A bibliometric review on the top 20 cited articles in the Jackson heart study

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ABSTRACT

Background: Cardiovascular diseases are higher in African American population, and in the past three decades, less decline in mortality was observed in African Americans compared with white Americans. American health disparities resulted in establishing one of the largest single-site investigations to examine causes of cardiovascular diseases in African American population, namely the Jackson Heart Study (JHS). Methods: In January 2020, we used the jacksonheartstudy.org website to obtain the list of publications produced by the JHS from 1999 to 2018. The citation’s frequency was obtained for 455 articles using the search engine “google.com”. The top 20 cited articles were characterized based on the first author's name, the month and year of publication, and the journal’s name and its impact factor. Results: The frequency of citations for the 20 most-cited articles in the Jackson heart study ranged from 282 to 5545. The average number of citations was 1045.60. The top 20 articles were represented in 8 different peer-reviewed journals. Conclusion: The top 20 cited articles in the JHS were in the genetics field and were all observational in type. Future direction of the JHS should be directed toward well established interventional studies.

Keywords: Cardiovascular diseases, citations, Jackson heart study

Introduction

Heart diseases remain the leading cause of mortality in the United States irrespective of the gender and ethnic background. Approximately, 647,000 American die because of heart diseases annually. At least half of the American population has one of the key risk factors for the development of cardiovascular diseases.¹ There is a disproportionate share of such burden by being African American. Cardiovascular diseases are higher in African American population, and in the past three decades, less decline in mortality was observed in African Americans compared with white Americans.² American health disparities resulted in establishing one of the largest single-site investigations to examine causes of cardiovascular diseases in African American population, namely the Jackson Heart Study (JHS).³

In the tradition of the large epidemiologic investigation such as the Framingham Heart Study, the JHS utilizes community-driven research approaches to extend our understanding of the current epidemic in the short and the long term.⁴ The JHS is a collaborative partnership among three institutions (Jackson State University, Tougaloo College, and the University of Mississippi Medical Center) involving more than 5300 participants in Jackson, Mississippi, USA. The JHS is supported by the National Institutes of Health's National Heart, Lung, and Blood Institute (NHLBI), and Office of Research on Minority Health. The goals of the study are to: (1) establish one-site study examining and identifying the key risk factors related to cardiovascular diseases’ development in African American population, (2) improve and promote the research capabilities in minority institutions via collaborative partnership, (3) increase the interest of minority

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students to consider careers in public health and epidemiology, and (4) develop an NHLBI field site in Jackson, Mississippi similar to the one established for the Framingham Heart Study.\(^{[2]}\)

The JHS has produced over the past two decades a total number of 455 publications.\(^{[3]}\) Evaluating the output of such large investigations is a crucial factor in determining the progressive impact of such large cohorts. The citations’ count, though debated, remains one of the easiest and most valuable tools to assess the quality of scientific literature. Bibliometrics studies utilize citations’ frequency to examine the most influential articles in a specific specialty.\(^{[4]}\) In an attempt to understand the quality of the JHS output, we performed an analysis to determine the top 20 cited publications from the JHS, and provide a brief overview of the significant characteristics of the JHS articles that have had increased our understanding of cardiovascular diseases’ causes in African American population.

### Methods

In January 2020, we used the jacksonheartstudy.org website to obtain the list of publications produced by the Jackson Heart Study from 1999 to 2018. The citation’s frequency was obtained for 455 articles using the search engine “scholar.google.com”. Each article’s title was copied and pasted in the search box of the search engine to retrieve the abstract. The number of citations for each article was recorded on a separate word document file. After that, among the 455 publications, we selected the top 20 cited articles. The abstracts of the top cited 20 articles were copied and pasted in a separate word document. From each abstract, we obtained the first author’s name, the month and year of publication, and the journal’s name and its impact factor. To ensure the accuracy of this process, it was done twice by both authors of this article. The top cited articles according to journal and their impact factors were determined. Pearson correlation was utilized to determine if an association between citation count and journal’s impact factor existed.

### Results

The first four publications from the Jackson Heart Study appeared in literature in 1999. The highest number of publications was 85 articles in 2016, there was only one article published in 2000 and 20001. Figure 1 shows a year-wise number of publications from the JHS. The frequency of citations for the 20 most-cited articles in the Jackson heart study ranged from 282 to 5545. The average number of citations was 1045.60. The sum of the citations for the top 20 articles in the JHS was 20,912. The median number of citations was 443.50. A total of 25% of the articles had >1500 citations. 60% of the articles had a citation count below 500, and three articles had a citation count between 600 and 800 citations. Table 1 shows the rank of articles with their corresponding first author, year of publication, citation count, and journal’s name. The top 20 articles were represented in 8 different peer-reviewed journals.

In total 9 of the top 20 cited articles were published in the Nature journal followed by 3 articles in the New England Journal of Medicine. Table 2 shows the top cited 20 articles in the JSH according to journal and their impact factor. There was no significant association between IF and the number of citations of top 20 cited articles \((P = 0.41)\).

### Discussion

The current bibliometric analysis shows that 16 of the top 20 cited articles in the JHS were in the field of genetics [Table 1]. These genetic studies addressed health disparities related to obesity, blood pressure, diabetes type II, and liver diseases. In our list, these genetic studies were published in the period between 2011 and 2017. Such coincidence is non-unpredictable especially that the completion of the human genome project happened at an era of evolving public attention to health disparities. This resulted in emphasizing the role of genetics in health disparities, combining race, genetic ancestry, and diseases.\(^{[5]}\) While genetics play a role in disease development and pathogenesis, however such overemphasis resulted in distracting attention from other important determinants of health and diseases such as: environmental, social factors influencing diet, and physical activity. Consequently, the introduction of new genomic testing and technology could further intensify the disparities in high quality healthcare access.\(^{[6,7]}\) One of the goals of the JHS was to explore the environmental and genetic factors associated with cardiovascular diseases among the African American population, yet the most-cited articles in this large investigation were related to genetics.

In the US, health disparities are important, complex and expanding topic, and have attracted the attention of policy makers and scientists, however it has shifted the nation's health research agenda to be largely focused on biological factors and biomedical interventions. The association between socioeconomic status and health is well studied and established.\(^{[8]}\) It has been documented in both developed and developing countries despite the of the changes over time in the diseases’ causes. Health disparities are multifactorial and requires a multidisciplinary collaboration.
Another major observation in this analysis is that all studies were of observational type and none had any intervention. While observational studies offer a greater understanding of associations and causation, interventional studies offer a greater value in understanding diseases’ outcome and management challenges and opportunities. The future trend of the JHS should focus on developing well-designed, randomized controlled trials that will produce management and treatment strategies that are efficacious, and cost effective for the African American population.

The top 20 cited articles were published in 8 different journals. Almost half of the publications (n = 9) were published in the well-recognized multidisciplinary journal, nature. Such finding is expected as nature was ranked to be the most cited journal worldwide by the science edition of the 2010 journal citation reports. This suggests that scientists favor presenting their important genetic studies in relation to health disparities in well-recognized journals. According to the Bradford’s law by

### Table 1: Shows the rank of the top 20 cited articles in the JHS with their corresponding first author, year of publication, publication’s title, citation’s frequency, and journal’s name

| Rank | Authors | Date   | Title                                                                 | No. of citations | Journal                  |
|------|---------|--------|----------------------------------------------------------------------|------------------|--------------------------|
| 1    | Lek M, et al. | Aug 2016 | Analysis of protein-coding genetic variation in 60,706 humans       | 5545             | Nature                   |
| 2    | Teslovich TM, et al. | Aug 2010 | Biological, clinical and population relevance of 95 loci for blood lipids | 3004             | Nature                   |
| 3    | Locke AE, et al. | Feb 2015 | Genetic studies of body mass index yield new insights for obesity biology | 2271             | Nature                   |
| 4    | Ephret GB, et al. | Sep 2011 | Genetic variants in novel pathways influence blood pressure and cardiovascular disease risk | 1653             | Nature                   |
| 5    | Jaiswal S, et al. | Dec 2014 | Age-related clonal hematopoiesis associated with adverse outcomes | 1610             | N Engl J Med.            |
| 6    | Fu W, et al. | Nov 2012 | Analysis of 6,515 exomes reveals the recent origin of most human protein-coding variants | 798              | Nature                   |
| 7    | Shungin D, et al. | Feb 2015 | New genetic loci link adipose and insulin biology to body fat distribution | 784              | Nature                   |
| 8    | Fuchsburger C, et al. | Jul 2016 | The genetic architecture of type 2 diabetes | 626              | Nature                   |
| 9    | Do R, et al. | Dec 2014 | Exome sequencing identifies rare LDLR and APOA5 alleles conferring risk for myocardial infarction | 454              | Nature                   |
| 10   | Sweedlow D, et al. | Jan 2015 | HMGI-coenzyme A reductase inhibition, type 2 diabetes, and bodyweight: Evidence from genetic analysis and randomized trials | 448              | Lancet                   |
| 11   | Crosby J, et al. | Jul 2014 | Loss-of-function mutations in APOC3, triglycerides, and coronary disease | 439              | N Engl J Med.            |
| 12   | Taylor H, et al. | 2005 | Toward resolution of cardiovascular health disparities in African Americans: Design and methods of the Jackson Heart Study | 437              | Ethn D.                  |
| 13   | Taylor H | 2005 | The Jackson Heart Study: An overview | 435              | Ethn D.                  |
| 14   | Chambers J, et al. | Oct 2011 | Genome-wide association study identifies loci influencing concentrations of liver enzymes in plasma | 392              | Nature Genet.            |
| 15   | Khera A, et al. | Jun 2016 | Diagnostic Yield and Clinical Utility of Sequencing Familial Hypercholesterolemia Genes in Patients with Severe Hypercholesterolemia | 373              | J Am Coll Cardiol.       |
| 16   | Dastani Z, et al. | Mar 2012 | Novel loci for adiponectin levels and their influence on type 2 diabetes and metabolic traits: A multi-ethnic meta-analysis of 45,891 individuals | 369              | PLoS Genetics            |
| 17   | Flannick J, et al. | Apr 2014 | Loss-of-function mutations in SLC30A8 protect against type 2 diabetes | 342              | Nature Genet.            |
| 18   | Liu J, et al. | Dec 2010 | Impact of abdominal visceral and subcutaneous adipose tissue on cardiometabolic risk factors: The Jackson Heart Study | 335              | J Clin Endocrinol Metab. |
| 19   | Sitzziel N, et al. | Nov 2014. | Inactivating mutations in NPC1L1 and protection from coronary heart disease | 315              | N Engl J Med.            |
| 20   | Marouli E, et al. | Feb 2017 | Rare and low-frequency coding variants alter human adult height | 282              | Nature                   |

### Table 2: Shows the representation of the top 20 articles in the JHS in 8 different journals with their impact factor

| Journal’s name          | Number of articles | 2018 impact factor |
|-------------------------|--------------------|--------------------|
| Nature                  | 9                  | 43.07              |
| New England Journal of Medicine | 3              | 70.67              |
| Nature Genetics         | 2                  | 31.07              |
| Ethnicity and Disease   | 2                  | 1.01               |
| The Journal of the American College of Cardiology | 1              | 18.63              |
| The Journal of Clinical Endocrinology & Metabolism | 1              | 5.60               |
| PLoS Genetics           | 1                  | 5.22               |
| Lancet                  | 1                  | 59.10              |

between researchers and clinicians sharing similar understanding of the role of social determinants in disease development and progression.\[9\]
Brookes and Siegelman, a great number of researchers acquire their citations from a few prestigious journals in their field of interest and expertise, however when they deviate from these main journals, their citation count tends to decrease.\[9\]

The knowledge dissemination capacity of the JHS has progressively improved over the past two decades. The publication count has increased reaching the highest numbers 85, and 83 in 2016, and 2017, respectively. While the JHS was established for increasing our understanding of health disparities via evidence-based, it has further promoted the research environment in minority institutions and engaged minority students to be public health leaders, advocates, and scientists. This is another important impact in reducing the gap in the future of the health disparities in the US.\[9\]\[Overall, disparities related to cardiovascular risks and diseases have reduced over time. It has been speculated that such reduction is attributed to the introduction of effective therapeutic interventions that ultimately led to better cardiovascular risk management. In the primary care setting, considering modifications in the guidelines related to cardiovascular risk counseling and management may potentially ameliorate future racial and health disparity.\[10\]

Bibliometric analysis has several limitations. First, it favors older articles in the citation count versus recent articles as there is not adequate duration to allow citation recognition of new articles. Second, journals indexed in different databases can alter the number of citations, and self-citation was not considered in this analysis.\[5\]

**Conclusion**

The evidence introduced in the JHS can be utilized to promote future research directions, policy, and practice recommendations. To achieve this goal, directions should be tailored toward more interventional studies. While the role of genetics remains important in understanding health disparity, emphasis should be dedicated more to highlighting the role of the social determinants. The role of standardizing clinical guidelines in the primary care setting may potentially help reducing health disparity in the future.

**Authors’ contribution**

Both authors contributed equally to the preparations, writing, and reviewing the manuscript. Bother authors approved the final version of the manuscript.

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**Conflicts of interest**

There are no conflicts of interest.

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