbulent history; an understanding of the evolution of current opinion has enormous value. The aim of this study was to identify and characterize the most highly cited articles published on bariatric and metabolic surgery.

Methods

The 50 most frequently cited articles in bariatric and metabolic surgery were identified from the Scopus database in December 2013 using the following key words, both alone and in combination: bariatric, metabolic surgery, diabetes surgery, gastric bypass, gastric banding, sleeve, obesity, morbid obesity, weight loss, intestinal bypass, jejunoileal bypass, ileal bypass, gastric stapling, and gastroplasty. Articles were ranked based on number of citations and then year of publication if 2 or more articles had the same number of citations. Articles were reviewed for several characteristics including number of citations, year of publication, authorship, country of origin, journal source, field of study, and level of evidence. The level of evidence of each article was determined based on criteria published by the Oxford Centre for Evidence–Based Medicine [9].

To account for the time bias that is inherent to bibliometric studies, we calculated average citations per year values (with reference to the year 2013) for all publications obtained from our Scopus query. Because a simple assessment of absolute citation values may favor older papers (more time to procure citations) and risks excluding more recent influential publications.

Results

T1 Table 1 lists the 50 most frequently cited bariatric surgery articles. The median number of citations was 383.5 (range 275–2482). Five papers were cited >1000 times.

The highest number of citations belonged to Buchwald's landmark meta-analysis [10]. Four articles reported the results of the Swedish Obese Subject (SOS) trial [11–14].

The oldest article was published in 1967 and the most recent in 2012. Most of the articles were published from 2000–2012 (n = 35), followed by 1990–1999 (n = 12), then before 1990 (n = 3). Eighteen (36%) articles were reported in the 3-year period of 2003–2005.

These citation classics came from 8 countries, with the majority originating from the United States (n = 34), followed by Sweden (n = 4), Australia (n = 4), Canada (n = 3), France (n = 2), Italy (n = 1), the United Kingdom (n = 1), and Belgium (n = 1). A total of 182 unique authors contributed to these articles. Forty-four people coauthored 2 or more of the top-cited articles. The top 5 first authors, who all had >1000 citations, were Buchwald H (n = 4374), Sjostrom L (n = 2898), Schauer PR (n = 1634), Cummings DE (n = 1296), and Pories WJ (n = 1164). Institutions in the United States that had a major contribution were the University of Minnesota, East Carolina University, the University of Washington, the University of Pittsburgh, Virginia Commonwealth University, the University of Utah, the University of California, and the University of Iowa Hospital. Among the academic centers outside the United States, studies originating from Gothenburg University in Sweden, Monash University in Australia, McGill University in Canada, and University of Genoa in Italy were among the top-cited articles.

The 50 articles were published in 20 journals, led by New England Journal of Medicine (n = 9) and Annals of Surgery (n = 9), followed by Obesity Surgery (n = 7), and Journal of the American Medical Association (n = 5). Only 10 of the articles were published in obesity specific journals. Among the journals that cited 1 of these 50 articles as a reference, Obesity Surgery and then Surgery for Obesity and Related Diseases were at the top.

Of the 50 articles, 39 were clinical experience, 10 were clinical review articles, and one was an experimental animal study. Meta-analyses were 16% of the total citations. First reports of gastric bypass (ranked #42) [15], vertical banded gastroplasty (ranked #27) [16], duodenal switch (ranked #30, 33) [17,18], and laparoscopic gastric bypass (ranked #21) [19] were among the top-cited papers. The studies on this list consisted of level I (n = 5), II (n = 11), III (n = 9), IV (n = 19), and V (n = 6) evidence.

Effect of surgery on co-morbidities (n = 12, including diabetes [n = 10] and fatty liver [n = 2]), survival benefit of bariatric surgery (n = 6), and perioperative complications (n = 5) were among the most common fields of study. "Metabolic surgery" was the main focus in only 14% of studies published before 2003. However, the rate increased to 32% of studies published after that time. All of the 6 mechanistic studies on the list that tried to examine how bariatric surgery leads to weight loss and improvement of co-morbidities were published between 2002 and 2009.

T2 Table 2 ranks the top 10 articles based on the highest average citations per year. Of note, this list includes 2 recent randomized clinical trials pertaining to "metabolic surgery" and its effect on diabetes (ranked #1, 4) [20,21]. Seven of the studies were published between 2007 and 2012. New England Journal of Medicine led the list with 7 articles.