Review Article / Derleme Makalesi

A Bibliometric Analysis of 4269 Articles Published on Laparoscopic Sleeve Gastrectomy in Journals Indexed in Scientific Citation Index-Expanded Between 2000-2023

2000-2023 Yılları Arasında, Scientific Citation Index Tarafından İndekslenen Dergilerde, Laparoskopik Sleeve Gastrektomi Üzerine Yayınlanan 4269 Makalenin Bibliyometrik Analizi

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Abstract

Background: Especially; In the last decade, the prestige of laparoscopic sleeve gastrectomy among surgeons and patients has increased, and the demand to get knowledge was accelerated. Holistic evaluation of scientific publications, including publication and citation metrics, is the definition of "Bibliometrics". In the present research, we aimed to analyze the most cited articles about LSG, published between the years 2000-2020, with repect to the database of Web of Science.
Materials and Methods: We used the search engine of Clarivate Analytics ®, Web of Science Core Collection, by using the keyword "*Laparoscopic sleeve gastrectomy*", and by choosing the *"Topic"* section on January 1, 2020. Only "*Articles"* in *"English"* were included in the study protocol. The publication rates, according to years, countries, journal categories, organizations, authors and 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. A weak positive correlation was found between publication numbers and GDP (r=0.370, p<0.05), also positive correlations with (GDPpp) and HDI (r=0.359, p>0.05; r=0.603, p>0.05; respectively).
Conclusions: This study shows the avalanching publication productivity concerning LSG, over the last twenty years. Bibliographic analysis will contribute to facilitating researchers' further research.

Keywords: Bibliometrics, Sleeve gastrectomy, Laparoscopic sleeve gastrectomy, Bariatric surgery

Öz

Amaç: Özellikle son on yılda laparoskopik sleeve gastrektominin (LSG) cerrahlar ve hastalar arasındaki prestiji artmış ve bilgi edinme talebi hızlanmıştır. "Bibliyometri", yayın ve atıf ölçütleri dahil olmak üzere bilimsel yayınların bütünsel değerlendirmesi olarak tanımlanır. Bu araştırmada 2000-2023 yılları arasında yayınlanan LSG ile ilgili en çok atıf alan makaleleri Web of Science veri tabanına bağlı kalarak incelemeyi amaçladık.
Materyal ve Metod: 1 Ocak 2023'de Clarivate Analytics ®, Web of Science Core Collection arama motorunda *"Topic"* bölümünü seçilerek *"Laparoskopik sleeve gastrectomy "* anahtar kelimesi arama için kullanıldı. Yalnızca "İngilizce" de "Makaleler" çalışma protokolüne dahil edildi. Yıllara, ülkelere, dergi kategorilerine, kuruluşlara, yazarlara ve yayın sayısına göre yayın oranları, atıf ve h-indeksi verileri değerlendirildi. Ayrıca, ülkelerin Gayri Safi Yurtiçi Hasıla (GSYİH), Kişi Başına Gayri Safi Yurtiçi Hasıla (GSYİHpp) ve İnsani Gelişme Endeksi (İGE) açısından yayın ölçütleri değerlendirildi.
Bulgular: En üretken ülkeler, bilimsel dergiler ve yazarlar sırasıyla ABD, Obesity Surgery ve Schauer PR' idi. Yayın sayıları ile GSYİH arasında zayıf bir pozitif korelasyon (r = 0.370, p <0.05), ayrıca (GDPpp) ve HDI ile pozitif korelasyon (sırasıyla r = 0.359, p> 0.05; r = 0.603, p> 0.05) bulundu.
Sonuç: Bu çalışma, son yirmi yılda LSG ile ilgili araştırmaların verimliliğinin çığ gibi arttığını göstermektedir. Bibliyografik analiz, araştırmacıların bundan sonraki araştırmalırının kolaylaşmasına katkı sağlayacaktır.

Anahtar Kelimeler: Bibliyometri, Sleeve gastrektomi, Laparoskopik sleeve gastrektomi, Bariatrik cerrahi

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Introduction

Obesity is associated with serious comorbidities and mortality and remains a major health problem. (1). With the increasing popularity of bariatric surgical procedures, the number of patients applying for surgical procedures has continued to increase significantly (2). Also, laparoscopic sleeve gastrectomy (LSG) is an effective, promising method for treating obesity (3,4).

The 1991 National Institutes of Health (NIH) consensus statement about body mass index and bariatric surgery did not address some techniques and advancements, including procedures like LSG (5). However, nearly two decades after the consensus of NIH, the American Society for Metabolic and Bariatric Surgery (ASMBS) affirmed LSG as an acceptable alternative option of ASMBS, insurance coverage for LSG started, and the International Classification of Diseases, 9th Revision, Clinical Modification code for this procedure established in 2011 (6,7). Following these developments, the prestige of LSG amongst surgeons and patients has risen. Accordingly, the demand for learning about LSG has increased (5,8).

Bibiometry means a holistic definition of scientific publications (9). Evaluation of citations to scientific articles is a bibliographic process. This analysis is created in the assessment of collaboration between scientists, published publications, various institutions, or countries (10). The internet accelerated on-line access to scientific databases or publications. For this reason, the amount of publication in scientific databases has also increased (11). Bibliometric studies lead to collaboration between authors, publications, and active journals from different countries, resulting in the formation of a guide for researchers (10). But there are no studies in the literature that measure the productivity of scientific articles about an obesity treatment method with markers and scales that measure the socio-economic well-being levels of countries producing scientific publications focusing on LSG.

With this research, we intend to measure the studies announced in the Web of Science (WOS) database, concerning LSG, written from 2000 to today. Our second aim is to assess if there is a relationship between the United Nations Development Statistics and bibliometric outcomes about this issue.

Materials and Methods

We obtained the data in this study from Clarivate Analytics®, Web of Science Core Collection (http://apps.webofknowledge.com), which compiling citations and categorizing academic effects globally (12). We researched by using the keyword "*Laparoscopic sleeve gastrectomy*", and by choosing the *"Topic"* segment on January 1, 2020. We categorized the upcoming data in order of publication time, which is the WOS default. Only articles with English and journals indexed as "Scientific Citation Index Expanded" in WOS were included in the study.

The website of the WOS analysis function was used to evaluate the data**.** The parameters used in the assessment of the publication rates were publication time, the countries that were the source of the publication, journal category, the institutions where the authors practice. Besides, the number of publications, citations received, and h-index information was determined. 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.

GDP and GDPpp: Data was obtained from the website of *The World Bank ,2018 statistics* (https://data.worldbank.org/indicator).

HDI: Data was collected from the *United Nations* "Human Development Indices and Indicators 2018 Statistical Update".

We applied the GNU operating system- PSPP software program for statistical estimation. We practiced descriptive statistical techniques for estimating the data. Spearman's rank-order correlation analysis was applied to measure the strength of a monotonic relationship between paired data. The estimate of correlation was recognized as $0.26<r<0.49$: low correlation; $0.50<r<0.69$: moderate correlation; $0.70<r<0.89$ high correlation; $0.90<r<1.00$: Very high correlation. Statistical significance was taken as $p<0.05$ (13).

Results

Range of Publications: Between 2000-2020, 4681 publications have been published about LSG. When we classify the publications according to their types, we found 4396 (93.3%) articles, 205 (4.3%) proceedings paper, 79 (1.6%) early access article, and 1 (0.2%) book chapter.

Language: The distribution of the articles according to language, English: 4269 (91.1%), German: 47 (1%), Spanish: 41 (0.8%), French: 27 (0.6%), Korean: 3 (0.06%), Polish: 3 (0.06%), Hungarian: 2 (0.04%), Italian: 1 (0.02%), Slovenian: 1 (0.02%), and language of the two articles were unspecified. In our study, only articles in English were used.

Range of Citations: The H-index of 4269 articles written in English was 107. The publication and citation measurements, according to years, were shown in Figure 1. The list of five most productive countries in 5-years periods; 2000-2004: USA, Austria, Australia, Canada, Switzerland; 2004-2009: USA, France, Germany, Greece, Spain; 2009-2014: USA, Italy, France, Spain, Germany; 2014-2019: USA, France, Italy, Turkey, China.

It was seen that 20339 (including self-citations) citations were made from the articles focusing on LSG in the time interval that is the subject of the study. Publication and citation measurements, according to countries, were shown in Table 1. Publications on LSG appear to be scarce in Africa, South Asia, and Central Asia. An ongoing increase in the number of citations and publications has been observed over the years (Figure 1).

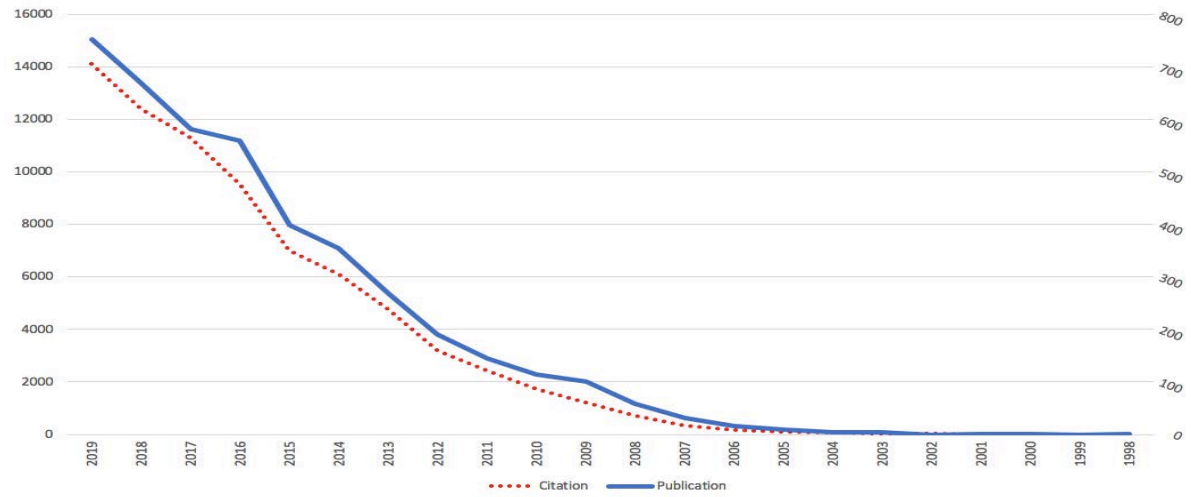

Figure 1. Publication and citation metrics according to years

The information obtained from the WOS shows that journals that publish on surgical or endocrine-metabolic diseases are the most focused journals on this topic (77.4 and 9.4, respectively). These journals are also leaders in citation (74% and 22.7%, respectively) (Table 2).

Top journals: The most publications on LSG are from 10 surgery-focused journals. *Obesity Surgery* is the most productive/ active journal in all evaluation categories. The metrics of productivity are shown in Table 3.

Most active authors: Nine of the ten most productive authors are surgeons. The most prolific authors are shown in Table 4.

Top organizations: Cleveland Clinic Foundation, Assistance Publique Hospitaux Paris APHP, and Harvard University are the most active organizations about the LSG topic. Seven of the fifteen most productive organizations are health providers from the USA. Israel, England, and France are other productive countries on this topic (Table 5).

Analysis of correlation between publication statistics and gross domestic product/ Human development index: There was a weak positive correlation between publication numbers and Gross Domestic Product (r=0.370, p<0.05), also positive correlations with GDPpp and HDI (r=0.359, p>0.05; r=0.603, p>0.05; respectively). Additionally, a weak negative correlation found between publication number and obesity incidence of the countries (r=-0.151, p>0.005) (Table 6).

Table 1. Publication and citation metrics according to countries

Country	Publication n *(%)*	Citation n *(%)*, Mean±SD (min-max)	h-index
USA†	1440 *(33.77)*	7159 *(36.33)* 21.72±66.01 (0-1201)	150
France	334 *(7.8)*	1143 *(5.8)* 14.26±24.15 (0-212)	35
Italy	280 *(6.5)*	1232 *(6.25)* 20.47±52.02 (0-695)	38
Spain	238 *(5.5)*	956 *(4.85)* 19.57±34.74 (0-313)	35
The U.K.	209 *(4.9)*	1485 *(7.53)* 16.04±32.89 (0-289)	31
PRC†	202 *(4.7)*	1250 *(6.34)* 9.82±24.62 (0-270)	23
Germany	185 *(4.3)*	1154 *(5.85)* 19.24±31.32 (0-260)	32
Turkey	176 *(4.1)*	442 *(2.24)* 4.2±17.3 (0-203)	10
Canada	156 *(3.6)*	908 *(4.6)* 16.9±43.3 (0-407)	50
Israel	146 *(3.4)*	304 *(1.54)* 14.5±25.7 (0-187)	23

† *USA: United States of America, U.K.: United Kingdom, PRC: People's Republic of China*

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)

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

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 *(1.7)*	3250 *(15.9)* *59.37*±179.8 (0-1201)	USA†	Cleveland Clinical Foundation	Surgery	25
Brethauer SA	64 *(1.4)*	2952 (14.4) 59.53±191.8 (0-1201)	USA†	Cleveland Clinical Foundation	Surgery	22
Lee WJ	57 *(1.3)*	1107 *(5.4)* 28.84±42.36 (0-263)	Taiwan	Min-Sheng General Hospital	Surgery	22
Aminian A	55 *(1.2)*	1765 *(8.6)* 39.95±135.79 (0-845)	USA†	Cleveland Clinical Foundation	Surgery	16
Gagner M	46 *(1)*	1832 *(8.9)* *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 *(0.9)*	1018 *(4.9)* 30.59±41.28 (0-168)	USA†	Cleveland Clinical Foundation	Surgery	18
Regimbeau JM	39 *(0.9)*	493 *(2.4)* *17*±27.28 (0-154)	France	University of Picardie Jules Verne	Surgery	15
Rosenthal RJ	39 *(0.9)*	1426 *(7)* *47.05*±85.6 (0-471)	USA†	Cleveland Clinical Foundation	Surgery	18
Le Roux CW	37 *(0.8)*	662 (3.2) 20.19±35 (0-184)	Ireland	University College of Dublin	Pathology	14

† *USA: United States of America*

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 LONDON	64 (1.38%)	ENGLAND
UNIVERSITY OF CINCINNATI	61 (1.31%)	USA
CORNELL UNIVERSITY	60 (1.29%)	USA

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/m²)
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
The U.K.	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

**Gross domestic product (Billion $), **Gross domestic product per capita, ***Human development index*

† USA: United States of America, U.K.: United Kingdom, PRC: People's Republic of China

GDP, GDPpp, Population: Data was obtained from the website of The World Bank,2018 statistics (https://data.worldbank.org/indicator)

HDI: Data was collected from the United Nations "Human Development Indices and Indicators 2018 Statistical Update".

Discussion

According to the data we obtained in our study, publication productivity related to LSG has been increasing in the last two decades. Our outcomes show that researchers have an increasing interest in morbid obesity and LSG procedure. The determination of this progress shows the importance of bibliographic analysis, which will facilitate researchers in their further studies.

The number of publications on LSG has increased like snowballs after initiation of insurance coverage at the end of the first decade of the twentieth-first century (14), especially in the USA. France, Italy, Spain, and the United Kingdom are other leading countries that follow the US in the publication productivity on LSG. This finding is anticipated if the massive funds and the high number of research centers designated for researching the morbid obesity in the USA are recognized. Simultaneously, the enrichment of the undeveloped/developing nations such as the People's Republic of China and Turkey was remarkable. In 2019, the Chinese scientist declared an "obesity prevention program" to identify primary steps to be taken to control future obesity problem in China, which eventually would lead to an obesity-related chronic disease epidemic (15). Like Chine, the Turkish Ministry of Health initiated a new structuring process by "Fighting Obesity and Control Program" to fight the upcoming epidemic in 2010 (16). Increasing awareness of developing countries like the People's Republic of China and Turkey about the forthcoming obesity epidemic has attracted scientists' attention. Despite this improving productivity, publications focusing on LSG are scarce in Africa, South Asia, and Middle Asia. Our outcomes are similar to previous studies (10,17), reporting that the number of publications was lower in these regions (Figure 1). The low socio-economic level is the reason why the African, South, and Middle Asian countries are lagging in producing scientific publications on obesity.

We think that the increase in scientific articles focusing on LSG also directly correlates with the long and mid-term national health programs beginning to define obesity as a severe life-threatening condition. Like Turkey and the People's Republic of China, in many European countries' health policy-makers have developed programs to raise awareness and fight obesity (18-21). However, it was not easy for society to adapt to these programs. In the "Fighting Fat, Fighting Fit" campaign performed in Britain, 30% of participants recognized healthy lifestyle messages, but less than 1% advised medical professionals to adopt the suggested behavioral modifications (20). Similarly, the campaign executed in the Netherlands did not have adequate power to establish behavioral changes in people (19). Despite all the unfavorable conditions, we think that the number of campaigns against obesity and scientific publications related to obesity should increase gradually. The literature suggests that raising general knowledge and awareness of potential health risks are the initial steps in stopping the spread of diseases as obesity (16,22).

An analysis among the journals showed that *Obesity Surgery,* published by the "International Federation for the Surgery of Obesity and metabolic disorders" since 1991, was the most productive journal in LSG. In many bibliometric studies,*Obesity Surgery* is ranked at the top in the number of both publications and citations (10,23). This journal aims to publish original researches, clinical reports, guidelines, historical notes, invited commentaries, letters to the editor, medicolegal issues, meeting abstracts, modern surgery/technical innovations, new concepts, reviews, scholarly presentations, and opinions about obesity, obesity-related comorbidities, and treatment options.The author, Schauer PR, has the highest publication productivity about the topic LSG. His study "Bariatric Surgery versus Intensive Medical Therapy in Obese Patients with Diabetes" was published in 2012, and had the highest citation numbers per year (Total citation: 1167, Citation per year: 145.8) (24). Schauer PR et al. evaluated 150 patients and aimed to compare the success of intensive medical therapy and surgical treatment to achieve glycemic control in obese patients with type 2 diabetes. The topic of morbid obesity is often considered as the subject of endocrinology, and surgical treatment methods were ignored in much of the

twentieth century. First reports about surgical therapy of the morbid obesity are published in the second half of the twentieth century, but they remained uncertain until the 1990s. Kremen performed the first metabolic surgery in 1954 (25); from this date to 1994, many modifications of bariatric procedures were reported, but none of them gained widespread acceptance (26-29). Alan Wittgrove performed the first laparoscopic gastric bypass surgery ın 1994 (30). Scopinaro is the first who mentioned about sleeve gastrectomy procedure as a part of the biliopancreatic diversion procedure (31). In the first decade of the twentieth-first century, LSG was accepted as a surgical technique of morbid obesity treatment with low perioperative morbidity, maintained digestive continuity, and was comfortable converting to other bariatric surgeries (32).

GDP is one of the most common indicators used to determine the economic level of a country. It depicts the cumulative result of income and expense in dollars over a period and includes different determinants, such as consumption and investment. Many authors have explored the relationship between obesity problem or its surgical treatment and GDP. Cazzo et al. investigated the correlation between GDP and the number of bariatric procedures and revealed a direct correlation (33). Norte et al. (34) and Oddo et al. (35), who obtained similar results, observed that economic changes occurring negatively could change diet quality and increase the risk of obesity. HDI emphasizes that people and their capability should be used as a criterion that evaluates not only the country's financial growth but also the development of that country. It is the average measurement of essential parameters such as long healthy life, intellectual level, and standard of living in people's development process. Gupta et al. found a significant correlation between HDI and obesity (36). Yach et al. (37) also showed that developing countries have been undergoing rapid "*obesogenic*". But none of the researchers evaluated if there is a relationship between socio-economic parameters and publishing productivity. In our study, we found a positive correlation between the countries' publications on LSG and GDP, GDPpp, and HDI values. The study of Gehanno JF et al. (38) is the most similar to our research in the literature. Gehanno et al. evaluated the relationship between socio-economic factors and publications focusing on childhood obesity. Identical to the presented study, they found a significant association between publication productivity on childhood obesity and HDI. Increasing the social and economic levels would cause an increase in the supply separated by the governments for scientific programs and researches.

This is the first study focusing on the bibliographic analysis of English publications published on LSG in SCI-E journals. The fact that it does not contain any database other than WOS, which is the most reliable source for accessing and classifying scientific publications (39), is the most critical factor that limits our study. Also, evaluating only English articles is another challenge that limits the study. However, the authors were unable to interpret and assess articles other than English. Therefore, multicenter research is required, including articles in other languages.

Conclusion

Many people have been suffering and will suffer from morbid obesity and comorbid diseases caused by morbid obesity, which can be effectively treated only by surgical procedures. For this reason, it is imperative to cooperate globally and support them on strategies to be applied in obesity prevention and treatment and new scientific approaches in this regard. The most crucial weapon in the battle against the obesity epidemic is scientific publications and the progress that these publications will cause.

The present study demonstrates the avalanching publication productivity concerning LSG, a popular treatment method of morbid obesity, over the last twenty years. Because of this progress, a bibliographic analysis will contribute to facilitating researchers' further research. The necessary support should be increased for the developing or undeveloped countries to publish scientific studies on obesity, obesity-related comorbidities, and treatment methods.

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

Author Contributions:
Concept: U.E.
Literature Review: U.E.
Design : U.E.
Data acquisition: U.E.
Analysis and interpretation: U.E.
Writing manuscript: U.E.
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