

# A Bibliometric Study of Articles on Laparoscopic Sleeve Gastrectomy Published in Science Citation Index Expanded Journals: Analysis of 4269 Articles Published Between 1998-2020

Emir Çapkinoğlu<sup>1</sup> , Banu Yiğit<sup>2</sup> , Bülent Çitgez<sup>3</sup> 

<sup>1</sup>Department of General Surgery, Acıbadem Mehmet Ali Aydınlar University, School of Medicine, Istanbul, Turkey

<sup>2</sup>Department of General Surgery, Elazığ Fethi Sekin City Hospital, Elazığ, Turkey

<sup>3</sup>Department of General Surgery, Uskudar University Faculty of Medicine, Memorial Hospital, Istanbul, Turkey

Emir ÇAPKINOĞLU

Banu YİĞİT

Bülent ÇİTGEZ

**Correspondence:** Emir Çapkinoğlu  
Department of General Surgery, Acıbadem Mehmet Ali Aydınlar University, School of Medicine, Istanbul, Turkey

**Phone:** -

**E-mail:** emircapkinoglu@gmail.com

**Received:** 10 March 2023

**Accepted:** 29 May 2023

## ABSTRACT

**Purpose:** In the last decade, the popularity of laparoscopic sleeve gastrectomy (LSG) among surgeons has increased, and the desire to get information has been accelerated. Holistic evaluation of scientific publications, including publication and citation metrics, is the definition of "Bibliometrics". In the present study, we aimed to analyze the top-cited articles about LSG, published between the years 1998-2020, according to the database of Web of Science.

**Methods:** We used the search engine of Thomson Reuters®, Web of Science Core Collection, by using the keyword "Laparoscopic sleeve gastrectomy", and by choosing the "Topic" section on December 1, 2020. Only "Articles" in "English" were included in the study protocol. The publication rates according to years, countries, journal categories, organizations and authors, publication number, citation, and h-index data were evaluated. Also, publication metrics were evaluated in terms of Gross Domestic Product (GDP), Gross Domestic Product per capita (GDPpp), and Human Development Index (HDI) of the countries.

**Results:** The most productive countries, scientific journals, and authors are USA, Obesity Surgery, and Schauer PR, respectively. There was a positive correlation between publication numbers and GDP ( $r=0.370$ ,  $p<0.05$ ), also a weak positive correlation between GDPpp and HDI ( $r=0.359$ ,  $p>0.05$ ;  $r=0.603$ ,  $p>0.05$ ; respectively).

**Conclusion:** The present study proves the avalanching publication productivity concerning LSG, over the last twenty years. Our outcomes show that researchers have an increasing interest in morbid obesity and LSG procedure. This progression highlights the value of bibliometric analysis, which facilitates the process of research in further studies.

**Keywords:** Bariatric surgery, Bibliometrics, Laparoscopic sleeve gastrectomy, obesity, scientific publications

## Science Citation Index Expanded Journals'da yayınlanan laparoskopik sleeve gastrektomi makalelerinin bibliyometrik çalışması: 1998-2020 yılları arasında yayınlanan 4269 makalenin analizi

### ÖZET

**Amaç:** Son on yılda cerrahlar arasında laparoskopik sleeve gastrektominin (LSG) popülaritesi artmış ve bilgi alma isteği hızlanmıştır. Yayın ve atıf ölçümleri de dahil olmak üzere bilimsel yayınların bütüncül değerlendirilmesi, "Bibliyometri"nin tanımıdır. Bu çalışmada 1998-2020 yılları arasında yayınlanan LSG ile ilgili en çok atıf alan makaleleri Web of Science veri tabanına göre incelemeyi amaçladık.

**Yöntemler:** Çalışma protokolünde 1 Aralık 2020 tarihinde "Konu" bölümünü seçerek Thomson Reuters®, Web of Science Core Collection arama motorunda "Laparoskopik sleeve gastrektomi" anahtar kelimesini kullandık ve sadece "İngilizce" dilindeki "Makaleler" dahil edildi. Yıllara, ülkelere, dergi kategorilerine, kuruluşlara ve yazarlara göre yayın oranları, yayın sayısı, atıf ve h-index verilerine göre değerlendirildi. Ayrıca yayın ölçütleri ülkelerin Gayri Safi Yurtiçi Hasıla (GSYİH), kişi başına Gayri Safi Yurtiçi Hasıla (GSYİH) ve İnsani Gelişme Endeksi (İGE) açısından değerlendirildi.

**Bulgular:** En üretken ülkeler, bilimsel dergiler ve yazarlar sırasıyla ABD, Obezite Cerrahisi ve Schauer PR'dir. Yayın sayısı ile GSYİH arasında pozitif bir korelasyon ( $r=0,370$ ,  $p<0,05$ ), ayrıca GDPpp ile İGE arasında zayıf bir pozitif korelasyon vardı (sırasıyla  $r=0,359$ ,  $p>0,05$ ;  $r=0,603$ ,  $p>0,05$ ).

**Sonuçlar:** Bu çalışma, son yirmi yılda LSG ile ilgili çığ gibi büyüyen yayın verimliliğini kanıtlamaktadır. Sonuçlarımız, araştırmacıların morbid obezite ve LSG prosedürüne artan bir ilgi duyduğunu göstermektedir. Bu ilerleme, daha sonraki çalışmalarda araştırma sürecini kolaylaştıran bibliyometrik analizin değerini vurgulamaktadır.

**Anahtar Kelimeler:** Bariatrik Cerrahi, Bibliyometrik, Laparoskopik Sleeve Gastrektomi, Obezite, Bilimsel çalışmalar

Obesity remains a major public health concern due to its association with severe comorbidities and high mortality rates. Surgery has been widely accepted as the most effective approach for reducing obesity and its related illnesses (1). As bariatric surgical procedures have risen in popularity, an increasing number of patients are seeking surgical treatment (2). Among the various surgical techniques available, laparoscopic sleeve gastrectomy (LSG) has emerged as a viable and effective method for treating morbid obesity (3).

However, the 1991 National Institutes of Health (NIH) consensus statement on body mass index and bariatric surgery exclude some recent advancements, including LSG (4). It was only in 2009 that the American Society for Metabolic and Bariatric Surgery (ASMBS) recognized LSG as a suitable alternative for the surgical therapy of morbid obesity. This declaration led to insurance coverage for LSG and the establishment of the International Classification of Diseases, 9th Revision, Clinical Modification code for the procedure in 2011 (5, 6). As a result, the reputation of LSG among surgeons has grown, and there has been an increase in demand for LSG information (4).

The term "Bibliometrics" refers the holistic assessment of scientific publications (7). This assessment involves examining citations among scientists, publications, organizations, and nations (8). The internet has made it easier to access scientific publications and databases online, resulting in a significant increase in the volume of publications available in online database (9). The importance of bibliometric research has grown steadily due to its ability to conduct an in-depth analysis of scientific research, allowing for a better understanding of the leading publications, authors, popular journals, and international collaborations (8).

Despite the growing demand for information on the LSG procedure among bariatric surgeons, there is a lack of complete bibliometric research analyzing publications on LSG. Furthermore, no studies have been conducted to measure the productivity of scientific articles on obesity treatment methods using markers and scales that reflect the socioeconomic well-being of countries producing scientific publications on LSG.

This study aims to examine the top-cited articles on LSG published in the Web of Science Core Collection database between 1998 and 2020. It also aims to assess citation collaboration among articles to identify collaborations

between countries and journals and report the latest developments and trending topics in this field.

## Materials and Methods

In this study, we used the search engine of Thomson Reuters®, Web of Science Core Collection (<http://apps.webofknowledge.com>) as our database. This database is considered the leading source of citation and other academic impact information globally (10). On December 1, 2020, we searched using the keyword "laparoscopic sleeve gastrectomy" in the "Topic" section. We included publications with the document type "Article" in English that were published between 1998-2020 and were indexed in the Web of Science Core Collection. Other type of publications were not included in this study. We evaluated the collected data using the analysis function of the Web of Science database. We examined publication rates by year of publication, country, journal category, organization, and author. We also evaluated publication metrics such as publication numbers, citations, and h-index data. Furthermore, we evaluated publication metrics based on the countries' Gross Domestic Product (GDP), Gross Domestic Product per capita (GDPpp), and Human Development Index (HDI).

The data for GDP and GDPpp were obtained from The World Bank's 2018 statistics (<https://data.worldbank.org/indicator>). Data for HDI were collected from the United Nations "Human Development Indices and Indicators 2018 Statistical Update."

For statistical analysis we used the Number Cruncher Statistical System 2007® (Kaysville, Utah). We used descriptive statistical methods such as mean, standard deviation, median, first and third quartiles, frequency, percentage, minimum, and maximum to analyze the data. Furthermore, we used Spearman correlation analysis to investigate the relationships between quantitative variables. In this analysis, we classified a correlation coefficient between 0.26 and 0.49 as a low correlation, 0.50 and 0.69 as moderate correlation, 0.70 and 0.89 as high correlation, and 0.90 and 1.00 as very high correlation. A p-value of < 0.05 was considered statistically significant.

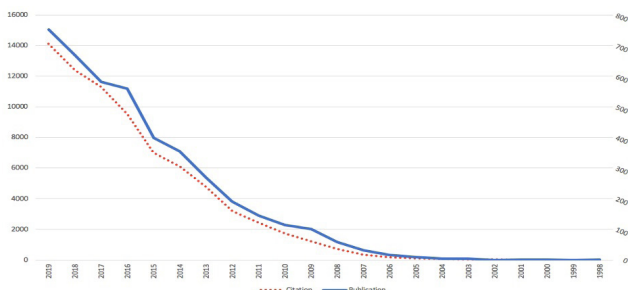
The difference between the number of articles and citations given in the title and the numbers in the tables is due to the fact that an article might be classified in more than one subclass in the Web of Science subclassification. An article on obesity surgery, for example, is indexed under the headings of Anatomy, Surgery, and Endocrinology/Metabolism.

## Results

**Publication Development:** From 1998 to present, a total of 4681 publications on LSG have been published, of which 4396 (93.91%) were articles, 205 (4.37%) were proceedings papers, 79 (1.68%) were early access articles, and 1 (0.02%) was a book chapter. This study focused on the 4396 articles only.

**Language:** Of the 4396 articles, 4269 (97.11%) were in English, 47 (1.06%) were in German, 41 (0.93%) were in Spanish, 27 (0.61%) were in French, 3 (0.06%) were in Korean and Polish, 2 (0.04%) were in Hungarian, and 1 (0.02%) was in Italian or Slovenian. For the purposes of this study, only English-language articles were included.

**Citation Development:** The H-index of the 4269 English-language articles was 107. The number of publications and citations has been increasing steadily since 1998, as shown in Figure 1. The top five countries with the most publications in 5-year intervals were: USA, Austria, Australia, Canada, Switzerland (1998-2004); USA, France, Germany, Greece, Spain (2004-2009); USA, Italy, France, Spain, Germany (2009-2014); and USA, France, Italy, Turkey, China (2014-2019).

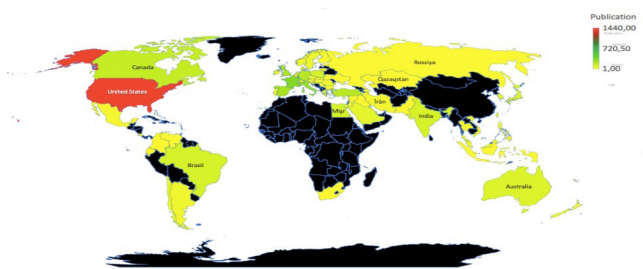


**Figure 1.** Publication and citation metrics according to years

The articles on LSG have been cited a total of 20,339 times, including self-citations, since 1998 (Table 1). Figure 2 shows that publications focusing on LSG are limited in Africa, South Asia, and Middle Asia. The Web of Science categorization indicates that surgery and endocrinology-metabolism journals are the most specialized in LSG. (77.4% and 9.44%, respectively), and they are also the most cited journals on LSG (74% and 22.7%, respectively) (Table 2).

Country	Publication n (%)	Citation n (%), Mean±SD (min-max)	h-index
USA	1440 (33.73)	7159 (35.19) 21.72±66.01 (0-1201)	150
France	334 (7.82)	1143 (5.61) 14.26±24.15 (0-212)	35
Italy	280 (6.55)	1232 (6.05) 20.47±52.02 (0-695)	38
Spain	238 (5.57)	956 (4.7) 19.57±34.74 (0-313)	35
The UK	209 (4.89)	1485 (7.3) 16.04±32.89 (0-289)	31
PRC	202 (4.73)	1250 (6.14) 9.82±24.62 (0-270)	23
Germany	185 (4.33)	1154 (5.67) 19.24±31.32 (0-260)	32
Turkey	176 (4.12)	442 (2.17) 4.2±17.3 (0-203)	10
Canada	156 (3.65)	908 (4.46) 16.9±43.3 (0-407)	50
Israel	146 (3.42)	304 (1.49) 14.5±25.7 (0-187)	23

USA: United States of America, UK: United Kingdom, PRC: People's Republic of China  
SD: Standard deviation



**Figure 2.** Publication density of world countries on laparoscopic sleeve gastrectomy (Black countries indicates no publication)

**Most Active Journals:** The top ten journals that focus on LSG are all surgery journals. Obesity Surgery is the most productive/active journal in all evaluation categories, as shown in Table 3.

**Most Active Authors:** Nine of the ten most productive authors are surgeons, as shown in Table 4.

**Table 2. Publication and citation metrics of top ten category according to Web of Science**

Journal Category	Publication n (%)	Citation n (%), Mean±SD (min-max)
Surgery	3303 (77.4)	15085 (74), 17.4±42.68 (0-793)
Endocrinology Metabolism	403 (9.44)	4633 (22.7), 16.83±39.91 (0-496)
Gastroenterology Hepatology	274 (6.41)	2708 (13.2), 13.09±24.07 (0-172)
Nutrition Dietetics	217 (5.08)	2667 (13), 15.53±40.17 (0-496)
Medicine General Internal	203 (4.75)	3684 (18), 23.07±112.14 (0-1201)
Nursing	94 (2.2)	136 (0.6), 1.51±3 (0-15)
Medicine Research Experimental	73 (1.7)	393 (1.9), 5.53±12.79 (0-98)
Pediatrics	49 (1.1)	439 (2.1), 12.67±22.81 (0-129)
Pharmacology Pharmacy	49 (1.1)	381 (1.8), 8.39±12.15 (0-63)
Multidisciplinary Sciences	48 (1.1)	740 (3.6), 16.48±63.51 (0-442)

SD: Standard deviation

**Most Active Organizations:** The most active organizations on the LSG topic are the Cleveland Clinic Foundation, Assistance Publique Hôpitaux Paris APHP, and Harvard University. Seven of the fifteen most productive organizations are health providers from the USA. Israel, England, and France are also productive countries in this field (Table 5).

**Analysis of Correlation:** The results presented in Table 6 demonstrate a direct relationship between the number of publications and GDP. ( $r=0.370$ ,  $p<0.05$ ). The study also found a weak positive correlation between publication numbers and GDPpp and HDI ( $r=0.359$ ,  $p>0.05$ ;  $r=0.603$ ,  $p>0.05$ ; respectively). Moreover, the research revealed a weak negative correlation between publication numbers and obesity incidence of the countries ( $r= -0.151$ ,  $p>0.005$ ).

Repeated publication and citation numbers in database research due to duplicated subclass classifications are 444 and 10527 , respectively.

**Table 3. Publication and citation metrics of top ten journals**

Journal	Publication n (%)	Citation n (%), Mean±SD (min-max)	h-index
Obesity Surgery	1372 (32.1)	9771 (47.9), 20±50.37 (0-793)	72
Surgery for Obesity and Related Diseases	663 (15.5)	5538 (27.1), 15.3±29.9 (0-471)	47
Surgical Endoscopy and Other Interventional Techniques	248 (5.8)	3851 (18.8), 23.6±41.9 (0-416)	38
Bariatric Surgical Practice and Patient Care	83 (1.9)	116 (0.56), 1.4±2.7 (0-15)	6
Journal of Laparoendoscopic Advanced Surgical Techniques	69 (1.6)	438 (2.14), 6.7±10 (0-44)	13
Annals of Surgery	50 (1.1)	2801 (13.7), 79.7±118.5 (0-539)	28
Journal of Gastrointestinal Surgery	45 (1)	730 (3.58), 17.4±28.1 (0-118)	15
Surgical Laparoscopy Endoscopy Percutaneous Techniques	44 (1)	425 (2.08), 10.8±15.9 (0-72)	11
American Surgeon	40 (0.9)	221 (1.08), 5.8±7.9 (0-28)	11
Videosurgery and Other Miniinvasive Techniques	40 (0.9)	238 (1.16), 7.9±11.5 (0-61)	10

SD: Standard deviation

**Table 4. Publication and citation metrics of top ten authors**

Author name	Publication n (%)	Citation n (%) mean±SD (min-max)	Nation	Institution	Expertise	h-index
Schauer PR	75 (1.75)	3250 (15.97) 59.37±179.8 (0-1201)	USA	Cleveland Clinical Foundation	Surgery	25
Brethauer SA	64 (1.49)	2952 (14.51) 59.53±191.8 (0-1201)	USA	Cleveland Clinical Foundation	Surgery	22
Lee WJ	57 (1.33)	1107 (5.44) 28.84±42.36 (0-263)	Taiwan	Min-Sheng General Hospital	Surgery	22
Aminian A	55 (1.28)	1765 (8.67) 39.95±135.79 (0-845)	USA†	Cleveland Clinical Foundation	Surgery	16
Gagner M	46 (1.07)	1832 (9) 62.59±95.35 (0-501)	Canada	University of Montreal	Surgery	25
Seeley RJ	43 (1)	1059 (5.2) 40.93±75.17 (0-442)	USA†	University of Cincinnati	Surgery	19
Szomstein S	41 (0.96)	1018 (5) 30.59±41.28 (0-168)	USA†	Cleveland Clinical Foundation	Surgery	18
Regimbeau JM	39 (0.91)	493 (2.42) 17±27.28 (0-154)	France	University of Picardie Jules Verne	Surgery	15
Rosenthal RJ	39 (0.91)	1426 (7.01) 47.05±85.6 (0-471)	USA	Cleveland Clinical Foundation	Surgery	18
Le Roux CW	37 (0.86)	662 (3.25) 20.19±35 (0-184)	Ireland	University College of Dublin	Pathology	14

USA: United States of America, SD: Standard deviation

**Table 5. Publication and citation metrics of most productive organizations**

Organization	Publication n (%)	Nation
CLEVELAND CLINIC FOUNDATION	172 (3.71%)	USA
ASSISTANCE PUBLIQUE HOPITAUX PARIS APHP	121 (2.61%)	FRANCE
HARVARD UNIVERSITY	108 (2.33%)	USA
INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE	90 (1.94%)	FRANCE
UNIVERSITY OF CALIFORNIA SYSTEM	90 (1.94%)	USA
CENTRO DE INVESTIGACION BIOMEDICA EN RED	82 (1.77%)	SPAIN
SACKLER FACULTY OF MEDICINE	73 (1.57%)	ISRAEL
TEL AVIV UNIVERSITY	73 (1.57%)	ISRAEL
SAPIENZA UNIVERSITY ROME	72 (1.55%)	ITALY
IMPERIAL COLLEGE LONDON	69 (1.49%)	ENGLAND
UNIVERSITY OF MICHIGAN	68 (1.46%)	USA
UNIVERSITY OF MICHIGAN SYSTEM	68 (1.46%)	USA
UNIVERSITY OF LONDON	64 (1.38%)	ENGLAND
UNIVERSITY OF CINCINNATI	61 (1.31%)	USA
CORNELL UNIVERSITY	60 (1.29%)	USA

USA: United States of America

**Table 6. Publication numbers and gross domestic product/human development index relation**

Nation	Article n (%)	GDP* (\$)	GDPpp** (\$)	Population (n)	HDI***	Incidence of obesity (%)	Average BMI (kg/m <sup>2</sup> )
USA	1440 (33.77)	20544	62694	329064917	0.924	36.2	28.8
FRANCE	334 (7.8)	2778	41463	65129728	0.901	21.6	25.3
ITALY	280 (6.5)	2084	34483	60550075	0.880	19.9	26
SPAIN	238 (5.5)	1419	30370	46736776	0.891	23.8	26.7
UK	209 (4.9)	2855	42943	67530172	0.922	27.8	27.3
PRC	202 (4.7)	13608	9770	1433783686	0.752	6.2	23.9
GERMANY	185 (4.3)	3948	47603	83517045	0.936	22.3	26.3
TURKEY	176 (4.1)	771	9370	82319724	0.791	32.1	27.8
CANADA	156 (3.6)	1713	46232	37411047	0.926	29.4	27.2
ISRAEL	146 (3.4)	370	41715	8883800	0.903	26.1	26.3

\*GDP: Gross domestic product, \*\*GDPpp: Gross domestic product per capita, \*\*\* HDI: Human development index  
USA: United States of America, UK: United Kingdom, PRC: People's Republic of China  
BMI: Body mass index



## Discussion

Since the implementation of insurance coverage in the late 2000s, the number of scientific articles related to LSG has rapidly increased, particularly in the United States. France, Italy, Spain, and the United Kingdom have also shown high productivity in LSG research, following the United States (11). This is not surprising given the large amount of funding and the number of research centers in the United States. However, it is noteworthy that developing countries such as China and Turkey have also shown significant progress in this area. In 2019, Chinese scientists launched an "Obesity Prevention Program" to combat China's upcoming obesity epidemic and related chronic diseases (12). Similarly, in 2010, the Turkish Ministry of Health introduced the "Fighting Obesity and Control Program" to combat the obesity epidemic (13). Although the growing awareness of developing countries of this issue has drawn scientific attention, but it is still evident that scientific publication activity on LSG is limited in Africa, South Asia, and the Middle East, as previous studies have indicated (8, 14). This is most likely due to the low socioeconomic status in these regions.

We believe that the increasing number of scientific articles focusing on LSG is also directly related to the introduction of long and mid-term national health programs that recognize obesity as a severe life-threatening condition. Many European countries, including Turkey and the People's Republic of China, have developed programs to raise awareness and fight obesity (15, 16). However, society found it challenging to accept these programs. For example, in the "Fighting Fat, Fighting Fit" campaign conducted in Britain, only 30% of participants acknowledged healthy lifestyle messages, and less than 1% adopted the recommended behavioral changes by medical professionals (15). Despite these unfavorable conditions, we believe that both the number of obesity-related campaigns against obesity and scientific publications will gradually increase. The literature suggests that raising general awareness and knowledge about potential health risks is the first step in preventing the spread of diseases such as obesity (13, 17).

Based on a journal analysis, Obesity Surgery has been identified as the most productive journal in LSG since 1991, and it serves as the official publication of the "International Federation for the Surgery of Obesity and Metabolic Disorders." The journal has consistently performed well in bibliometric studies, boasting a large number of publications and citations (8, 18). Obesity Surgery

provides a wide variety of contents, including original research, clinical reports, guidelines, historical notes, commentaries, letters to the editor, medicolegal issues, meeting abstracts, technical innovations, new concepts, reviews, scholarly presentations, and opinions on topics related to the treatment options, comorbidities, and overall aspects of obesity.

P.R. Schauer is the most prolific author in the field of LSG, with his study "Bariatric Surgery versus Intensive Medical Therapy in Obese Patients with Diabetes" being the most cited article per year since its publication in 2012 (Total citation: 1167, Citation per year: 145.8) (19). In this study, P.R. Schauer et al. compared intensive medical therapy with surgical treatment in improving glycemic control in 150 obese patients with type 2 diabetes. Surgical treatments for morbid obesity were disregarded until the later half of the 20th century, despite the fact that the problem has long been considered within the realm of endocrinology. While changes to bariatric procedures were reported from the 1950s to the 1990s (20-22), Alan Wittgrove performed the first laparoscopic gastric bypass surgery in 1994 (23). Due to its low perioperative morbidity, maintained digestive continuity, and easy conversion to other bariatric surgeries, LSG gained acceptance as a surgical technique for morbid obesity treatment in the first decade of the 21st century, (24).

The Gross Domestic Product (GDP) is a widely used indicator for assessing a nation's economic status. It is calculated by taking into account various factors such as consumption, investment, and production, and represents the total monetary value of goods and services produced over a certain period. Several studies on the relationship between GDP and obesity, as well as surgical interventions have been conducted. Cazzo et al. (25) found a direct correlation between GDP and the number of bariatric procedures performed. Norte et al. observed that adverse economic conditions could lead to poor diet quality and an increased risk of obesity, which was also supported by the findings of Oddo et al. (26, 27). On the other hand, the Human Development Index (HDI) was introduced to emphasize that people's well-being and capabilities, rather than only financial growth, should be the primary criteria for evaluating a country's progress. Gupta et al. (28) revealed a significant correlation between HDI and obesity rates, whereas Yach et al. (29) showed that developing countries are experiencing rapid "obesogenic" changes. However, no previous studies have examined the relationship between socioeconomic parameters and publishing productivity. The study found a positive correlation

exists between the rate of articles published on LSG and GDP, GDP per capita, and HDI. In a similar study, Gehanno et al (30) found a significant relationship between publication productivity and HDI in childhood obesity. These results suggest that higher socioeconomic levels may lead to increased government funding for scientific research and programs.

This is the first study to focus specifically on LSG articles published in SCIE journals in English. This study is limited to using the Web of Science database, which is widely recognized as a reliable source of scientific papers. It should be noted that our analysis included only articles written in English, which may be considered a limitation. However, because of the difficulties in accurately analyzing articles in lesser-known languages, these were excluded from the study.

## Conclusion

Morbid obesity and its associated comorbid diseases have inflicted and will continue to afflict a large number of people, for which surgical interventions are the only effective treatment. Therefore, it is imperative to promote collaborations, multidisciplinary investigations, and the development of novel scientific perspectives and treatment strategies to address obesity on a global scale. Scientific publications are a crucial weapon in the fight against the obesity epidemic, and our study highlights the increase in publication productivity regarding for LSG, a common treatment method for morbid obesity, over the past 2 decades. This progress emphasizes the significance of bibliometric analysis, which can facilitate research in future studies. The study should stimulate developing and underdeveloped nations, in particular, to publish scientific studies on obesity, its comorbidities, and treatment strategies.

## Declarations

### Ethical Approval Statement

All procedures performed in studies were following the Helsinki declaration and its later amendments or comparable ethical standards.

### Authors' Contributions

All authors have made substantial contributions to this article being submitted for publications. All authors critically reviewed the manuscript and approved the final form.

## Competing Interests

No conflict of interest was declared by the authors.

## Funding

There is no funding related to this article

## Availability of Data and Material

Available.

## References

- Berrington De Gonzalez A, Hartge P, Cerhan JR, et al. Body-mass index and mortality among 1.46 million white adults. *N Engl J Med.* 2010;363:2211-9. DOI:10.1056/NEJMoa1000367
- Mechanick JI, Youdim A, Jones DB, et al. Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient--2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. *Endocr Pract.* 2013;19:337-72. DOI:10.4158/ep12437.GI
- Sowier A, Pyda P, Borucka AM, et al. Initial experience with endoscopic sleeve gastropasty in Poland. *Pol Przegl Chir.* 2018;90:16-22. DOI:10.5604/01.3001.0011.7488
- Ekici U and Ferhatoglu MF. Perioperative and Postoperative Effects of Preoperative Low-Calorie Restrictive Diets on Patients Undergoing Laparoscopic Sleeve Gastrectomy. *J Gastrointest Surg.* 2020;24:313-9. DOI:10.1007/s11605-019-04157-5
- Anonymous. Updated position statement on sleeve gastrectomy as a bariatric procedure. *Surg Obes Relat Dis.* 2012;8:e21-6. DOI:10.1016/j.soard.2012.02.001
- Ferhatoglu MF, Kartal A, Filiz A, et al. Comparison of New Era's Education Platforms, YouTube® and WebSurg®, in Sleeve Gastrectomy. *Obes Surg.* 2019;29:3472-7. DOI:10.1007/s11695-019-04008-x
- Demir E. The Evolution of Spirituality, Religion and Health Publications: Yesterday, Today and Tomorrow. *J Relig Health.* 2019;58:1-13. DOI:10.1007/s10943-018-00739-w
- Ozsoy Z and Demir E. Which Bariatric Procedure Is the Most Popular in the World? A Bibliometric Comparison. *Obes Surg.* 2018;28:2339-52. DOI:10.1007/s11695-018-3163-6
- Aronsky D, Madani S, Carnevale RJ, et al. The prevalence and inaccessibility of Internet references in the biomedical literature at the time of publication. *J Am Med Inform Assoc.* 2007;14:232-4. DOI:10.1197/jamia.M2243
- Li L, Ma X, Pandey S, et al. The Most-Cited Works in Severe Traumatic Brain Injury: A Bibliometric Analysis of the 100 Most-Cited Articles. *World Neurosurg.* 2018;113:e82-e7. DOI:10.1016/j.wneu.2018.01.164
- Zhao N, Tao K, Wang G, et al. Global obesity research trends during 1999 to 2017: A bibliometric analysis. *Medicine.* 2019;98.
- Wang Y, Xue H, Sun M, et al. Prevention and control of obesity in China. *The Lancet Global Health.* 2019;7:e1166-e7.
- Arikan I, Karakaya K, Erata M, et al. Fighting obesity campaign in Turkey: evaluation of media campaign efficacy. *Central European Journal of Public Health.* 2014;22.
- Perez-Iratxeta C and Andrade MA. Worldwide scientific publishing activity. *Science.* 2002;297:519-.
- Wardle J, Rapoport L, Miles A, et al. Mass education for obesity prevention: the penetration of the BBC's Fighting Fat, Fighting Fit campaign. *Health Education Research.* 2001;16:343-55.
- Schwarzer R. Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied psychology.* 2008;57:1-29.

17. Nichols MS, Reynolds RC, Waters E, et al. Community-based efforts to prevent obesity: Australia-wide survey of projects. *Health Promotion Journal of Australia*. 2013;24:111-7.
18. Dabi Y, Darrigues L, Katsahian S, et al. Publication trends in bariatric surgery: a bibliometric study. *Obesity surgery*. 2016;26:2691-9.
19. Schauer PR, Kashyap SR, Wolski K, et al. Bariatric surgery versus intensive medical therapy in obese patients with diabetes. *New England Journal of Medicine*. 2012;366:1567-76.
20. Kremen AJ, Linner JH and Nelson CH. An experimental evaluation of the nutritional importance of proximal and distal small intestine. *Annals of surgery*. 1954;140:439.
21. Mason EE and Ito C. Gastric bypass in obesity. *Surgical Clinics of North America*. 1967;47:1345-51.
22. Capella RF, Capella JF, Mandac H, et al. Vertical Banded Gastroplasty-Gastric Bypass: preliminary report. *Obesity Surgery*. 1991;1:389-95.
23. Wittgrove AC, Clark GW and Tremblay LJ. Laparoscopic gastric bypass, Roux-en-Y: preliminary report of five cases. *Obesity surgery*. 1994;4:353-7.
24. Faria GR. A brief history of bariatric surgery. *Porto biomedical journal*. 2017;2:90-2.
25. Cazzo E, Ramos AC and Chaim EA. Bariatric surgery offer in Brazil: a macroeconomic analysis of the health system's inequalities. *Obesity Surgery*. 2019;29:1874-80.
26. Norte A, Sospedra I and Ortíz-Moncada R. Influence of economic crisis on dietary quality and obesity rates. *International journal of food sciences and nutrition*. 2019;70:232-9.
27. Oddo VM, Nicholas LH, Bleich SN, et al. The impact of changing economic conditions on overweight risk among children in California from 2008 to 2012. *J Epidemiol Community Health*. 2016;70:874-80.
28. Gupta R, Gaur K, Mohan I, et al. Urbanization, Human Development and Literacy and Syndemics of Obesity, Hypertension and Hyperglycemia in Rajasthan: National Family Health Survey-4. *The Journal of the Association of Physicians of India*. 2018;66:20-6.
29. Yach D, Stuckler D, Brownell KD. Epidemiologic and economic consequences of the global epidemics of obesity and diabetes. *Nat Med*. 2006;12:62-6.
30. Gehanno J-F, Gehanno B, Schuers M, et al. Analysis of publication trends in childhood obesity research in PubMed since 1945. *Childhood Obesity*. 2019;15:227-36.