THE SCIENTIFIC PRODUCTION ON VEGETARIAN DIETARY PATTERN: A SYSTEMATIC REVIEW

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Abstract
The increase in scientific evidence on the health benefits of vegetarian diets presented in the literature and the scientific interest in the subject is reflected in the number of articles published. This review assesses the scientific production on vegetarianism between 1888 and 2019. To analyze the publication trends on the subject, the keyword "vegetarian" was used in the bibliographic database of the National Institutes of Health Medline. The publication rate on vegetarianism has increased over the years, and its historical evolution can be seen divided into 3 periods. The first called "low production", from 1888-1949, with studies focused on hygienic and sanitary issues, the second period known as "medium production", between 1950-1979, with publications on cardiovascular risk factors, and the third entitled "high production", between 1980-2019, with themes focused on the vegetarian food pattern and its influence on the environment. A strong correlation (r=0.9339) was observed between the publication of articles on vegetarian eating habits in relation to the total number of articles indexed in Medline. The increase in the production of articles on vegetarianism over the years in absolute terms was accentuated, meaning a growing interest, with its characteristics focused on their historical periods and specific events.

Keywords: diet, vegetarian; medline; bibliometric indicators; articles.

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Introduction

Vegetarian diets, when well planned, promote adequate growth and development and can be adopted in all life cycles, including pregnancy, lactation, childhood, adolescence and for athletes (AMERICAN DIETETIC ASSOCIATION, 2013). Many studies have demonstrated the association between omnivorous eating patterns and hypertension, risk of heart disease, metabolic disorders and mortality (ACOSTA-NAVARRO *et al.*, 1998; ACOSTA-NAVARRO *et al.*, 2006; RIZZO *et al.*, 2016; CROWE *et al.*, 2013; ORLICH *et al.*, 2013).

According to data from the "Brazilian Institute of Public Opinion and Statistics", in 2018, 8% of the population evaluated in Brazil fully agrees with the statement "I am a vegetarian" (IBOPE, 2012). In global data, the percentage of vegetarians in the United States and Canada is 4%; Italy, Germany and Great Britain are 9%; and India is 35% (LEITZMANN, 2014).

The increase in scientific evidence on the health benefits of vegetarian diets presented in the biomedical literature is one of the factors of greatest aptitude for vegetarian eating. This scientific interest in the subject is reflected in the number of articles published on medical databases (SABATÉ; DUK; LE, 1999), determined the number and annual proportion of vegetarian nutrition articles published in the biomedical and nutritional literature from 1966 to 1995, with 1,309 records. In a study published 16 years later, Acosta-Navarro *et al*. (2015) analyzed articles on vegetarian nutrition in the same database from 1907-2013 and the number of indexed articles was 3,256. Since its publication (SABATÉ; DUK; LE, 1999), the number of articles on vegetarian nutrition has increased and there are articles about motivations, psychological aspects, types of diets, health implications, prevalence of risk factors and chronic diseases, among others.

The importance for vegetarianism society goes beyond the effects in the prevention of chronic diseases. Currently, there are major repercussions created by the increase in animal food intake in several global crises related to water, climate and energy (POPKIN, 2009), such as the current pandemic that the world suffers called Coronavirus Disease 2019 (COVID-19), whose assumption that its beginning has a zoonotic origin based on the large number of people

infected by the “Wet Market” seafood market in the city of Wuhan, China (HAMID; MIR; ROHELA, 2020).

Given the increase in the number of followers of vegetarian practice and the scientific interest related to it, the objective of this study was to characterize and quantify the production of articles on vegetarian nutrition published in MEDLINE over the years.

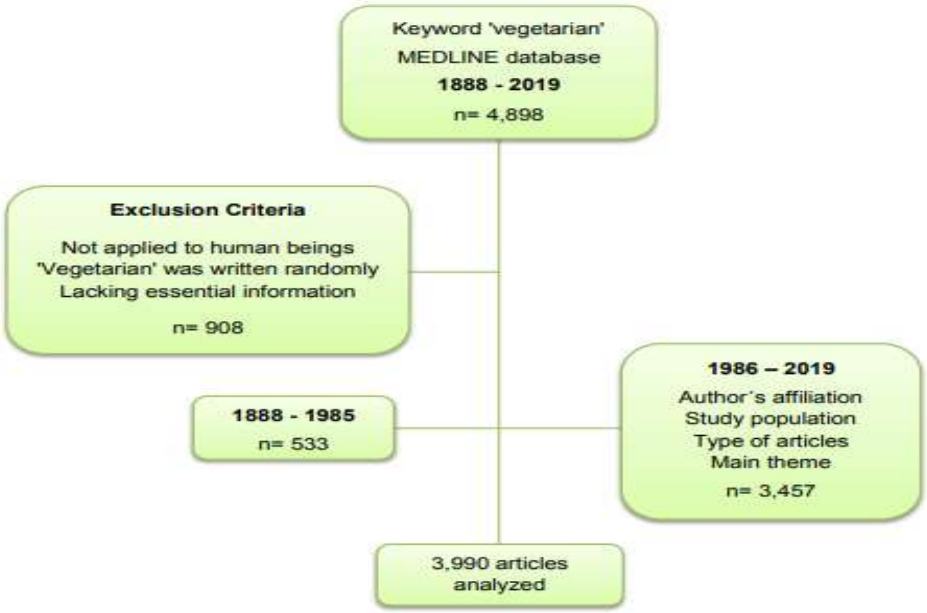
Material and Methods

This analysis of scientific production on vegetarian nutrition was carried out in the MEDLINE database. We used the keyword "vegetarian", which listed 4.898 articles. The analyzed period was from 1888, the year of the first indexed article until December 2019. Data collection was carried out in March 2020.

From the total number of articles (n = 4,898), we can see in which types of journals were published (nutritional and non-nutritional journals). To qualify as a nutrition journal, journals in the NCBI database icon (National Center for Biotechnology Information) were used on the MEDLINE website, which listed all journals indexed in nutrition. All newspapers and vegetarian words were typed. Non-nutritional journals included nursing, dentistry, medicine, among others. To compare the rate of publication of articles on vegetarian nutrition in relation to the total number of articles indexed in MEDLINE, we used the keyword 'all studies'.

Other characteristics were analyzed: the origin of the population studied, the author's first affiliation, the type of article and the main theme. For the analysis of these variables, articles that did not apply to humans, that the word vegetarian was written randomly, or that lacked essential information were excluded. MEDLINE records did not include the authors' addresses until 1986, so we studied these variables from that year until 2019. When only the abstract was available or just the title, the original article for analysis of these variables was searched individually and manually tabulated. With all these procedures, 908 were excluded and only 3,990 articles were analyzed (Figure 1).

Figure 1. Design of the study



Source: the authors.

To compare the proportion of vegetarian nutrition articles in relation to the total number of articles indexed annually by Medline from 1888 to 2019, the total number of articles was used (n = 4,898), since the articles that were not about vegetarian nutrition were without any criteria mentioned above to perform this comparison.

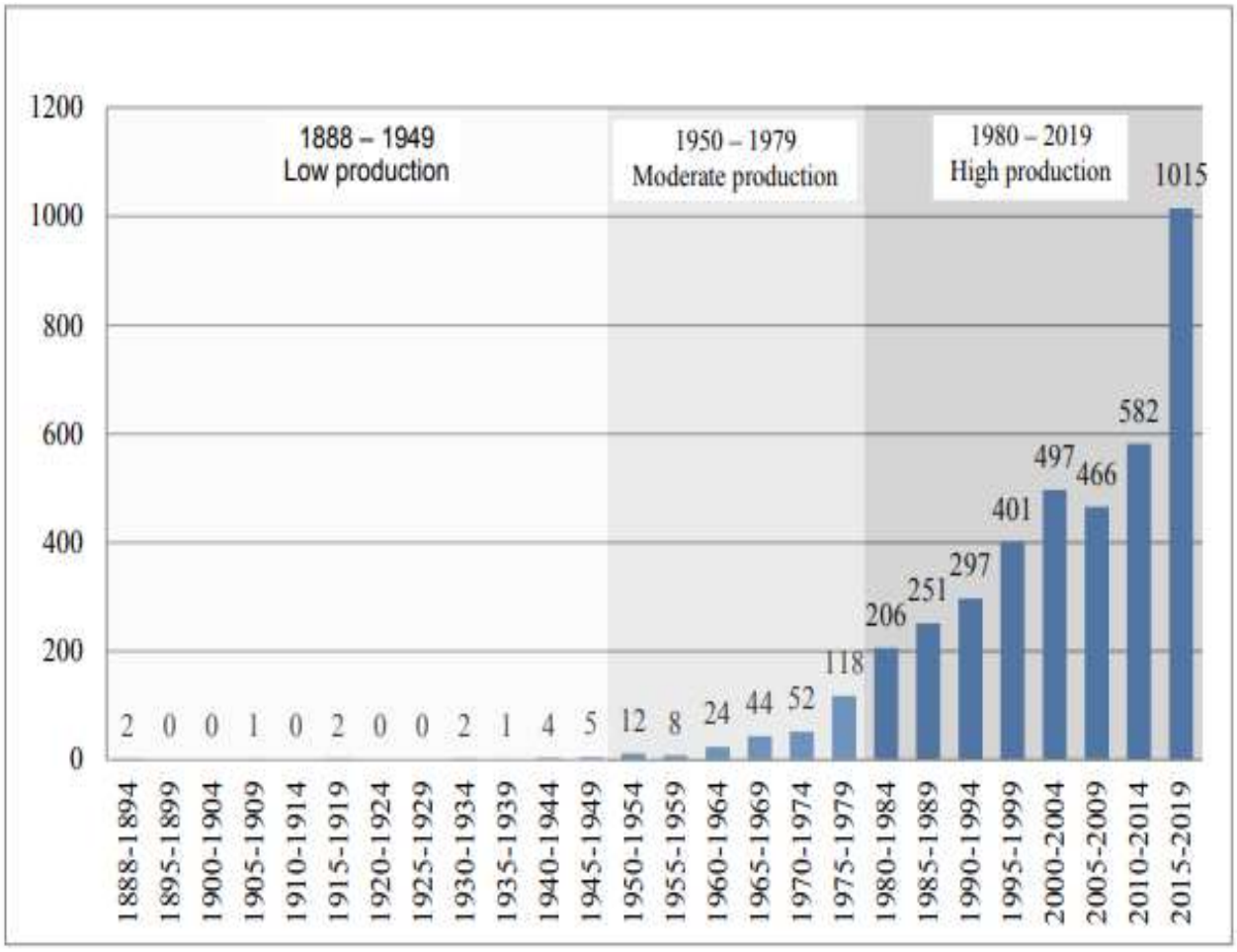
The articles were analyzed into 5 categories. The operational graph of the Excel program was used for the database and the graphic construction. To verify the differences between linear trends, the chi-square test was used and to measure the strength of a linear correlation, Pearson's correlation coefficient was calculated. The level of significance considered was 5%. All calculations were performed using Stata version 10.0.

Results

The total number of articles found in MEDLINE, it has been 4,898. The average publication rate of articles on vegetarian nutrition has increased almost exponentially from 1935-1939 to 1950-1954, from 1955-1959 to 2000-2004 and from 2005- 2009 to 2015-2019, in which the last annual range was the one with the strongest increase in publications. In the period from 2010-2014 to 2015-2019, there was an increase of 433 articles published from one five-year period to another, remembering that from 1888-1894 to 1935-1939, with an

interval of 51 years, only 8 articles were indexed, which is equivalent to about ± 1 job every five years (Graphic 1).

Graphic 1. Average annual publication rate of vegetarian articles, since 1888 to 2019.



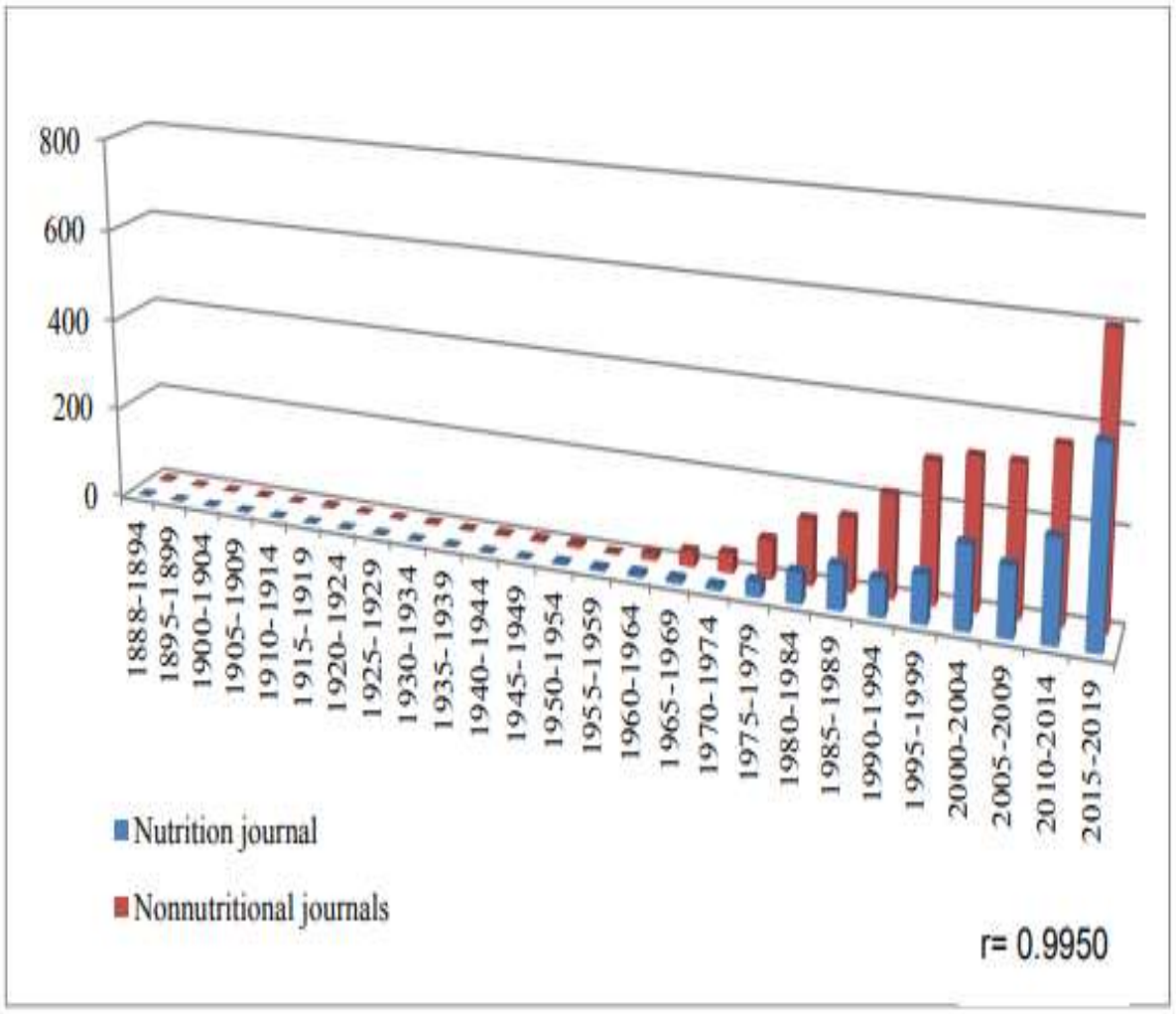
Source: the authors.

With this growing number of publications focused on vegetarianism, we can divide these years into periods known as “low production” (1888-1949), “medium production” (1950-1979) and “high production” (1980-2019).

As seen in Graphic 2, of the 3,990 articles, non-nutrition journals published more articles on vegetarian nutrition (n=2,618) than nutrition journals (n=1,372). However, the number of vegetarian nutrition articles published in non-nutrition and nutrition magazines shows a strong correlation (r=0.9950) and the proportion of the total number of vegetarian articles in non-nutrition and nutrition magazines was 1.9:1.

It is observed a significant increase over the period from 1975-1979 up to 1995-1999, followed by growth stabilization and growth recovery between the periods 2010-2014 and 2015-2019.

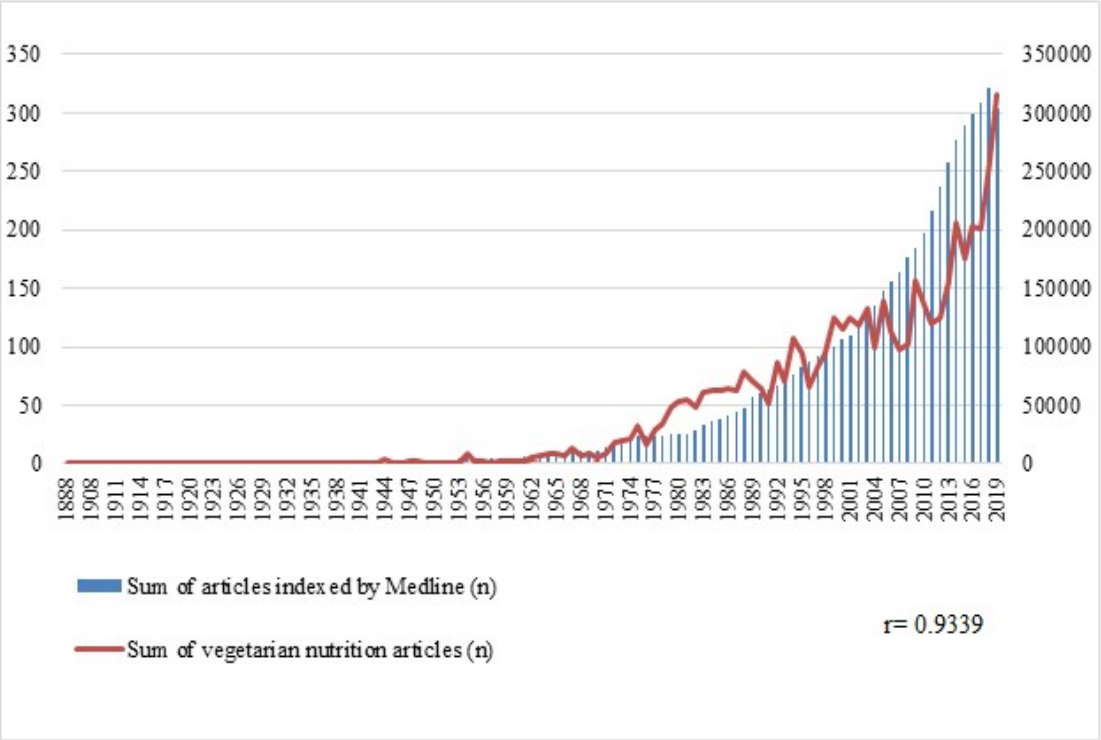
Graphic 2. Scientific production in vegetarian nutrition field by journal's type, from 1888 to 2019.



Source: the authors.

The proportion of articles on vegetarian nutrition in relation to all articles indexed by MEDLINE in each year is shown in Graphic 3. A strong correlation was found (r=0.9339), showing the relevance and interest in publishing on vegetarian dietary pattern. It was noticed that, from the end of the 60's, the sum of articles of vegetarian nutrition began to follow the increasing proportion in relation to the total of articles indexed in MEDLINE.

Graphic 3. Ratio of vegetarian nutrition articles in regarding to the total number of articles indexed by Medline annually from 1888 to 2019.



Source: the authors.

Table 1 shows the characteristics of the vegetarian nutrition articles published from 1986 to 2019 summarized by periods of five years. We found information from 3367 articles. It was observed that the first author's affiliation is predominant in the European continent during all years ($p < 0,001$). In recent years, most of the study population's origin is in Europe (n = 232, 25.95%) followed by Asia (n = 218, 19.80%). Original research articles were predominant in all years ($p <0.001$) followed by review articles ($p <0.001$) In the years between 2016-2019, the main theme studied was the adequacy of diets / nutritional status (n = 221, 24,72%) and other topics (environment, intestinal microbiota) were prevalent in previous years.

Table 1. Scientific production in the area of vegetarian nutrition, from 1986 to 2019.

Variables	**1986-1990** n (%)	**1991-1995** n (%)	**1996-2000** n (%)	**2001-2005** n (%)	**2006-2010** n (%)	**2011-2015** n (%)	**2016-2019** n (%)	**p**
Affiliation of the first author								
Europe	100 (40,32)	152 (46,48)	204 (47,66)	236 (47,77)	184 (38,98)	227 (38,22)	336 (37,58)	<0,001

Variables	**1986-1990** n (%)	**1991-1995** n (%)	**1996-2000** n (%)	**2001-2005** n (%)	**2006-2010** n (%)	**2011-2015** n (%)	**2016-2019** n (%)	**p**
North America	89 (35,89)	105 (32,11)	115 (26,87)	134 (27,13)	133 (28,18)	147 (24,75)	243 (27,18)	0,03
Ásia	25 (10,08)	35 (10,70)	56 (13,08)	80 (16,19)	112 (23,73)	178 (29,97)	245 (27,40)	<0,001
Latin America	0 (0,00)	1 (0,31)	4 (0,93)	7 (1,42)	11 (2,33)	12 (2,02)	30 (3,36)	<0,001
Others (oceanic, african)	22 (8,87)	15 (4,59)	30 (7,01)	24 (4,86)	19 (4,03)	21 (3,54)	25 (2,80)	<0,001
Ausent	12 (4,84)	18 (5,50)	19 (4,44)	13 (2,63)	13 (2,63)	4 (0,67)	7 (0,78)	<0,001
Mixed	0 (0,00)	1 (0,31)	0 (0,00)	0 (0,00)	0 (0,00)	5 (0,84)	8 (0,89)	0,02
Origin of study population								
European	78 (31,45)	53 (16,21)	70 (16,36)	157 (31,78)	129 (27,33)	150 (25,25)	232 (25,95)	<0,001
North American	65 (26,21)	31 (9,48)	41 (9,58)	55 (11,65)	55 (11,65)	92 (15,49)	177 (19,80)	<0,001
Asian	27 (10,89)	36 (11,01)	49 (11,45)	68 (13,77)	102 (21,61)	159 (26,77)	218 (24,38)	<0,001
African	2 (0,81)	4 (1,22)	7 (1,64)	6 (1,21)	8 (1,69)	3 (0,51)	3 (0,34)	0,11
Ocean	14 (5,65)	4 (1,22)	16 (3,74)	15 (3,04)	8 (1,69)	9 (1,52)	14 (1,57)	<0,001
Latin	0 (0,00)	1 (0,31)	1 (0,23)	2 (0,40)	7 (1,48)	7 (1,18)	22 (2,46)	<0,001
Ausent	54 (21,77)	193 (59,02)	238 (55,61)	187 (37,85)	160 (33,90)	154 (25,93)	136 (15,21)	<0,001
Mixed	8 (3,23)	5 (1,53)	6 (1,40)	4 (0,81)	3 (0,64)	20 (3,37)	92 (10,3)	<0,001
Type of articles								
Review	55 (22,18)	88 (26,91)	104 (24,30)	119 (24,09)	118 (25)	127 (21,38)	291 (32,55)	<0,001
Original research	117 (47,18)	183 (55,96)	251 (58,64)	292 (59,11)	258 (54,66)	404 (68,01)	523 (58,50)	<0,001
Clinical case	32 (12,90)	10 (3,06)	25 (5,84)	32 (6,48)	25 (5,30)	33 (5,56)	25 (2,80)	<0,001
Letter	8 (3,23)	7 (2,14)	20 (4,67)	4 (0,81)	16 (3,39)	12 (2,02)	24 (2,68)	0,01

Variables	**1986-1990** n (%)	**1991-1995** n (%)	**1996-2000** n (%)	**2001-2005** n (%)	**2006-2010** n (%)	**2011-2015** n (%)	**2016-2019** n (%)	**p**
Others (editorial)	32 (12,90)	24 (7,34)	23 (5,37)	15 (3,04)	42 (8,90)	17 (2,86)	31 (3,47)	<0,001
Ausent	4 (1,61)	15 (4,59)	5 (1,17)	32 (6,48)	13 (2,75)	1 (0,17)	0 (0,00)	<0,001
Risk factors and cardiovascular diseases	35 (14,11)	29 (8,87)	69 (8,87)	41 (8,30)	62 (13,14)	47 (7,91)	71 (7,94)	<0,001
Other diseases	47 (18,45)	82 (25,08)	91 (21,26)	86 (17,41)	81 (17,16)	183 (30,81)	165 (18,46)	<0,001
Motivations/biopsyc osocial contexto	10 (4,03)	21 (6,42)	20 (4,67)	50 (9,53)	45 (9,53)	26 (4,38)	126 (14,09)	<0,001
Adequacy of vegetarian diets/nutritional status	75 (30,24)	83 (25,38)	127 (29,67)	124 (25,10)	132 (27,97)	109 (18,35)	221 (24,72)	<0,001
Nutrients deficiency	24 (9,68)	25 (7,65)	28 (6,54)	55 (11,13)	59 (12,50)	60 (10,10)	97 (10,85)	0,05
Others topics	57 (22,98)	87 (26,61)	93 (21,73)	138 (27,94)	93 (19,70)	169 (28,45)	214 (23,94)	<0,001
Total	**248**	**237**	**428**	**494**	**472**	**594**	**894**	

Source: the authors.

Discussion

There was an evolution in the understanding of dietary vegetarian pattern. Evidence that the dietary vegetarian pattern can prevent various types of diseases and promote health may be contributing positively to increasing the number of vegetarians. The number of vegetarians in Brazil is unknown, however, according to IBOPE data, in 2018, 8% of the evaluated population fully agrees with the statement "I'am vegetarian" (IBOPE, 2018).

The concept of vegetarian nutrition has undergone a paradigm shift over time, so the historical evolution for five years assessed in the study can be divided into 3 periods for a better understanding of the events.

The first period of "low production" is consecrated between the years 1888-1949, and at the beginning of studies focused on vegetarianism, the first, so far, to be published

in the MEDLINE database was Knight's (1888), which addressed the theme of the food pattern and its relationship with the issue of hygiene and zoonosis. In addition to this, other articles in that period addressed themes focused on the importance of vegetarianism in relation to influenza and epidemiologies caused at the time. According to Yates (1891) presented data from individuals who were adherents to a vegetarian dietary pattern demonstrated a better health status in relation to omnivores, whose time was marked by several cases of death due to the flu epidemic. Recalling that the world currently suffers from a worldwide pandemic called the Coronavirus Disease 2019 (COVID-19), which first episodes started in Wuhuan, China, and some articles mention its zoonotic origin, due to the cultural consumption of wild mammals in this region, such as pangolins and bats, which are speculated to be the causative agent of the disease (LAU *et al*., 2020).

The second period of 1950-1979, "medium production", presented studies on cardiovascular risk factors, of which according to Sabaté (2003), until the 1960s, it was believed that a population that followed a vegetarian diet was at greater risk of developing diseases for nutrient deficiency than a population on a meat-based diet. In the past 4 decades, vegetarian diets are seen more as improving health than causing disease, in contrast to meat-based diets. Vegetarian diets decrease the risk of cardiovascular disease (ACOSTA-NAVARRO *et al*., 2006), metabolic syndrome (Rizzo *et al*., 2011), diabetes (TONSTAD *et al*., 2009) and cancer (TANTAMANGO-BARTLEY *et al*., 2013).

Finally, the last period "high production" between 1980-2019 demonstrated that the importance for vegetarianism society goes beyond the effects in preventing chronic diseases with high mortality such as cardiovascular, metabolic and neoplastic diseases, but also influences the planet. Currently, there are major repercussions generated by the increased intake of food of animal origin in several global crisis related to water, climate and energy (CRAIG; MANGELS, 2009). The critical issue to understand is that, as meat is much further down the food chain, estimates are that water use is 2 to 5 times higher for food of animal origin than for basic crops (for example, legumes, grains) worldwide (HOEKSTRA; CHAPAGAIN , 2007). It is estimated that 23% of the world's water is destined for the use of animals in total. The effects of animal production on water pollution, however, are much greater. In the United States, animal production is responsible for 55% of the erosion process, 37% of applied pesticides, 50% of antibiotics consumed and one third of the total discharge of nitrogen and phosphorus into surface waters (STEINFELD *et al.,* 2006). As for the use of fossil fuels and global climate control, the recent United Nations report suggests that livestock is responsible for 18% of greenhouse gas emissions, much higher than transport. Overall, scholars first question the

sustainability of modern agriculture in general, and second, they question the much higher use of energy in animal feed production (PARRY *et al*., 2007).

In this study, we found that the work on vegetarian nutrition has increased over the years, reflecting a great interest in professionals and scientists. Sabaté *et al.* (1999), documented trends in the publication of 1,309 vegetarian nutrition articles on MEDLINE between 1966 and 1965. Acosta-Navarro *et al*. (2015) analyzed 3,256 articles in the period 1907-2013. In the same way as the studies cited, in this study we worked with 4898 articles between 1888 and 2019. The number of articles with the highest increase between publications was between the years 2015-2019, with a total of 1,015, which represents 57.33% more compared to 2010-2014.

The rate of publication of articles on vegetarian nutrition has steadily increased over time since the mid-1930s, except in the 2005-2009 period, which proved to be equivalent. We speculate that this may have been a reflection of the capitalism crisis that may have affected research funding, because the financial support for vegetarianism research probably comes from public resources and does not have enough support.

The research can also explain that, since the end of the 1960s, articles on nutrition have been presented in an increasing way along with the total number of articles indexed in MEDLINE, thus showing the relevance and interest in publishing works on vegetarian diets throughout the unfolding of the years.

A strong correlation shows that there is a trend in publishing this type of article. The increase in vegetarian nutrition articles in the scientific literature, especially in the last 50 years, reflects the interest in this subject, both in nutrition professionals and in other areas of health. The same reason could explain that the publication of articles in nutrition and non-nutrition magazines is growing.

The first author's affiliation is predominant on the European continent, followed by North America and Asia, with the majority of the study population absent and followed by Europe and Asia. This trend may be related to the presence of more developed countries, where greater financial investment in research is observed and also, in the evaluated database, as studies from other continents can be published in local databases.

We found that original research and analysis on vegetarian diets is prevalent. These studies with methodological designs with a strong level of evidence generate more robust data on the benefits of a vegetarian diet and can serve as a basis for campaigns and public policies in the fields of health and the environment.

In the study by Sabaté *et al*. (1999), 40% of all publications, preventive and therapeutic applications of vegetarian diets were the main themes of vegetarian articles in the 1986-1995 decade. However, 20 years earlier, the main focus was on the nutritional adequacy of vegetarian diets. In our study, although the main theme of the study was the adequacy of vegetarian diets / nutritional status, we noticed a decrease in the last period and an increase in the theme of other diseases.

The strength of our study is the extensive bibliographic period, since the first publication on vegetarianism, with 131 years old, which allows us to evaluate the evolution of the production of literature on the subject as reliable as possible. A bias in our study is that only one database was used, but stated that MEDLINE has the advantage of having most of the major biomedical and health journals, despite prejudice in favor of medical journals and the United States of America, Canada and United Kingdom compared to other scientific journals in health and non-Englis, which reduces this limitation. This preference for journals from these countries justifies the fact that more than 90% of the articles are written in English.

Considering that the vegetarian diet can cause disease prevention, health maintenance and less wear and tear on natural resources, it is of great importance that the present study has evaluated the evolution of scientific production on this subject and can direct trends in future publications.

Conclusion

We observed a sharp increase in the production of articles on vegetarian nutrition published in MEDLINE in absolute terms, which means an increase in the curve in relation to the numerical value, but not aimed at its proportionality. Most studies consist of original research and review articles, published by non-nutritional journals, in English, on the European continent and as the main theme of the adequacy of vegetarian diets/nutritional status.

So, the study showed that over the years, 1888 to 2019, articles indexed in MEDLINE presented their own characteristics geared to their specific periods and historical events.

Declaration of Interest

The Authors Declare That They Have No Known Competing Financial Interests.

References

Acosta-Navarro, J. C. *Et Al.* Vegetarians And Semi-Vegetarians Are Less Exposed To Cardiovascular Risk Factors. **International Journal Of Atherosclerosis**, São Paulo, V. 1, N.

1, P. 48-54, 2006. Available From: Https://Www.Semanticscholar.Org/Paper/Vegetarians-And-Semi-Vegetarians-Are-Less-Exposed-Navarro/C315c25372376b9834b38b92b134946f875706e7. Accessed: 26 Set. 2021.

Acosta-Navarro, J. C. *Et Al*. Pressão Sanguínea, Perfil Lipídico E Outros Parâmetros Bioquímicos Entre Peruanos Vegetarianos, Semi-Vegetarianos E Onívoros. O Estudo Lima. (Blood Pressure, Lipid Profile And Other Biochemical Parameters Among Vegetarians, Semi-Vegetarians And Omnivores Peruvians. The Lima Study). **Anais Paulistas De Medicina E Cirurgia**, São Paulo, V. 125, P. 87-10, 1998. Available From: Https://Www.Scienceopen.Com/Document?Vid=532f9c67-716c-4275-894f-1f72d808cbd9. Accessed: 26 Set. 2021.

Acosta-Navarro, J. C. *Et Al*. Evolution In Scientific Production In The Area Of Vegetarian Nutrition, 1907-2013. **International Journal Of Nutrition**, New York, V. 1, N. 3, P. 39-46, 2015. Available From: Https://Openaccesspub.Org/Article/214/Ijn-15-675.Pdf. Accessed: 26 Set. 2021. Doi 10.14302/Issn.2379-7835.Ijn-15 675.

American Dietetic Association. Dietitians Of Canada. Position Of The American Dietetic Association And Dietitians Of Canada: Vegetarian Diets. **Journal Of American Dietetic Association**, Netherlands, V. 103, N. 6, P. 748-765, 2003. Doi 10.1053/Jada.2003.50142.

Craig, W. J.; Mangels, A. R.; American Dietetic Association. Position Of The American Dietetic Association: Vegetarian Diets. **Journal Of The American Dietetic Association**, New York, V. 109, N. 7, P. 1266-1282, 2009. Doi 10.1016/J.Jada.2009.05.027.

Crowe, F. L. *Et Al*. Risk Of Hospitalization Or Death From Ischemic Heart Disease Among British Vegetarians And Nonvegetarians: Results From The Epic-Oxford Cohort Study. **The American Journal Of Clinical Nutrition**, Bethesda, V. 97, N. 3, P. 597–603, 2013. Doi: Https://Doi.Org/10.3945/Ajcn.112.044073

Hamid, S.; Mir, M. Y.; Rohela, G. K. Novel Coronavirus Disease (Covid-19): A Pandemic (Epidemiology, Pathogenesis And Potential Therapeutics). **New Microbes And New Infections**, London, V. 35, P. 100679, 2020. Doi 10.1016/J.Nmni.2020.100679.

Hoekstra, A. Y.; Chapagain, A. K. Water Footprints Of Nations: Water Use By People As A Function Of Their Consumption Pattern. **Water Resources Manage**, Cham, V. 21, P. 35-48, 2007. Doi 10.1007/978-1-4020-5591-1_3.

Ibope - Instituto de Opinião Pública e Estatística. **Dia mundial do vegetarianismo**: 8% da população brasileira afirma ser adepta do estilo. Rio de Janeiro, 2012. Available from: http://www.ibope.com.br/pt-br/noticias/paginas/dia-mundial-do-vegetarianismo-8-da-populacao-brasileira-afirma-ser-adepta-ao-estilo.aspx. Accessed: 26 set. 2021.

IBOPE - Instituto de Opinião Pública e Estatística. **Pesquisa do IBOPE aponta crescimento histórico no número de vegetarianos no Brasil**. Rio de Janeiro, 2018. Available from: https://www.svb.org.br/2469-pesquisa-do-ibope-aponta-crescimento-historico-no-numero-de-vegetarianos-no-brasil. Accessed: 26 set. 2021.

KNIGHT, J. Vegetarianism. **The Hospital**, London, v. 4, n. 82, p. 51, 1888. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5262691/. Accessed: 26 set. 2021.

LAU, S. K. P. *et al*. Possible bat origin of severe acute respiratory syndrome coronavirus 2. **Emerging Infectious Diseases Journal**, Atlanta, v. 26, n. 7, p. 4-7, 2020. DOI 10.3201/eid2607.200092.

LEITZMANN, C. Vegetarian nutrition: past, present, future. **The American Journal of Clinical Nutrition**, Bethesda, v. 100, p. 496-502, 2014. DOI 10.3945/ajcn.113.071365.

ORLICH, M. J. *et al*. Vegetarian dietary patterns and mortality in adventist health study 2. **JAMA Internal Medicine**, Chicago, v. 173, n. 13, p. 1230-1238, 2013. DOI 10.1001/jamainternmed.2013.6473.

PARRY, M. *et al*. **Climate change 2007**: impacts, adaptation and vulnerability. Cambridge: IPCC Working Group II, 2007. Available from: https://www.ipcc.ch/site/assets/uploads/2018/03/ar4-wg2-intro.pdf. Accessed: 26 set. 2021.

POPKIN, B. M. Reducing meat consumption has multiple benefits for the world's health. **Archives of Internal Medicine**, Chicago, v. 169, n. 3, p. 543-545, 2009. DOI 10.1001/archinternmed.2009.2.

RIZZO N. S. *et al*. Vegetarian dietary patterns are associated with a lower risk of metabolic syndrome. **Diabetes Care**, New York, v. 34, n. 5, p. 1225-1227, 2011. DOI 10.2337/dc10-1221.

SABATÉ, J. The contribution of vegetarian diets to health and disease: a paradigm shift? **The American Journal of Clinical Nutrition**, Bethesda, v. 78, n. 3, p. 502S–507S, 2003. Supplement. DOI 10.1093/ajcn/78.3.502S.

SABATÉ, J.; DUK, A.; LE, C. L. Publication trends of vegetarian nutrition articles in biomedical literature, 1966-1995. **The American Journal of Clinical Nutrition**, Bethesda, v. 70, n. 3, p. 601-607, 1999. Supplement. DOI 10.1093/ajcn/70.3.601s.

STEINFELD, H. *et al*. **Livestock's long shadow**: environmental issues and options. Rome: Food and Agriculture Organization of the United Nations, 2006. Available from: http://www.fao.org/3/a0701e/a0701e00.htm. Accessed: 26 set. 2021.

TANTAMANGO-BARTLEY, Y. *et al*. Vegetarian diets and the incidence of cancer in a low-risk population. **Cancer Epidemiology, Biomarkers & Prevention**, Philadelphia, v. 22, n. 2, p. 286-294, 2013. DOI 10.1158/1055-9965.EPI-12-1060.

TONSTAD, S. *et al*. Type of vegetarian diet, body weight, and prevalence of type 2 diabetes. **Diabetes Care**, New York, v. 32, n. 5, p. 791-796, 2009. DOI 10.2337/dc08-1886.

YATES, M. The influenza. **The Hospital**, London, v. 10, n. 245, p. 112, 1891. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5258368/. Accessed: 27 set. 2021.

A PRODUÇÃO CIENTÍFICA NO PADRÃO ALIMENTAR VEGETARIANO: UMA REVISÃO SISTEMÁTICA

Resumo

O aumento das evidências científicas sobre os benefícios para a saúde das dietas vegetarianas apresentadas na literatura e o interesse científico pelo assunto se reflete no número de artigos publicados. Esta revisão avalia a produção científica sobre o vegetarianismo entre 1888 e 2019. Para analisar as tendências de publicação sobre o tema, foi utilizado a palavra-chave "vegetariano" na base de dados bibliográfica do National Institutes of Health Medline. A taxa de publicação sobre vegetarianismo tem aumentado ao longo dos anos, e sua evolução histórica pode ser visto dividido em 3 períodos. O primeiro denominado "baixa produção", de 1888-1949, com estudos voltados para questões higiênico-sanitárias, o segundo período conhecido como "média produção", entre 1950-1979, com publicações sobre fatores de risco cardiovascular, e o terceiro titulado de "alta produção", entre 1980-2019, com temáticas voltadas para o padrão alimentar vegetariano e sua influência no meio ambiente. Observou-se

forte correlação (r=0,9339) entre a publicação de artigos sobre hábitos alimentares vegetarianos em relação ao total de artigos indexados no Medline. Acentuou-se o aumento da produção de artigos sobre vegetarianismo ao longo dos anos em termos absolutos, significando um crescente interesse, com suas características voltadas para seus períodos históricos e eventos específicos.

Palavras-chave: dieta vegetariana; medline; indicadores bibliométricos; artigos**.**