A SCIENTOMETRIC REVIEW OF ARTICLES PUBLISHED IN THE JOURNAL APHASIOLOGY IN THE YEAR 2020

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AUGUST 2022

CERTIFICATE

This is to certify that this dissertation entitled "**A scientometric review of articles published in the journal aphasiology in the year 2020**" is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 20SLP008. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for an award of any other Diploma or Degree.

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CERTIFICATE

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DECLARATION

This is to certify that this dissertation entitled ― "**A scientometric review of articles published in the journal aphasiology in the year 2020**" is the result of my own study under the guidance of Dr. S.P. Goswami, Professor, Department of Speech-Language Pathology, All India Institute of Speech and Hearing, Manasagangothri, Mysuru-570006 and has not been submitted earlier to any other University for an award of any other Diploma or Degree.

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CHAPTER I

INTRODUCTION

In today's era, as the world of research academia witnesses an ever-rising surge of scientific publications year after year, assessing the quality of publications becomes both vital and necessary. The use of Scientometrics is one way to quantitative analyze the quality of research articles in any discipline (Saritas & Burmaoglu, 2015). The field of Scientometry has expanded throughout time and is often considered a sub-field of bibliometrics. Scientometrics as a technique has various applications including identifying research trends in a field, trends in authorship and collaboration in research, stagnation and dispersion of scientific literature, examining the productivity and impact of individual researchers, and distribution of scientific publications by research organizations and so on. Further, it can be beneficial in the identification of emerging research areas (Brindha and Murugesapandian, 2016) As a result, Scientometrics can be considered an important technique which can be used to assess the quality and quantity of literature published across different fields of academia within a specific geographical area (*Glossary of Thompson*, 2008).

In literature, there are many definitions for the term "Scientometrics". Hess (1997) defined Scientometrics as the study of quantifiable components in science, communication in science and science policy. Scientometrics, also known as "the science of science" (Fortunato et al., 2018), is a group of measurement techniques that are employed for examining the emergence of foundational patterns and interconnections across different fields of academia. Scientometrics focuses on investigating quantifiable features of scientific information specifically its generation, propagation and utilization (Braun et al., 2019). It is a kind of review study which aims

to evaluate the application of statistical approaches to scientific work and research output based on journal publications (Swain et al. 2020).

Ramkumar et al. (2016) investigated the collaboration trend in three Speech, Language, and Hearing Sciences journals. Journal of Speech, Language, and Hearing Research (JSLRH), published by the American Speech and Hearing Association (ASHA), Asia Pacific Journal of Speech, Language, and Hearing (SLH), and Journal of the All India Institute of Speech and Hearing (JAIISH) were the authors' top three choices in the field of Speech, Language, and Hearing. The author examined articles published between the years 2009 and 2013. They used Scientometric techniques such as the degree of collaboration, the collaboration index, the collaborative coefficient, and the Modified collaborative coefficient. They also introduced three new parameters for analysis: local collaborative index, domestic collaborative index, and international collaborative index. Authorship patterns were analyzed by journal, subject, and authorship pattern. Through the study, they discovered that between 2009 and 2013, the number of papers published in journals grew linearly. The collaborative index was found to be high, indicating that the majority of the publications were collaborative in nature. In addition to that, the study also revealed that the number of publications published in Language was higher than Speech and Hearing subjects in their subject-by-subject study. Local collaborations were shown to be more common than domestic and international collaborations.

Sadik and Chaturbhuj (2019) conducted a scholarly communication study in the field of Phonology from 2000 to 2017 through articles, book reviews, reviews, proceeding papers, book chapters, letters, and reprints. A statistical tool was used to examine the outcome characteristics, which included the collaborative index, relative

growth rate, collaboration co-efficient, and degree of collaboration. Single-authored publications were found to be more prevalent than multi-authored ones. They also observed a low collaborative index, indicating that collaboration between authors in the field was limited. The results also showed that the United States had the highest proportion of publications in this subject.

Gupta et. al in the year 2011, published a Scientometric study which analyzed the Dementia research output from India during the time period 2002-11. They studied parameters such as growth, global publications share, citation impact, the contribution of various subject fields and by type of dementia, and patterns of research communication in most productive journals. The study revealed that among the top 20 most productive countries in dementia research, India ranked 16th (with 1109 papers) with a global publication share of 1.24% and had an annual average publication growth rate of 25.58% during the time period 2002-11. The results also showed that in spite of 3.7 million elderly people suffering from dementia by 2010 in India, the country had produced only 1109 papers during the last ten years from 2002-11. The review article concluded by strongly highlighting on the need to increase India's research output and bring about improvement in the quality of research conducted in the field of Dementia.

1.1 Need for the Study

Through the current study, the researcher aims to carry out a scientometric analysis of literature published in the field of communication disorders pertaining to Aphasia. Such a study will help the researcher gain an overview of the scientific research that takes place in the field of Aphasiology. It helps researchers identify research gaps or areas that are understudied or overlooked, for instance, studying whether or not a particular therapy technique is widely used and whether its popularity

stems from a reasonable amount of scientific evidence. The study can also provide valuable information regarding the intricate dynamics of research activity, allowing researchers, scientists and policymakers to provide adequate facilities and proper guidance as to where the research should be conducted. This research will aid in determining the direction in which the scientific research in a particular field is headed. It will also help researchers identify patterns in authors' collaborative practices. This research can reveal the professional background of the researchers and their disciplines of interest. Further, yielding information on such aspects can also facilitate research that is more collaborative in nature. Owing to the pandemic, taking up research projects that requires the author to interact with people becomes difficult and unsafe. Consequently, doing scientometric analyses, systematic reviews, or research that does not involve one-on-one contacts as an appropriate, feasible and useful alternative. Lastly, the review of literature on scientometric studies in the field of communication disorders reveal that no such study has been done in the subject of Aphasiology. The findings of this study hence, will aid future researchers who take interest in the subject. The findings can help determine both research gaps and current research trends in the field of Aphasiology.

1.2 Aim of the Study

The study aims to quantify articles' quality based on different parameters (such as the number of publications, growth rate, and distribution of publication). It also aims to determine the country-wise and author-wise productivity of articles.

1.3 Objectives

- To quantify the topic-wise distribution of publication of articles in the Journal Aphasiology in the year 2020.

- To examine the nature of the authorship patterns of the articles in Aphasia.

- To recognize Country-wise distribution of articles in Aphasia

- To identify the funding agencies and pattern of funding in Aphasia

- To quantify the annual distribution of publication and growth of literature in the Journal Aphasiology in the year 2020.

CHAPTER II

REVIEW OF LITERATURE

This section discusses the scientific research collaborations that took place worldwide. The section illuminates on the existing literature of scientometric studies that were present in the field of Communication Disorders. The review shows that several scientometric studies have been carried out in the field, namely in areas of Phonology, Dementia, Autism, Voice, Dysgraphia, Dyslexia and Audiology.

2.1 Scientometric study in General Sciences

Gazni et.al. (2012) carried out an analysis of all the scientific material published between the years 2000 to 2019 in the Web of Science (WoS) database. Their purpose was to study the collaborative patterns across countries and various fields. A total of 1,39,17,488 research documents were analyzed by the authors. The investigators categorized them using Essential Science Indicators (ESI) into 22 different fields. The journals were categorized under field different fields and they are; Life sciences, Social sciences, Physical sciences, Medicine, and Multidisciplinary. The results of the investigation revealed that between the years 2000 to 2009, multiple authorship patterns in research increased from 69% to 78%. The average number of authors per paper also increased from 3.3 to 4.1 authors with a majority of publications consisting of 1-3 authored research papers (57%). On analyzing co-authorship patterns, it was noted that levels of co-authorship were significantly higher among researchers in the field of Life Sciences, while Social Sciences showed the least levels of co-authorship patterns. According to these findings, an increase from 39% to 48% in institutional collaborations was observed, with intra-institutional collaborations being about 56%.

Further, it was observed that inter-institutional collaborations were preferred particularly in Space Science research.

Additionally, the authors reported an increase in growth from 14% to 18% in international collaborations and high preferences for multi-national collaborations in the field of Physics and Mathematics. The findings showed that USA contributed 30% of the world 's publications out of which 20% was attributed to the country's involvement in international collaborations. It was also identified that the USA, UK, Germany, France, Italy, and Canada where the key centers in the network of international collaborations. Based on the analysis, the authors established that there was a positive correlation between countries with high incomes and increased production of publications with multi-national collaborative pattern. Finally, it was noted that the highest percentage of international publications came from the multidisciplinary field.

The data from such a study is very useful for scholars, policy makers and administrators of their respective fields, who are involved in conducting bibliometric evaluations. The results of this study serves as a benchmark and help in drawing comparative conclusions across various domains. Such comparisons are essential and help in bringing out the large differences in collaborative behavior among authors, institutions as well as countries.

2.2 Scientometric study in the field of Speech and Hearing Sciences

Ramkumar et.al. (2016) studied the collaboration and networking of the research grant projects in the domain of Speech, Language and Hearing Sciences. The authors considered the research grant projects from 2001-02 to 2015-16, mentioned in

the Annual report of All India Institute of Speech and Hearing, Mysore. For ease of analyzing the data, they divided the data into two groups consisting of projects with seven years each and named it Span I (2001-02 to 2007-08) and Span II (2009-10 to 2015-16). The data consisted of a total of 211 Research projects. The authors reported that the number of projects grew from Span I to Span II by a factor of 3.39. The highest and lowest ARF projects were in 2011-12 and 2001-02 with 38 and 4, respectively. The authors categorized the data domain-wise to check the productivity in each domain. In Span I, Speech ranked first with 18 projects, and in Span II, Language ranked first with 47 projects. Two-authored projects were the typical investigator 's pattern in both Spans, I and II with 19 and 74 projects, respectively. Interestingly, the results showed that single-authored projects declined from 31.25% (span I) to 17.17% (span II). Collaborative co-efficient improved from 0.40 to 0.49, which demonstrates an increasing pattern in collaboration. The investigators reported that local collaborations were the highest type of collaboration which amounted to a total of 137, and the least was an international collaboration with nine projects. As per the study, in the span of 14 years, an overall increase in the domestic and international types of collaboration was noted. Most of the international collaborators were universities from the USA, while Manipal College of Allied Health Sciences, Manipal, was the highest contributor to the domestic type of collaboration. The pattern of professional networking revealed to be highest between junior and senior faculty (19.85%), followed by networking with clinical staff (15.81%). It was then concluded that the growth in the output of research projects could be attributed to the increase in the number of faculty members. According to the researchers, the flow of knowledge from seniors to juniors was enhanced with the type of pattern of professional networking observed. They also

suggested that some policies need to be implemented to improve the international type of collaboration.

The study is the first of its kind to be carried out in the field of speech and hearing from an Indian context. However, the authors suggest that the results on collaborative trend from this study could be indicative in nature as the findings are based on the review of no more than 905 articles. Considering more number of journals and articles for review and conducting, an exhaustive study in the domain may be beneficial for achieving more accurate results.

2.3 Scientometric studies in Audiology

In a similar study, Nandeesha and Begum (2017) conducted an analysis of research material published in the field of Audiology between the years 1989 to 2016 in the Web of Science (WoS) database. The investigators identified a total of 1382 research documents in the field of Audiology. Among them, scientific articles were the most common category of research conducted and made up 1180 (85%) of the total documents present, followed by Conference proceedings, which accounted for 93 (7%) of all documents. The authors noted that there was a significant growth in the number of publications released between the years 1989-2016; increasing from 5 in 1989 to 144 in 2016. As for the number of citations, a marked increase from 0 in the year 1989 to 1739 in 2016 was observed. As per the results, De Wet Swanepoel (2017) had 20 publications and ranked first as the author with the maximum number of publications published in the field during that period. Among the most productive university in terms of research, The University of Petronia ranked first with 32 publications. The United States came out on top in terms of productivity, with 507 (36.69 per cent) papers produced. England, Germany, Australia, and Canada were among the top five

most productive countries. The study also revealed that the majority of research was published in English (1284), followed by German (79). Other languages used included Portuguese, Spanish, Turkish, French, and Polish. Another aspect of research productivity was measured by ranking the annual journal output. Among journals, the International Journal of Audiology ranked the first with 135 publications, with the Journal of the American Academy of Audiology coming in as second with 99 publications. With 815 and 410 articles, respectively, Otorhinolaryngology and Audiology and Speech-Language Pathology are the top two research topics in Audiology. The National Institute of Deafness and Other Communication Disorders (NIDCD NIH) was ranked as the organization that had sponsored the maximum number of publications, and had sponsored 23 publications in the time period studied. This study provides an overview of the contributions made in the field of Audiology and Hearing Sciences. The study explores the contribution made by different authors and universities, in different languages, and subjects within the field. Furthermore, it illuminates the existing research gaps in the field of Audiology and presents future directions to be explored in the same.

2.4 Scientometric study in Eye-tracking

Aryadoust et al. (2021) carried out a detailed scientometric analysis of 341 research papers and their 14,866 references during the time period 1994- 2018. The researchers used the data collected from 27 journals in the language sciences that were included in the Social Science Citation Index and/or Scopus. The results of study revealed a number of countries, scholars, institutions, and institutes with huge number of publications in language studies using eye tracking methods. The authors also observed blending of different research trends that can affect the type and future

directions of eye tracking research. A research co-citation analysis, in particular, revealed a number of important research clusters, as well as their key subjects, links, and bursts (sudden citation surges). Lastly, the author explored how the evident patterns studied so far have contributed to the generation of new trends, based on a data-driven theory of scientific revolution.

This scientometric study presents various implications for the future of eye tracking research, particularly considering the novelty of the same in the investigation of eye tracking research in language studies. Further, in this study, a large corpus of publications in the field of eye tracking was reviewed. This increases the generalizability of the results obtained from this study to the overall field. The use of scientometric approach also provides evidence for dynamicity of eye tracking research in language studies.

2.5 Scientometric study in Phonology

Batcha et al. (2019) investigated collaboration and authorship patterns in Phonology using scientometric techniques. The authors picked an 18-year period, starting from 2000 to 2017, and resorted to data collection through the Web of Science (WoS). The researchers identified 5015 documents on the whole and analyzed the data with scientometric variables such as the Collaboration index, degree of collaboration, Collaborative coefficients, Modified collaborative coefficients, Relative growth rate, and Doubling time. The study revealed that scientific publications had the most entries, with 4019, followed by book reviews and paper proceedings, which had 397 and 214 records, respectively. It was seen that there was a 5 per cent rise in research production from 2000 to 2017. An observation was also made that single authors and two authors authored 41.81% (2097) and 23.39% (1173) of the articles, respectively. According to

the study, the year 2012 had the highest collaboration index, with a score of 2.70. The average degree of collaboration was found to be 0.57 and the year 2013 had the highest level of collaboration, with a score of 0.63. The modified collaboration coefficient resembled to that of the average collaboration coefficient (0.36 and 0.37, respectively). In 18 years, the average relative growth was 0.07, while the average Doubling time was 0.044. Between the years 2000-2017, the highest-ranking author was identified as Usha Goswami, with 34 a total of 34 publications, followed by Iris Berent, who had 33 publications. Lingua had the most articles in the discipline of phonology, which were 192, followed by Clinical Linguistics and Phonetics, which had 111. The authors also reported that, as per their findings, the United States was the country with the most number of articles published (1928), followed by the United Kingdom with 1302 articles published. Thus, from the results, it was concluded that single-author articles were more common in the subject of phonology. Consequently, the collaboration coefficient was found to be less than 0.5, leading to a modified collaborative coefficient of 0.37. This study considered a large corpus of literature for their review and provides in depth information about the authorship pattern and collaborative work of authors in the field of phonology.

2.6 Scientometric studies in Dementia

Pestana and Sobral (2019) conducted an in depth scientometric review on Cognitive research and Dementia examining the intellectual structure, developing patterns, and relevant alterations in the growth of available knowledge. The data collected from the Web-of-Science during the period 1998 and 2017, revealed an increased network of 564 articles and 12,504 citations. A scientometric study of the co-citation network visualized was performed using CiteSpace. It was found that the

Stern (2018) had the highest number of publications and citations. The Journal Neurology ranked first among journals with maximum networking, with Harvard University being the second in the network of institutions, and USA being third in the network of countries. Cognitive reserve continues to be one the most studied aspect of this field, while research on functional ability, executive control, mortality data, and reserve mechanisms has progressively and evidently increased. Through identification of relevant articles and the facilitating the emergence of new trends sheds light on many new insights from this field of research. This allows for better communication of major discoveries and data exploration.

The study has extensively reviewed the literature on CR and dementia from WoS databases providing a framework of the evolutionary trajectory of the collective knowledge of the field over the past two decades. It has also revealed areas that require future research. As reported by the authors, it is the first study which attempt to apply Cite Space to explore and visualize CR and dementia knowledge. It is one of the only a few investigations that have focused on co-citations as a marker of development of this domain from different perspectives. Another significant contribution made by this research paper, is the understanding it promotes regarding the way knowledge is structured in the field of CR and dementia. However, the paper was restricted to English language journals hence, the literature that has been published in other languages, if present, is unknown and overlooked.

In another study, (Asghar et al. 2018) reviewed recent studies on assistive techniques (AT) for patients with dementia between the years 2000 and 2014. The authors used information from the Scopus and Citation databases and collected a total of 1902 publications and performed bibliometric and scientometric analyses on them. It

was observed that there was a 29% increase in research outcomes for AT-related research on an annual basis. In terms of national productivity, the United States was ranked first with 503 publications, followed by the United Kingdom with 399 publications. In the joint research, the United States was at the top, followed by the United Kingdom. The authors used several parameters to assess the quality of the publication. For example, the P Index, which provides an average number of citations (C), a balance between quantity and quality of publications, is the quantity divided by the number of citations (C) and the quality divided by the ratio. Depends on C / P. Where P is the total number of publications and H index is the author's index of productivity and number of citations per article. The US P Index was the highest, with a P Index of 44.73 and a C score of 13.34. Germany had a high C-score of 16.43 and a high P Index of 30.09, but there were few publications due to articles published in influential journals. They also observed that different countries have different emphases on different aspects of AT research. The United States is focusing on digital cities for the elderly. In contrast, the UK focuses on telecare, Germany focuses on monitoring activities, while Australia focuses on human-like communication-assisting robots for emotional well-being. Further, the results revealed that countries such as the United States, United Kingdom and France have established national dementia strategies. Based on the findings, the study concluded that East Asia-Pacific countries have low production in the region and that these countries need to make more efforts in the field of dementia research.

Studies of this nature from other South Asian and Western countries can bring forth crucial and possibly interesting information about the use and acceptance of assistive technology. Such studies can pave the way to generate a global framework of AT acceptance in the society which shall greatly benefit person with disability.

2.7 Scientometric study in Autism

Lorenzo et al. (2016) employed the use of bibliometric markers to study the evolution of research in Asperger's syndrome between the years 1990 to 2014. The authors used Web of Science, Medline, Inspec, Biosis Citation Index, SciELO Citation Index, and Current Contents Connect to collate their findings. After review, the authors compiled a total of 3452 publications on the subject and observed that the research papers published on Asperger's Syndrome increased steadily over the years; from 1990 to 2001, and again from 2003 to 2014. In the year 2002, however, a prominent dip in scientific output was observed. According to the authors, papers on this topic were published in 574 existing journals, with the Journal of Autism and Developmental Disorders accounting for 17.14 percent of the total. The articles published in the Journal had an average page length of ten pages. 65 percent of the data gathered resulted from multi-authored publications, that is, publications produced by two, three, four, or five authors. The study showed that among the documents studied, 126 publications out of them had ten or more authors. The number of citations for these publications ranged from 0 to 1083. It was also noted that since 1990, the quantity of citations showed a gradual increase. Among authors with highest number of publications in the subject, Baron Cohen ranked first, with 143 paper publications. Three out of them, received 708 to 1083 citations. The authors identified a total of 2730 papers, Asperger related subject was mostly published under the area of Psychology and Behavioural Sciences. As per the study, the US was found have maximum research productivity on the subject, preceded by England.

This study provides thorough and in depth information regarding the upward evolution in research during the last 8 years of the scientific production especially, with

respect to Asperger's syndrome. It also sheds light on the bibliometric indicators from the field of social sciences which were previously overlooked. The review study however, has several limitations. The large sample considered, does not allow a deeper exploration of the methodological aspects related to intervention. Although the article provides extensive information about the state of the art facilities available, the treatment could have been carried out the treatment with a smaller sample size.

2.8 Scientometric study in Dysgraphia

In a study aimed to investigate the performance of global dysgraphia research, Gupta et al.(2018)reviewed 493 dysgraphia research papers indexed in Scopus database between the last 10 years; starting from 2007 to 2016. The results of the study revealed an annual average growth rate of 4.02% in the registered publications and per paper, the citation impact averaged to be around 7.90. Among the 64 countries that were identified to be participating in dysgraphia global research, the top 10 most productive countries contributed individual global shares, ranging from 3.04% to 20.69%. USA was observed to be the largest contributor to the global publication share of 20.69%, followed by Italy (11.76%), U.K. (11.36%), and then Japan (8.32%). During this time period, the cumulative global publication shares of the top 10 most productive countries accounted for 81.34% global publication share and 96.74% global citation share. Among the top 10 most productive countries, the authors noted that four countries had scored relative citation index that was above the world average which was 1.19. These countries are Canada (2.85), USA (1.51), U.K. (1.46) and Israel (1.39). The individual share of international collaborative publications from the 10 most productive contributors ranged from 7.32% to 39.13% in the field. As per the findings of the study, the largest publication shares to dysgraphia research came from the field of medicine

(72.41%), followed by neurosciences (36.51%), and then psychology (30.53%). The top 15 and 10 most productive organizations and authors together contributed 22.92% and 13.18% global publication share and 33.50% and 17.27% the global citation share. The study is the first known quantitative study to have been carried out in the area of dysgraphia both at national and international level.

2.9 Scientometric studies in Voice

Pestana et al. (2019) used text mining, clustering, and various other scientometric techniques to investigate the trends of singing voice between the years 1949 to 2016. The data was collected from PubMed database and was then segregated into two periods: the first (1949-2010) and the second (2011-2016). (2011-2016). A total of 754 publications published was identified in this field. The researchers also found that the number of articles published in this field increased from 1949 to 2016 and that the total number of publications found in the second period was 225. The authors also observed that the number of publications published climbed steadily, decade after decade. They also stated that articles about the singing voice were published in 162 journals. It was also found that the Journal of Voice had the most articles published in both time periods. The authors observed that until 2010, the professional singer was the most explored topic, with an emphasis on opera singers. The emphasis changed from organic structure to functional features of the singing voice, with a focus on male vocalists. The study concluded that singing voice research has progressed, the number of articles published in this subject has increased, and study into the functional elements of singing voice has become more important.

This article summarizes almost all of the research in the field that has been conducted in the overtime. It uses novel and innovative methods of reviewing existing

research in the field, with the use of both bibliometric and scientometric approaches. The study provides and overview and a comparison of research trends existing within the field and reveals the evolution of topics studied within the field across the years. However, the investigators limited their search to PubMed due to time restrictions hence, the likelihood and presence of a selection bias cannot be ruled out. Although publication count is a significant and one of the most widely used indicators, the fact remains that it only reveals the quantity and doesn't give any information regarding the quality of the publications. Inclusion of more search engines to cover other fields, could further strengthen the results.

2.10 Scientometric study in Dyslexia

Janaarthanan et al. (2020) conducted a scientometric study aimed to map the research output of dyslexia during the years 2015-2019. The authors identified 1677 research papers contributed by 7623 authors and evaluated them for scientometric properties. Among authorship patterns, it was observed that 134 of the research papers were contributed by single authors and 314 of research papers were triple authored. On analyzing the country-wise productivity, the authors noted that, the USA was the highest contributor ranking 1st with a total of 398 research papers on Dyslexia. India occupied the 20th rank, contributing a total of 13 research papers in the field. Further, the study also revealed that among the researchers, English was the most preferable language in Dyslexia research. The journal "Dyslexia" (Chichester, England) contributed the highest with 134 (7.99%) research papers, occupying the 1st rank. Among institutions, Behavioral Science Institute of Netherlands was reported to be the most prolific contributors with a total of 15 publications and ranked first. The degree of collaboration was calculated by using Subramaniam formula and the mean degree of

collaboration was found to be 0.920 which shows that 92% of contributions are from collaborative authors. Based on the findings, it was observed that contribution to Dyslexia research from India was limited in comparison. The authors suggested that funding agencies and Government of India must take initiation to encourage more research in the field. Further the authors also emphasized on the need for more international collaborations among Indian researchers.

In summary, scientometric studies in the field of communication disorders started emerging in the last two decades. Such studies provide valuable information regarding current and ongoing research trends. They are also known for their ability to identify research gaps and aid in formulating future directions for research to take place within a field. Although present, in comparison to many other fields, scientometric studies in the area of communication disorders are not as widespread. Therefore, more research using scientometric tools in the field is required, particularly to study speech and language disorders where scientometric studies haven't been conducted before. Till date, no known scientometric studies have been reported in the field of Aphasiology. The current study is an attempt to address this research gap.

CHAPTER III

METHOD

The present study is a scientometric review aimed to quantify articles' quality based on different parameters (such as the number of publications, growth rate, and distribution of publications). Further, an attempt is also made to determine the country-wise and author-wise productivity of a select journal. The method followed for the study is elaborated below.

3.1 Procedure

The study was carried out in three phases and these include:

  a)   Identification of the journal and selection of time period for review.

  b)   Retrieval of the documents published in the journal during the time period of interest.

  c)   Data collection i.e. collecting all the documents published during the year 2020 and analyzing them for scientometric properties.

3.1.1 Identification of the journal and selection of time period for review

The journal chosen for review in this study was *Aphasiology*. Aphasiology is a well-renowned journal that focuses on publishing research concerning all aspects of acquired language disorders resulting from brain damage. It provides a platform that facilitates the exchange and propagation of scientific research. It also serves as an excellent source of peer-reviewed content related to aphasia from multidimensional and multidisciplinary perspectives. The journal publishes papers on clinical, psychological, linguistic, social and neurological aspects of aphasia. The journal welcomes submissions and readership from academics and practitioners in speech and language

pathology, neurology, neuropsychology, and neurolinguistics. In addition to the standard features such as significant reviews, clinical fora, case studies, and book reviews, studies utilizing a wide range of empirical approaches, such as experimental, clinical, and single case studies, surveys, and physical investigations are published.

The journal publishes one volume (of publications) annually, comprising 12 issues with each issue containing 5-8 research articles. All documents published in the journal are in the English language. As of 2022, the journal *Aphasiology* has published a total of 36 volumes. In the current study, articles and research documents published in the year 2020, (Volume 34) were considered for scientometric review.(*Aphasiology Aims & Scope*, n.d.)

3.1.2 Retrieval of the documents published in the journal during the time period of interest.

For collecting and reviewing articles from the journal, the databases in the E-Journal facility provided by the Library and Information Centre of All India Institute of Speech and Hearing (AIISH), Mysore, was utilized.

3.1.3 Data Collection

All articles and documents published in the year 2020, Volume 34, were individually reviewed. The articles were organized and tabulated issue-wise. The articles were then systematically segregated and categorized of based on the parameters using Microsoft Excel sheet.

Inclusion criteria -

The inclusion criteria about this study were as follows:

(1)   Articles in the journal Aphasiology.

(2)   The publication time span from 1st January 2020 to 31, December 2020.

(3)   Data collection was only limited to E-Journal facility provided by the Library and Information Centre of All India Institute of Speech and Hearing (AIISH), Mysore.

3.2 Analysis

The articles were analyzed and segregated based on the following parameters;

(a)   The number of articles: The total number of articles (comprising review articles, research articles, reports, and editorials) of each issue of the Journal,

(b)   Document/Article type: Scientific articles (SA), Reviews [(RW) which contains systematic reviews, literature reviews and book reviews], reports (RP) and editorials (EE) were considered under this,

(c)   Title of the article,

(d)   The names and number of authors per paper (authorship pattern and author-wise productivity)

(e)   The research contribution to the field of Aphasia from each country (Country-wise productivity),

(f)   Collaboration from different institutes (Collaborative pattern): local collaboration (within the same institute or the same state/province), national collaboration (between two or more states/provinces), and international collaboration (between two countries),

(g)   Topic-wise distribution of article pertaining to adult language disorder particularly Aphasia. The four categories include: Assessment (development of assessment tools for adult language disorders, validation and standardization of the same, improving methods of diagnosis and devising

better diagnostic protocols/ procedures for adult language disorders), Management (intervention strategies, treatment techniques, or have evident implications for rehabilitation of adult language disorders), Assessment and Management (articles that have major implications for both assessment and management of adult language disorders), and Others (articles that do not have any direct implications for either assessment or management).

(h)   The type of participants (Speech and Language Pathology, Allied health professionals', Persons with Aphasia, Persons with Primary Progressive Aphasia, Person with other neurological language disorders and normal individuals) or Not applicable (review articles),

(i)   Age group of the participants [Not specified (articles with human participants whose age is not mentioned), Adults (18-55 years), Geriatrics (>55 years) and Adults and Geriatrics (>18)]

(j)   The number of citations of the article (it was determined using the web search engine called Google Scholar),

(k)   Funding source for the research article and

(l)   Research trends in Aphasia (issue-wise analysis on the number of articles was done for each year).

The above parameters were analyzed through scientometric tools.

3.2.1 Scientometric tools

Collaboration Index (CI)

The average number of authors per joint paper is used to calculate the Collaboration Index (Savanur & Srikanth, 2009). Single-authored papers are always

excluded from the collaboration index analysis. So, for CI, the formula is CI = (Total author) / (Total joint paper). The statistical formula for Collaboration Index is,

$$CI = \frac{\sum_{j=1}^{A} j f_j}{N}$$

Where f_j is the number of j authored papers, j is the number of authors, and N is the total number of research papers.

Degree of Collaboration (DC)

The ratio of collaborative research papers to the overall number of research publications in a discipline over a given period is known as the degree of collaboration(Subramanyam, 2016). The formula for Degree of Collaboration is,

$$DC = \frac{Nm}{Nm + Ns}$$

Where Nm is the number of multi-authored papers, and Ns is the number of single authored papers.

Collaborative Co-efficient (CC)

The collaboration co-efficient is a measure of research collaboration that takes into account both the average number of authors per publication and the percentage of multi-authored papers(Ajiferuke et al., 2005). The equation to calculate the CC is,

$$CC = 1 - \frac{\sum_{j=1}^{A} \left(\frac{1}{j}\right) f_j}{N}$$

Where f_j is the number of j-authored papers, j is the number of authors, and N is the total number of research papers.

3.3 Statistical analysis

The data pertaining to the articles were tabulated and analyzed using SPSS software (version 20). Variables such as Topic-wise distribution of articles, the number of authors, the country from which the authors are, collaboration from different institutes, the number of citations for the paper, and the research article's funding source were quantified in terms of frequency and percentage.

Figure 3.1

Depiction of the procedure in flow chart
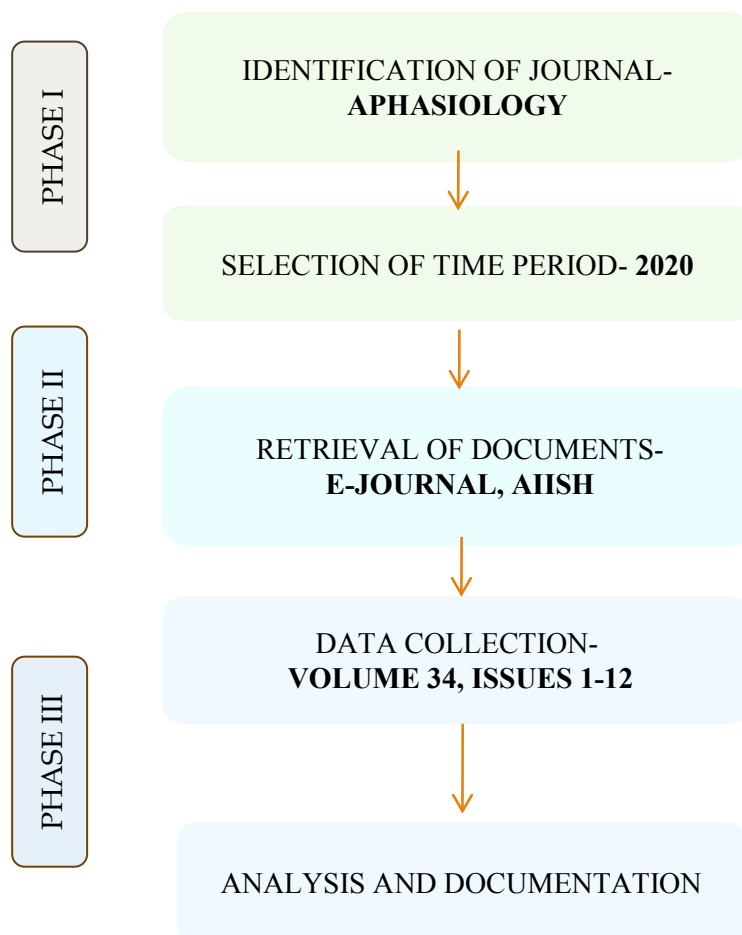
CHAPTER IV

RESULTS

This section provides detailed descriptions and visual representations of the results obtained from the current study. A scientometric analysis was conducted on all articles present in Volume 34 of the journal *Aphasiology,* released in 2020. All scientific material (i.e. articles, reports, reviews and editorials) published in this volume was analyzed. The findings specific to each parameter considered in the study, namely, the number of publications, type of publications, and issue wise distribution of publications, topic wise distribution of publication, authorship patterns and collaboration index are elucidated below.

4.1 The number of articles

The volume 34 of *Aphasiology*, contains a total of seventy-two (72) articles published across 12 issues. The journal publishes its issues on a monthly basis. The issue wise distribution of articles published in the year 2020 is depicted in Table 4.1 and Figure 4.1. The following observations from Table 4.1 are noteworthy.

a)   On average, each issue of the volume contains six to seven (6-7) articles.

b)   Issue number 8, published in the month of August, contains the highest number of articles published per issue (12.50%), with a total of nine (9) documents.

c)   Issue no. 10 and 12, published in the months of October and December, contains the lowest number of articles published per issue (5.56 %), with a total of four (4) documents in each.

Table 4.1

Issue-wise distribution of the number of articles in 2020

Year-2020, Vol 34- Issue No.	No. of Articles (N, %)
I-1	6 (8.33%)
I-2	6 (8.33%)
I-3	6 (8.33%)
I-4	6 (8.33%)
I-5	6 (8.33%)
I-6	7 (9.72%)
I-7	5 (6.94%)
I-8	9 (12.50%)
I-9	5 (6.94%)
I-10	4 (5.56%)
I-11	8 (11.11%)
I-12	4 (5.56%)
TOTAL	72

Note: I in I-1 to I-12 denotes Issues

Figure 4.1

Total number of articles issue wise in 2020
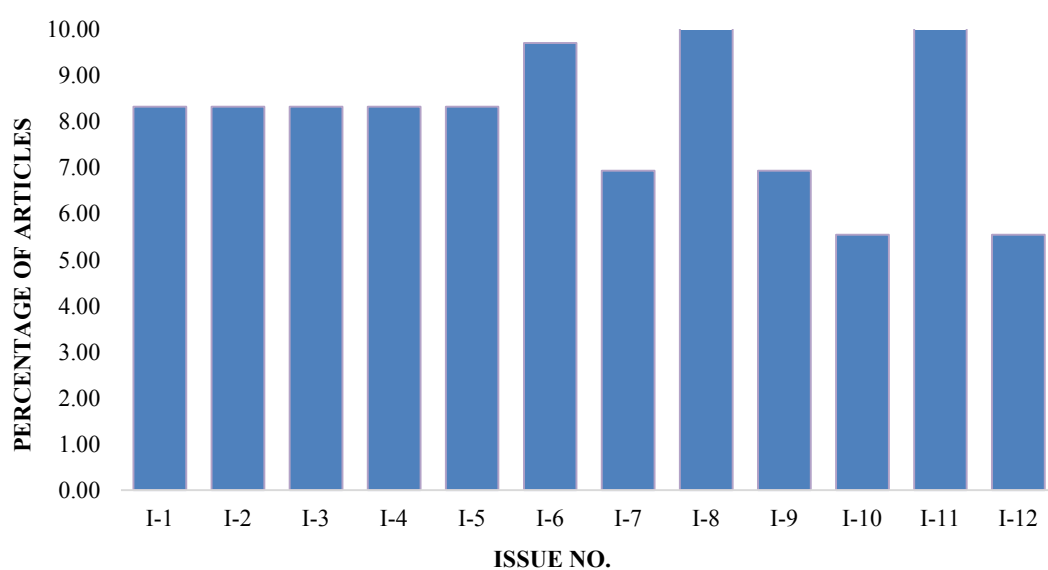
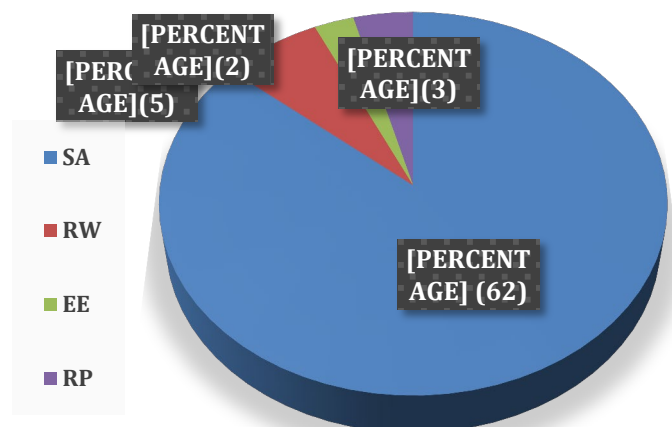*Note:* I in I-1 to I-12 denotes Issue

4.2 Article/document type-wise distribution

The articles/documents published in Volume 34 of the journal were classified based on the type of articles/documents present. Four such types of publications were identified and these are scientific articles (SA), review studies (RW), editorials (EE) and reports (RP). Figure 4.2 represents the percentage wise distribution of the different types of publications published in 2020. Table 4.2 and Figure 4.3 shows the type wise distribution of publications across the 12 issues published in the year 2020. The following observations were made from Figure 4.2, Table 4.2, and Figure 4.3.

a) Out of the seventy-two (72) articles/documents release in volumes 34, the majority of documents were scientific articles, constituting 86.11% or sixty-two (62) documents of the total number of publications.

b) Among other types identified, 6.94% or five (5) of the documents were found to be review studies, 4.17% (3) of them were reports, and 2.78% (2) were editorials.

c) The type wise distribution of documents published across the 12 issues is not equal, indicating that none of the issues contains all types of publications.

Figure 4.2

Type of document distribution in 2020

Note. I in I-1 to I-12 denotes Issue. SA-Scientific Articles, RW-Review Studies, EE-Editorials, RP-Reports

Table 4.2

Issue-wise document type distribution in 2020

Issue No.	No. of Scientific Articles (N, %)	No. of Review Studies (N, %)	No. of Editorials (N, %)	No. of Reports (N, %)
I-1	5, 83.33%	0, 0.00	0, 0.00	1, 16.67%
I-2	5, 83.33%	1, 16.67%	0, 0.00	0, 0.00
I-3	5, 83.33%	0, 0.00	0, 0.00	1, 16.67%
I-4	5, 83.33%	1, 16.67%	0, 0.00	0, 0.00
I-5	5, 83.33%	1, 16.67%	0, 0.00	0, 0.00
I-6	4, 57.14%	2, 28.57%	0, 0.00	2, 14.2%
I-7	5, 100.00%	0, 0.00	0, 0.00	0, 0.00
I-8	8, 88.89%	0, 0.00	1, 11.11%	0, 0.00
I-9	5, 100.00%	0, 0.00	0, 0.00	0, 0.00
I-10	4, 100.00%	0, 0.00	0, 0.00	0, 0.00
I-11	7, 87.50%	0, 0.00	2, 12.5%	0, 0.00
I-12	4, 100.00%	0, 0.00	0, 0.00	0, 0.00
TOTAL:72	62 (86.11%)	5 (6.94%)	2 (2.78%)	3 (4.17%)

Note. I in I-1 to I-12 denotes Issue.SA-Scientific Articles, RW-Review Studies, EE-Editorials, RP-Reports

Figure 4.3

Issue-wise document type distribution in 2020

Note: I in I-1 to I-12 denotes Issue.SA-Scientific Articles, RW-Review Studies, EE-Editorials, RP-Reports

4.3 Topic Wise Distribution of Articles/Documents

All publications released in Volume 34, were classified in terms of the topic that is, the domain of study and the research implication of each article. The articles were classified and under four broad categories which are Assessment, Management, a combination of Assessment and Management and Others. Figure 4.4 depicts the topic wise distribution of articles published in 2020, while Figure 4.5 and Table 4.3 represents the topic wise distribution of articles based published across the 12 issues. Based on these figures, a few inferences can be made.

a) Articles on management of adult language disorders constitute 33.33% (24) of the total number of publications present in Volume 34, making it the category with the highest number of articles.

b) Articles with implications for both assessment and management constitute 27.78%(20) of the volume.

c) The remaining publications include articles on Assessment only, constituting 25.00%(18), followed by articles classified under the category 'Others', constituting 13.98% (10).

Figure 4.4

Topic-wise Distribution in 2020
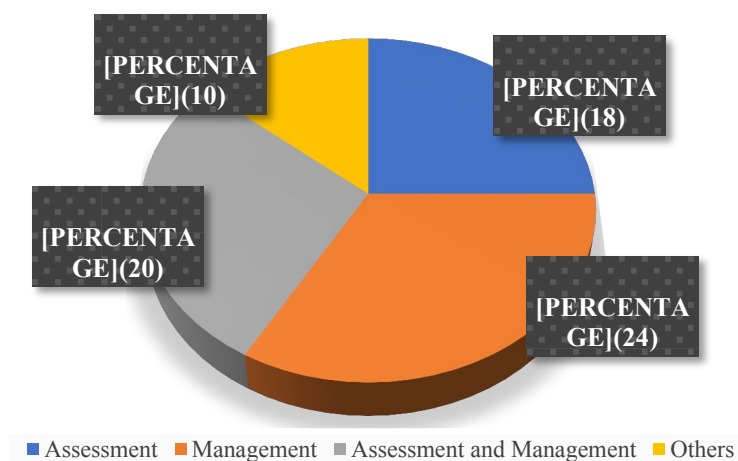
Note: I in I-1 to I-12 denotes Issue

Table 4.3

Issue-wise topic distribution in 2020

Issue No.	No. of articles in Assessment (N, %)	No. of articles in Management (N, %)	No. of articles in Assessment and Management (N, %)	No. of articles in Others (N, %)
I-1	1, 16.67%	4, 66.67%	0, 0.00	1, 16.67%
I-2	2, 33.33%	2, 33.33%	2, 33.33%	0, 0.00
I-3	1, 16.67%	2, 33.33%	2, 33.33%	1, 16.67%
I-4	1, 16.67%	2, 33.33%	1, 16.67%	2, 33.33%
I-5	2, 33.33%	4, 66.67%	0, 0.00	0, 0.00
I-6	2, 28.57%	2, 28.57%	1, 14.29%	2, 28.57%
I-7	3, 60.00%	1, 20.00%	0, 0.00	1, 20.00%
I-8	2, 22.22%	0, 0.00	5, 55.56%	2, 22.22%
I-9	1, 20.00%	1, 20.00%	2, 40.00%	1, 20.00%
I-10	0, 0.00	4, 100.00%	0, 0.00	0, 0.00
I-11	1, 12.50%	1, 12.50%	6, 75.00%	0, 0.00
I-12	2, 50.00%	1, 25.00%	1, 25.00%	0, 0.00
TOTAL: 72	18, 25.00 %	24, 33.33%	20, 27.78%	10, 13.89%

Note: I in I-1 to I-12 denotes Issue

Figure 4.5

Issue-wise topic distribution in 2020
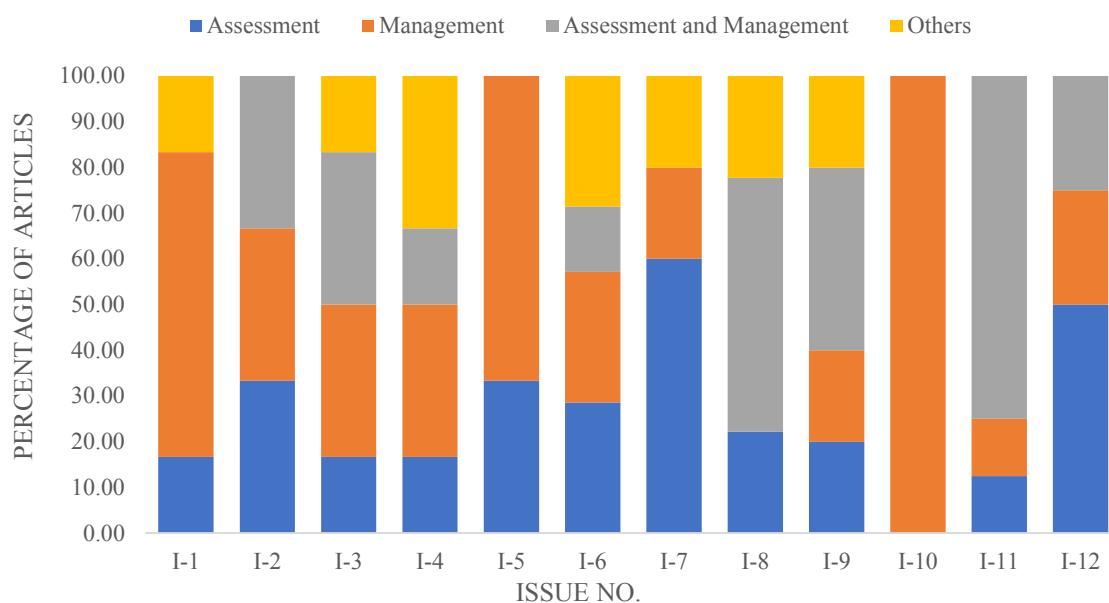
Note: I in I-1 to I-12 denotes Issue

4.4 Type of Participants

The type of participants considered by the authors for their research was studied. The publications were categorized based on whether the participants involved were diagnosed with adult language disorders, individuals with brain damage, or were professionals in the field of Rehabilitation. The articles were thus, grouped into five such categories namely, persons with Aphasia (PWA), persons with Primary Progressive Aphasia (PPWA), person with other neurological language disorders (PO-Multiple sclerosis, Acquired Dyslexia, Traumatic Brain Injury), professionals (speech language pathologists, physiotherapists, social workers etc.), and normal individuals (caregivers, individuals without brain damage). Articles and studies that did not require participants or were non-experimental were classified under a 6th category, 'Not applicable'(NA). Figure 4.6 represents the type of participants considered in the articles published in the year 2020. Further, the type of participants considered in the articles published across the issues are depicted in Figure 4.7 and Table 4.4. The figures displayed below, reveal the following information.

a)   Out of 72 publications, 61.11% (44) of articles published in the year 2020 considered the participant group 'PWA' (Persons with Aphasia) for their study. Hence, the maximum number of publications in this volume involved articles studying persons with Aphasia (PWA).

b)   15.28 % (11) of the articles were classified under the category 'Non Applicable '(NA) thus, ranking as the category with the second highest number of articles.

c)   Among the remaining 17 studies of the volume, 4(8.33%) of the articles considered persons with other neurological language disorder (PO), 4(5.56%) of them considered person with Primary Progressive Aphasia (PWA) and professionals each, and 3 (4.47%) of articles considered normal individuals.
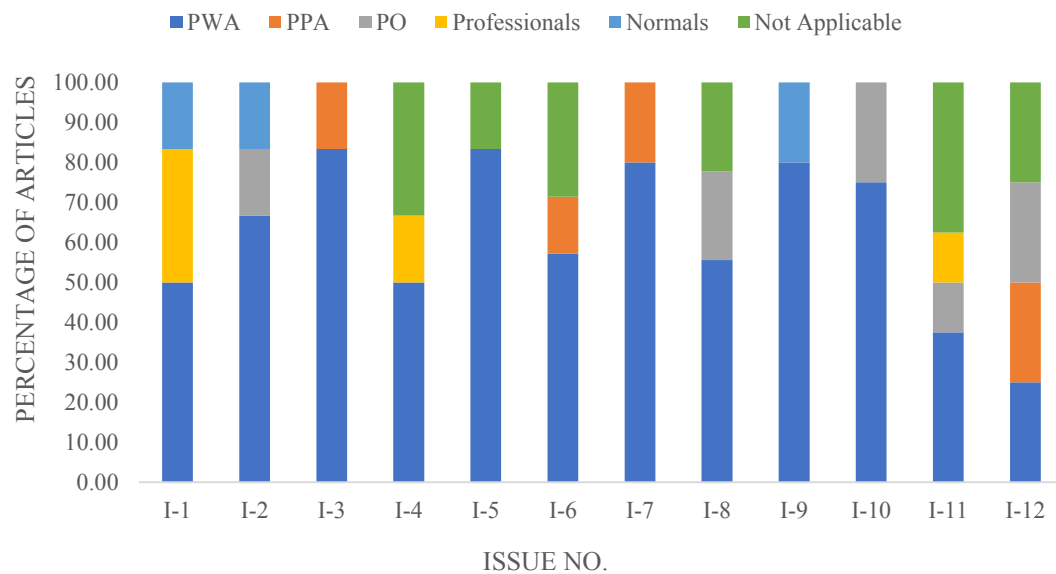
Figure 4.6

Participant type distribution in 2020
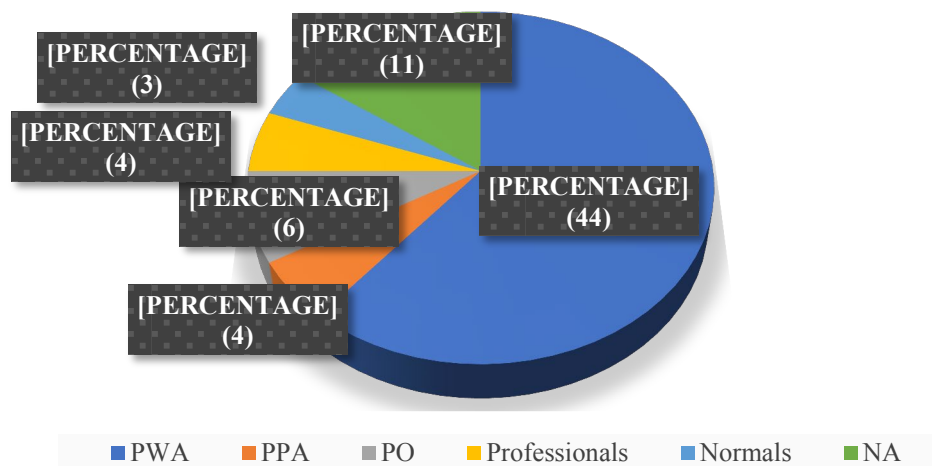
Note: I in I-1 to I-12 denotes Issue. PWA-Persons with Aphasia, PPA- Primary Progressive Aphasia, PO-Persons with other acquired Neurological language disorders

Table 4.4

Issue wise Participant type distribution in 2020

Issue No.	PWA (N, %)	PPA (N, %)	PO (N, %)	Professionals (N, %)	Normal (N, %)	Not applicable (N, %)
I-1	3, 50.00%	0, 0.00	0, 0.00	2, 33.33%	1, 16.67%	0, 0.00
I-2	4, 66.67%	0, 0.00	1, 16.67%	0, 0.00	1, 16.67%	0, 0.00
I-3	5, 83.33%	1, 16.67%	0, 0.00	0, 0.00	0, 0.00	0, 0.00
I-4	3, 50.00%	0, 0.00	0, 0.00	1, 16.67%	0, 0.00	2, 33.33%
I-5	5, 83.33%	0, 0.00	0, 0.00	0, 0.00	0, 0.00	1, 16.67%
I-6	4, 57.14%	1, 14.29%	0, 0.00	0, 0.00	0, 0.00	2, 28.57%
I-7	4, 80.00%	1, 20.00%	0, 0.00	0, 0.00	0, 0.00	0, 0.00
I-8	5, 55.56%	0, 0.00	2, 22.22%	0, 0.00	0, 0.00	2, 22.22%
I-9	4, 80.00%	0, 0.00	0, 0.00	0, 0.00	1, 20.00%	0, 0.00
I-10	3, 75.00%	0, 0.00	1, 25.00%	0, 0.00	0, 0.00	0, 0.00
I-11	3, 37.50%	0, 0.00	1, 12.50%	1, 12.50%	0, 0.00	3, 37.50%
I-12	1, 25.00%	1, 25.00%	1, 25.00%	0, 0.00	0, 0.00	1, 25.00%
TOTAL: 72	44, 61.1%	4, 5.56%	6, 8.33%	4, 5.56%	3, 4.17%	11, 15.28%

Note: I in I-1 to I-12 denotes Issue. PWA-Persons with Aphasia, PPA- Primary Progressive Aphasia, PO-Persons with other acquired Neurological language disorders

Figure 4.7

Issue wise participant type distribution in 2020

Note: I in I-1 to I-12 denotes Issue. PWA-Persons with Aphasia, PPA- Primary Progressive Aphasia, PO-Persons with other acquired Neurological language disorders

4.5 Age group of Participants

The age group of participants considered by the researchers in their articles was another parameter considered for the analysis in the current study. All the publications in the year 2020 were also classified in terms of participant age. Articles were grouped under four categories. The four categories were adult (18-55 years), geriatrics (above 55 years of age), combination of adult and geriatrics and finally, 'Not Applicable'(NA) which included the unclassifiable articles that didn't specify the age group of their participants or didn't involve participants. Figure 4.8 shows the age wise distribution of participants considered in the articles published in the year 2020. Figure 4.9 and Table 4.5 depict the age wise distribution of participants considered in the articles published across the 12 issues. The figures displayed below, reveal the following information.

a)   55.56% (40) of articles present in volume 34, considered a combination of both adults and geriatric participants for their research study indicating that the

highest number of articles published in the volume were categorized under the category 'Adult and Geriatrics'.

b) 23.61% (17) of the articles were unclassifiable in terms of participant age and hence fell into the category 'Not Applicable'.

c) Among the remaining 15 articles, 14 (19.44%) articles considered geriatric individuals and only 1 article (1.39%) specifically considered adult individuals.

Figure 4.8
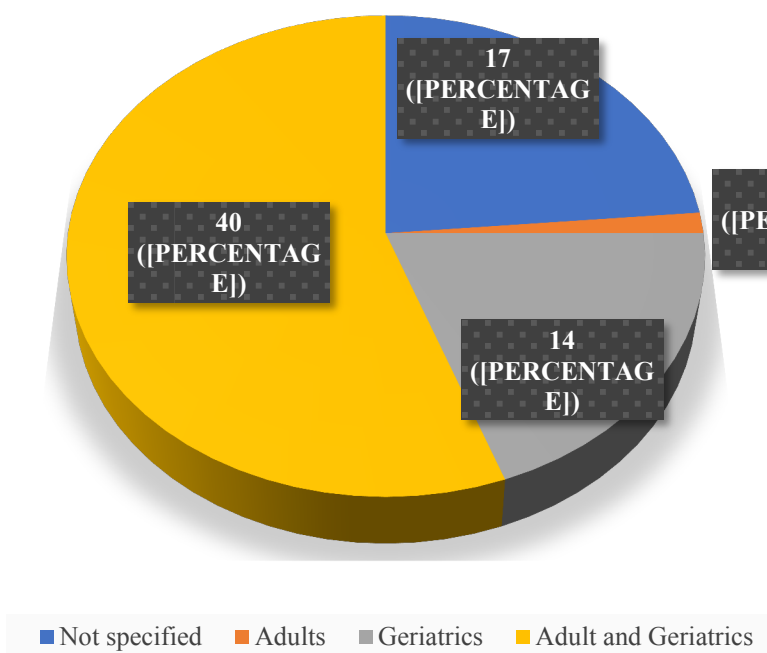
Age of Participants in 2020

Table 4.5

Issue-wise age of participants in 2020

Issue No.	Adults (18-55 years) (N,%)	Geriatrics (>55 years) (N,%)	Adult and Geriatrics (>18 years) (N,%)	Not specified (N,%)
I-1	0, 0.00	2, 33.33%	2, 33.33%	2, 33.33%
I-2	0, 0.00	0, 0.00	5, 83.33%	1, 16.67%
I-3	0, 0.00	1, 16.67%	5, 83.33%	0, 0.00
I-4	0, 0.00	2, 33.33%	1, 16.67%	3, 50.00%
I-5	0, 0.00	0, 0.00	3, 50.00%	3, 50.00%
I-6	0, 0.00	3, 42.86%	2, 28.57%	2, 28.57%
I-7	0, 0.00	1, 20.00%	4, 80.00%	0, 0.00
I-8	0, 0.00	1, 11.11%	6, 66.67%	2, 22.22%
I-9	1, 20.00%	1, 20.00%	3, 60.00%	0, 0.00
I-10	0, 0.00	1, 25.00%	3, 75.00%	0, 0.00
I-11	0, 0.00	0,0.00	5, 62.50%	3, 37.50%
I-12	0, 0.00	2, 50.00%	1, 25.00%	1, 25.00%
TOTAL:72	1, 1.39%	14, 19.44%	40, 55.56%	17, 23.61%

Note: I in I-1 to I-12 denotes Issues

Figure 4.9

Issue-wise age of participants in 2020
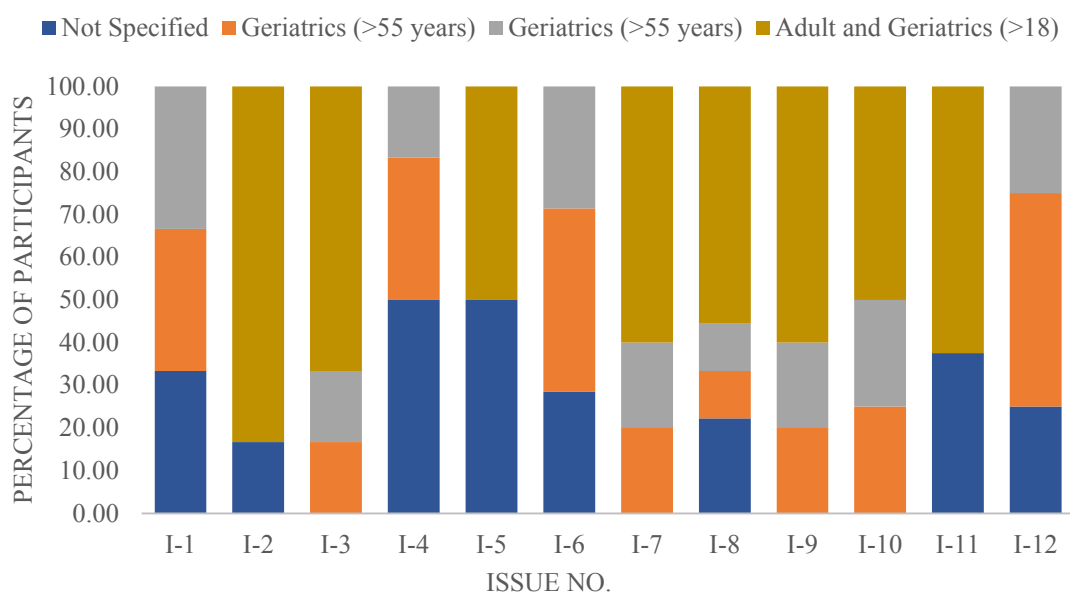
Note: I in I-1 to I-12 denotes Issues

4.6 Authorship Pattern

The publications of this volume were also classified based on the number of authors present for each article for analyzing authorship patterns. This classification was done based on whether an article was authored by a single author, two authors, three authors and four or more authors, and the publications were segregated accordingly. Figure 4.10 depicts the authorship patterns observed in Volume 34 of the journal *Aphasiology.* Figure 4.11 and Table 4.5 shows the authorship pattern observed among the publications of the same however, issue wise. Based on the figures displayed below, the following inferences were made.

a)   Out of 72 publications, 68 (94.44%) articles were authored by multiple researchers and only 4(5.56%) articles were authored by single researchers.

b)   Among the multi-authored articles, articles with 4 or more authors ranked the highest constituting 61.38% (37) of the total number of publications in the year 2020.

c)   Number of articles with 3 or more authors ranked second, constituting 30.55% (22) of the all articles present in the volume followed by articles with 2 authors, constituting 12.50% (9) of the total number of publications.

Figure 4.10
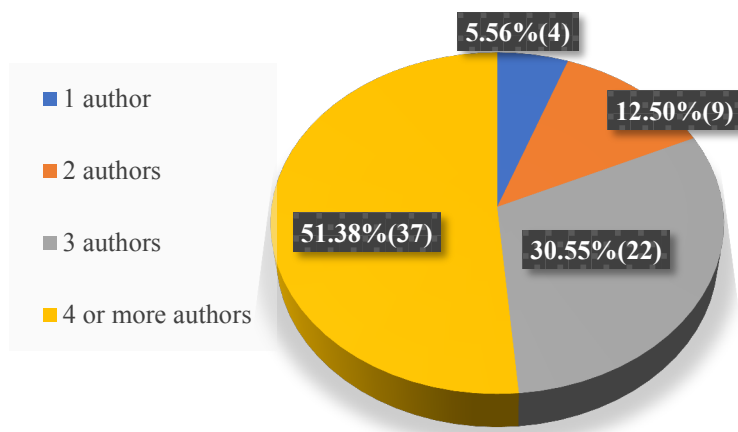
Authorship patterns in 2020

Table 4.6

Issue-wise authorship patterns in 2020

Issue No.	1 authored articles (N, %)	2 authored articles (N, %)	3 authored articles (N, %)	4 or more authored articles (N, %)
I-1	0, 0.00	1, 16.67%	0, 0.00	5, 83.33%
I-2	1, 16.67%	0, 0.00	1, 16.67%	4, 66.67%
I-3	0, 0.00	0, 0.00	3, 50.00%	3, 50.00%
I-4	1, 16.67%	2, 33.33%	1, 16.67%	2, 33.33%
I-5	0, 0.00	2, 33.33%	2, 33.33%	2, 33.33%
I-6	0, 0.00	0, 0.00	2, 28.57%	5, 71.43%
I-7	0, 0.00	0, 0.00	1, 20.00%	4, 80.00%
I-8	0, 0.00	1, 11.11%	3, 33.33%	5, 55.56%
I-9	0, 0.00	1, 20.00%	1, 20.00%	3, 60.00%
I-10	1, 25.00%	1, 25.00%	2, 50.00%	0, 0.00
I-11	1, 12.50%	0, 0.00	5, 62.50%	2, 25.00%
I-12	0, 0.00	1, 25.00%	1, 25.00%	2, 50.00%
TOTAL: 72	4, 5.56%	9, 12.50%	22, 30.56%	37, 51.39%

Note: I in I-1 to I-12 denotes Issues

Figure 4.11

Issue-wise authorship patterns in 2020
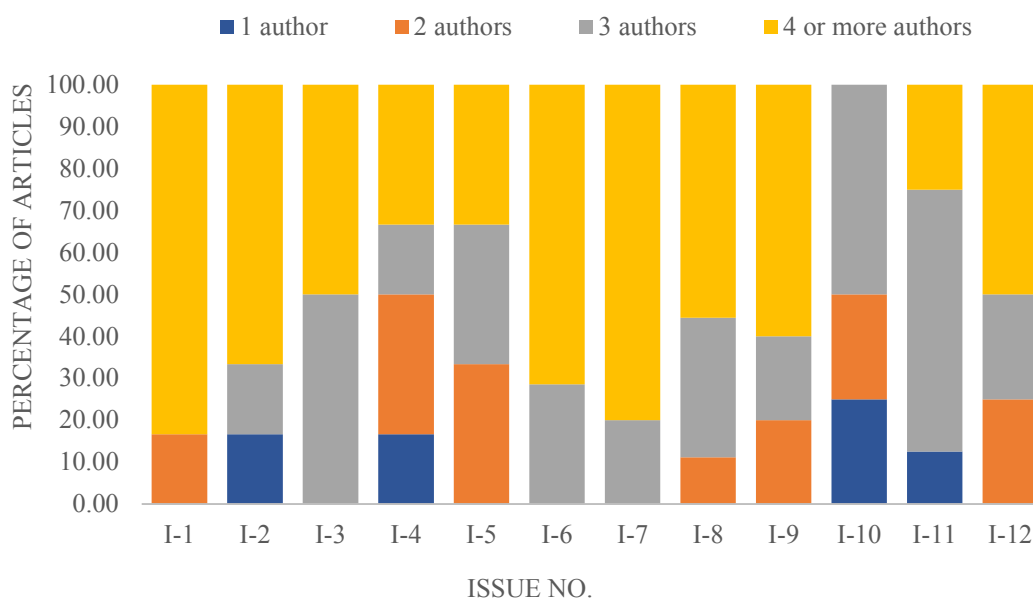
Note: I in I-1 to I-12 denotes Issues

4.7 Author wise productivity

In Volume 34 of the journal Aphasiology, the highest number of articles published per author was found to be three (3). Eight (8) authors with three publications each were identified from the Volume and they are Argye E. Hillis, Swathi Kiran, Miranda L. Rose, Simon Horton, Donna C. Tippet, David Howard, Linda Worrall and Maria Garraffa.

4.8 Collaboration pattern

In this study, the collaboration patterns of authors present in all publications of Volume 34 were analyzed. Based on the number of authors present per paper, articles were grouped under two categories namely, 'Collaboration' and 'No collaboration'. An article authored by a single author implied a lack of collaboration while an article authored by multiple authors i.e. two or more authors implied the presence of some type of collaboration. Figure 4.12 depicts the total number of publications present with and without collaboration in the year 2020. Figure 4.13 and Table 4.7 shows the issue wise distribution of publications with and without collaboration, in the year 2020. From the figures displayed below, the following observations were made.

a) 94.44%(68) of publications present in Volume 34 show collaboration indicating that a vast majority of articles published in the year 2020 were multi-authored.

b) Only 4 out 68 publications (5.56%) were single authored and thus, lacked collaboration.

Figure 4.12

Number of publications with or without collaboration in 2020
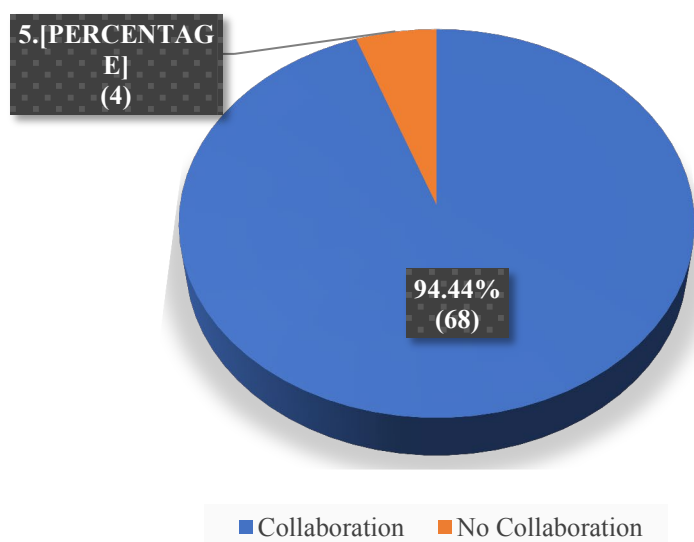
Table 4.7

Issue-wise distribution of publications with and without collaboration in 2020

Issue No.	Collaboration (N, %)	No Collaboration (N, %)
I-1	6, 100.00%	0, 0.00
I-2	5, 83.33%	1, 16.67%
I-3	6, 100.00%	0, 0.00
I-4	5, 83.33%	1, 16.67%
I-5	6, 100.00%	0, 0.00
I-6	7, 100.00%	0, 0.00
I-7	5, 100.00%	0, 0.00
I-8	9, 100.00%	0, 0.00
I-9	5, 100.00%	0, 0.00
I-10	3, 75.00%	1, 25.00%
I-11	7, 87.50%	1, 12.50%
I-12	4, 100.00%	0, 0.00
TOTAL: 72	68, 94.44%	4, 5.56%

Note: I in I-1 to I-12 denotes Issues

Figure 4.13

*Issue-wise distribution of publications with and without collaboration in 2020*
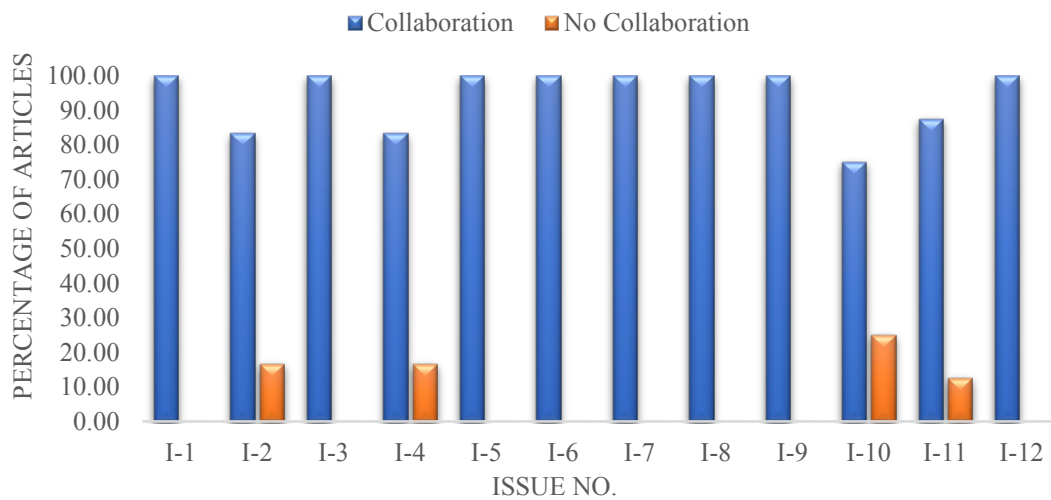
Note: I in I-1 to I-12 denotes Issues

Among articles that were multi-authored, the various type of collaboration shown by the authors were studied. Based on whether the collaborations present were between authors of different institutions, cities/ states/ provinces, and/or countries, articles were arranged under 3 categories: Local Collaboration, National Collaboration and International Collaboration. Figure 4.14 depicts the various collaboration types seen in articles published in the year 2020. Figure 4.15 and table 4.8 depict the different collaboration types seen in articles across the 12 issues. The following inferences were made based on the figures displayed below.

a) Among multi-authored publications, local collaboration was the most frequently occurring collaborative pattern. 45.28% (29) of articles present in the volume consisted of local collaborations.

b) Publications with national collaborations ranked second, constituting 30.56% (22) of the total number of publications.

c) Lastly, international collaboration was the least observed collaborative pattern, constituting 23.61% (17) of the total number of publications.

Figure 4.14

Type of collaboration in the year 2020
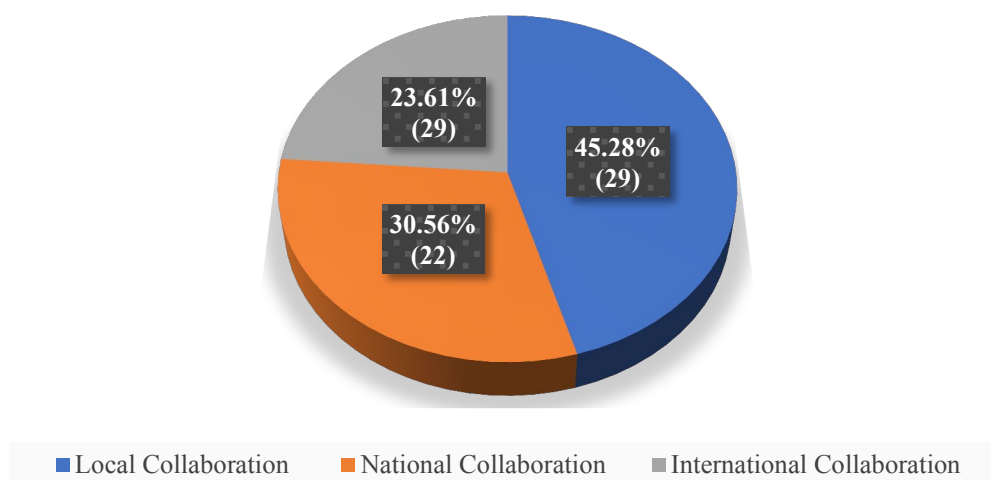
Table 4.8

Issue-wise type of collaborations in 2020

Issue No.	Local Collaboration (N, %)	National Collaboration (N, %)	International Collaboration (N, %)
I-1	2, 33.33%	3, 50.00%	1, 16.67%
I-2	2, 33.33%	3, 50.00%	2, 33.33%
I-3	2, 33.33%	2, 33.33%	2, 33.33%
I-4	4, 66.67%	0, 0.00	1, 16.67%
I-5	2, 33.33%	2, 33.33%	1, 16.67%
I-6	2, 28.57%	3, 42.86%	2, 28.57%
I-7	2, 40.00%	1, 20.00%	2, 40.00%
I-8	2, 22.22%	5, 55.56%	5, 55.56%
I-9	3, 60.00%	2, 40.00%	0, 0.00
I-10	3, 75.00%	0, 0.00	0, 0.00
I-11	5, 62.50%	1, 12.50%	1, 12.50%
I-12	4, 100.00%	0, 0.00	0, 0.00
TOTAL: 72	29, 45.28%	22, 30.56%	17, 23.61%

Note: I in I-1 to I-12 denotes Issues

Figure 4.15

Issue-wise type of collaborations in 2020
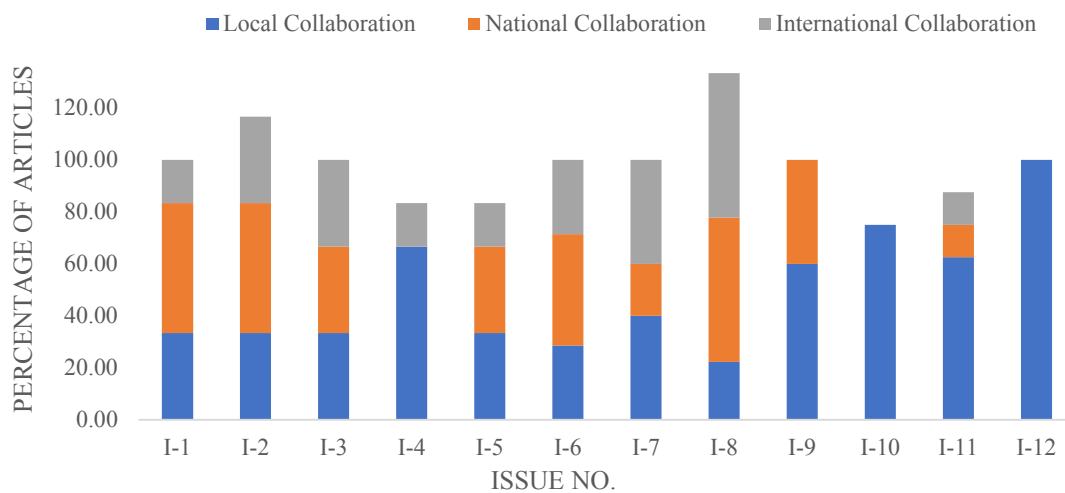
Note: I in I-1 to I-12 denotes Issues

4.9 Collaboration index (CI), Degree of Collaboration, and Collaboration Co-efficient (CC)

To better understand the collaborative patterns in research, the collaborative index, degree of collaboration and collaboration co-efficient were computed. Table 4.9 represents the collaboration parameters of the articles published in the year 2020. Figure 4.16, figure 4.17, and figure 4.18 depict the issue wise measures of collaboration index, degree of collaboration and collaboration co-efficient respectively. The figures displayed below reveal the following information.

a)   The average number of authors i.e. the collaboration index (CI) ranged from 2.25 to 14.00.

b)   Degree of collaboration and collaboration coefficient tend towards one implying the number of multi-authored papers were higher than that of single authored papers.

c)   With the exception of Issue No. 8, the collaboration coefficient of all issues were above 0.5 indicating the presence of collaborative trends.

Table 4.9

Collaboration parameters of articles in 2020

Issue No.	Collaboration Index (CI)	Collaboration Coefficient (CC)	Degree of Collaboration (DC)
I-1	4.67	0.74	1
I-2	14.00	0.67	0.83
I-3	4.33	0.74	1
I-4	4.17	0.57	0.83
I-5	3.00	0.64	1
I-6	5.00	0.78	1
I-7	5.20	0.77	1
I-8	4.22	0.72	1
I-9	3.80	0.70	1
I-10	2.25	0.46	0.75
I-11	3.75	0.62	0.87
I-12	4.75	0.70	1

Note: I in I-1 to I-12 denotes Issues

Figure 4.16

Issue wise collaborative index in 2020
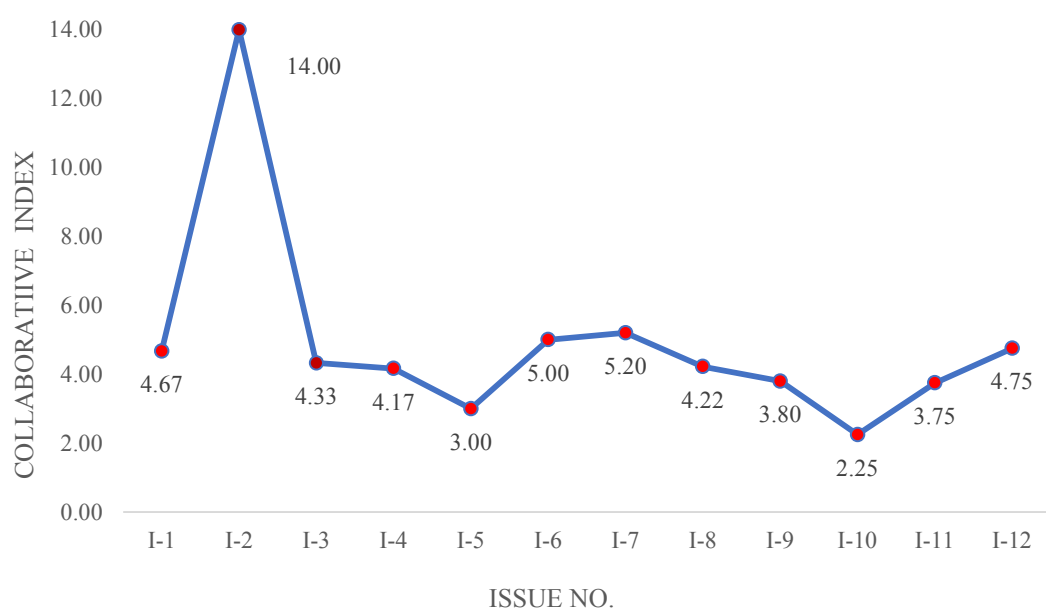
Note: I in I-1 to I-12 denotes Issues

Figure 4.17

Issue wise degree of collaboration in 2020
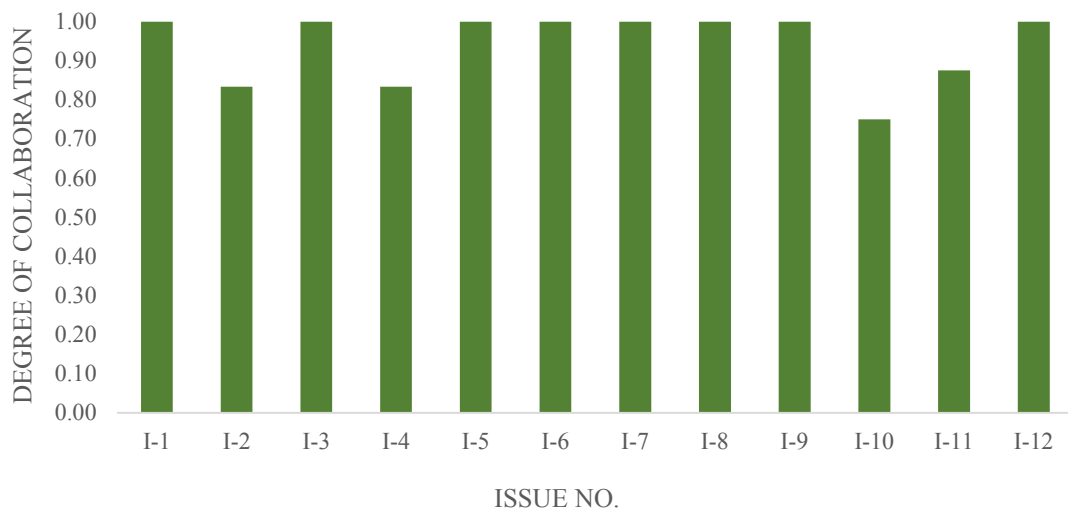
Note: I in I-1 to I-12 denotes Issues

Figure 4.18

Issue wise collaboration coefficient in 2020
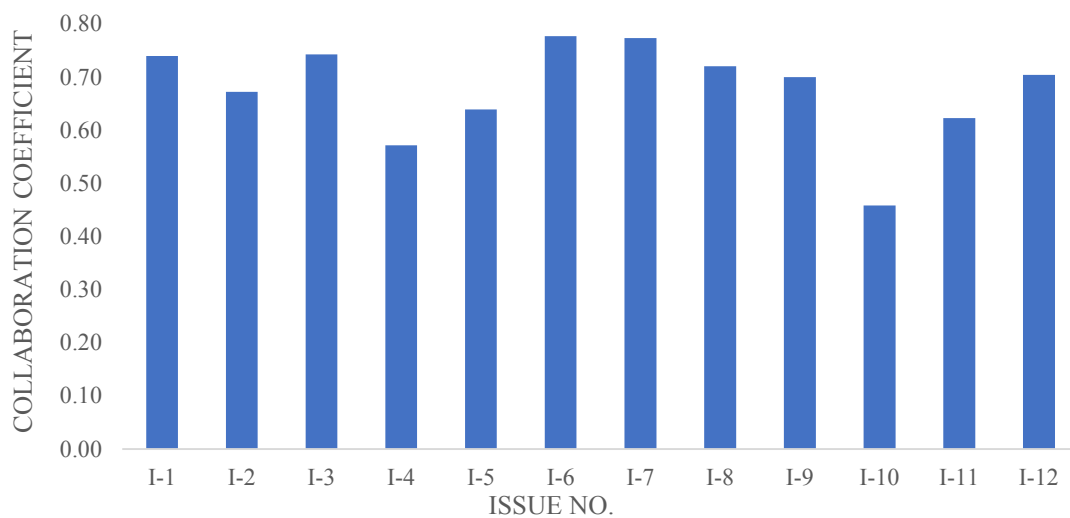
Note: I of I-1 to I-12 denotes Issues

4.10 Country wise productivity

The professional background and geographical location of institution or organization to which an author belonged to was noted and tabulated. The number of articles published from each country was thus calculated and the countries were ranked

based on their annual research productivity. The top 5 countries with highest research output are listed below in Table 4.10. The following observations were noted.

a) USA ranks the first, with a total of thirty (30) publications out 72 which constitutes 16.66% of the Volume.

b) The UK ranks second with seventeen (17) publications while Australia ranks third with eleven (11) publications in the year 2020.

Table 4.10

Country wise productivity in 2020

Rank	Country	Number of Articles
I	USA	30
II	UK	17
III	Australia	11
IV	Denmark	5
V	Italy	4
V	The Netherlands	4

4.11 Number of Citations

The number of citations received by all articles published in the year 2020 were noted and tabulated. As of 13th July, 2020, the maximum number of citations received per articles was 45 and Issue no.1 was identified to have had the maximum number of citations per issue in the year 2020.

Table 4.11

Top 5 citations in 2020

Rank	Article	No. of Citations
I	Baker, C., Worrall, L., Rose, M., & Ryan, B. (2020). 'It was really dark': the experiences and preferences of people with aphasia to manage mood changes and depression. *Aphasiology*, *34*(1), 19-46. https://doi.org/10.1080/02687038.2020.1752906	45
II	Doedens, W. J., & Meteyard, L. (2020). Measures of functional, real-world communication for aphasia: A critical review. *Aphasiology*, *34*(4), 492-514. https://doi.org/10.1080/02687038.2019.1630597	38
III	Filiou, R. P., Bier, N., Slegers, A., Houzé, B., Belchior, P., & Brambati, S. M. (2020). Connected speech assessment in the early detection of Alzheimer's disease and mild cognitive impairment: a scoping review. *Aphasiology*, *34*(6), 723-755. https://doi.org/10.1080/02687038.2019.1608502	32
IV	Lahiri, D., Dubey, S., Ardila, A., Sawale, V. M., Roy, B. K., Sen, S., & Gangopadhyay, G. (2020). Incidence and types of aphasia after first-ever acute stroke in Bengali speakers: Age, gender, and educational effect on the type of aphasia. *Aphasiology*, *34*(6), 709-722. https://doi.org/10.1080/02687038.2019.1702848	20
V	Harmon, T. G. (2020). Everyday communication challenges in aphasia: Descriptions of experiences and coping strategies. *Aphasiology*, *34*(10), 1270-1290. https://doi.org/10.1080/02687038.2020.1752906	18

4.12 Funding Source

The articles were segregated and categorized into 2 group based on the presence or absence of funding. Articles authored by researchers who received funds/grants for their research work were placed under the category, 'Funded' while articles authored by researchers who weren't supported by funding agencies or provided with research grants were placed under the category, 'No funding'. Figure 4.19 depicts the total number of funded and unfunded publications present in the year 2020. Additionally, Figure 4.20 and Table 4.12 shows the issue wise distribution of funded and unfunded publications present in the year 2020. The following inferences were made from the figures displayed below.

a)   Out of 72 publications, 61.11 % (75) of the published articles in the year 2020 were funded.

b)   On the other hand, 38.89% (25) of published articles in the year 2020 did not receive any funding.

Figure 4.19

Number of publications with and without funding in 2020
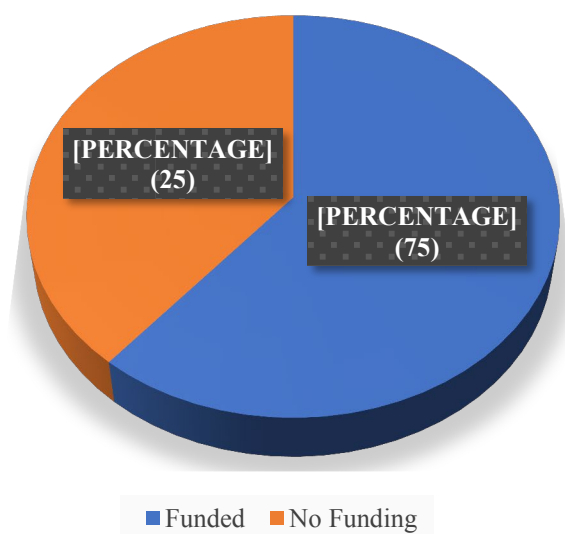
Table 4.12

Issue-wise distribution of publications with and without funding in 2020

Issue No.	No. of Articles with Funding (N, %)	No. of article without Funding (N.%)
I-1	4, 66.67%	2, 33.33%
I-2	5, 83.33%	1, 16.67%
I-3	4, 66.67%	2, 33.33%
I-4	5, 83.33%	1, 16.67%
I-5	2, 33.33%	4, 66.67%
I-6	3, 42.86%	4, 57.14%
I-7	4, 80.00%	1, 20.00%
I-8	4, 44.44%	5, 55.56%
I-9	3, 60.00%	2, 40.00%
I-10	3, 75.00%	1, 25.00%
I-11	4, 50.00%	4, 50.00%
I-12	3, 75.00%	1, 25.00%
TOTAL	**44, 61.11%**	**28, 38.89%**

Note: I in I-1 to I-12 denotes Issues

Figure 4.20

Issue-wise distribution of publications with and without funding in 2020
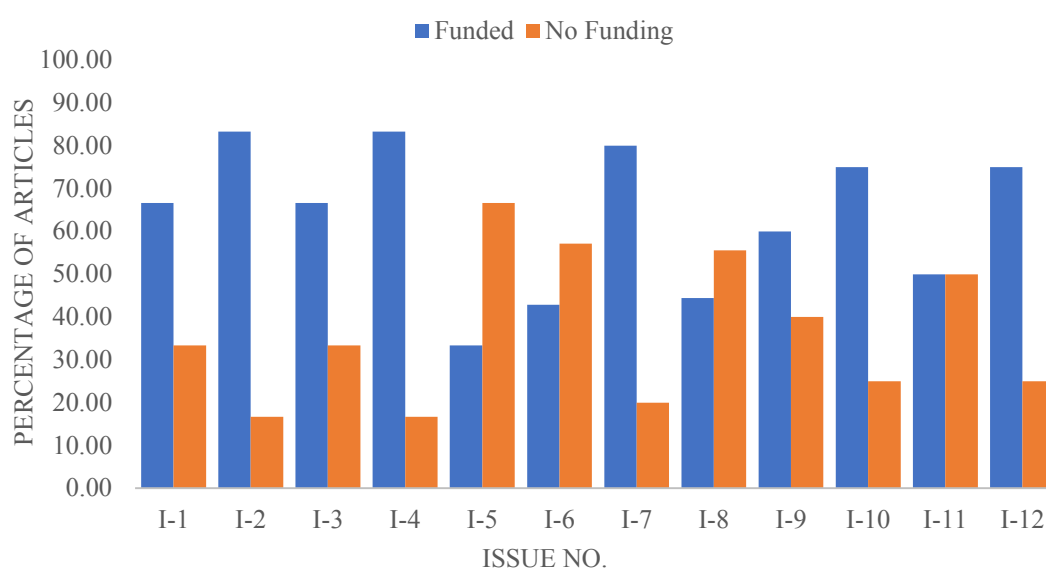
Note: I in I-1 to I-12 denotes Issues

To summarize, the above results reveal information regarding aspects such as number of articles, document-wise distribution, author related parameters, collaboration parameters, country-wise productivity, citations and funding sources in the journal Aphasiology.

CHAPTER V

DISCUSSION

This study aimed to carry out a scientometric analysis of the articles published in the journal Aphasiology in the year 2020. The study is an attempt to quantify the quality of the articles published. Aphasiology is a well-renowned journal that focuses on publishing research concerning all aspects of acquired language disorders resulting following brain attack.

The current study reveals the total number of publications released in volume 34 of the journal Aphasiology in 2020. As the period considered for this study is only one year, the growth rate of scientific publications released by the journal is difficult to determine. The results show the distribution of articles published across the 12 monthly issues. On average, each issue contained less than 10 publications. Hence, the monthly issue-wise variation in the number of articles published was found to be insignificant. As demonstrated by the Scientometric studies conducted in the past (Gazni et al., 2011; Lorenzo et al., 2016; Pestana et al., 2017, Batcha & Chaturbhuj, 2019), it may be recommended that for the calculation of growth rate in scientific publications produced by a journal, a researcher must consider a minimum of 10-20-year period for review. Hence, the findings of the present study have to be generalized with caution.

Out of the total number of publications analyzed in Audiology and Phonology (Batcha & Chaturbhuj, 2019; Nandeesha & Begum, 2017), the most published document type was found to be Scientific articles. The results of the current study also reveal the same. Among the documents published in 2020, scientific articles ranked first, constituting 86.11% of the total number of publications. This shows that professionals are contributing significantly to the research growth of Aphasia.

In this study, topic-wise productivity was determined based on the topic-wise classification explicitly designed to suit articles published in the field of Aphasiology. In a previous study investigating the use of assistive technology among person with mild dementia, themes and sub themes were identified based on qualitative data gathered from semi structured interviews (Asghar et. al, 2017). In literature however, various approaches to topic wise classification are observed. In another study conducted to determine subject specific collaborations in general sciences, the authors adopted a different approach. Each article presents in the dataset considered was classified under 22 different fields using Essential Science Indicators (Gazni et al. 2011). Topic wise classification can also be carried out using keyword search and cluster analysis techniques (Pestana et. al, 2017; Pestana and Sobral, 2019). In a study aimed to determine the trends in singing voice, most frequently researched sub topics were identified and topic wise productivity was determined using these techniques (Pestana et. al, 2017). The topic wise classification used in the current study revealed articles under the categories of assessment, management, a combination of assessment and management of aphasia. Maximum number of articles published in 2020 were classified under the category of management indicating that research in Aphasia was primarily focused on Rehabilitation. This includes investigating the efficacy of various therapy technique and treatment strategies, testing out new techniques and enhance quality of life in person with Aphasia. The focus of research on management and conducting studies that have implications on both management and assessment of Aphasia as opposed to assessment alone indicate both the success and demand of Aphasia rehabilitation and a growing number of individuals who avail speech and language therapy services following brain attack.

On analyzing authorship patterns of articles present in this journal, it was observed that, in 2020, almost all articles published were multi-authored. Single authored publications constituted only 5.56% of the total number articles published that year. This could be attributed to a number of reasons. Unavailability of resources, presence of time constraints, lack of funding and appropriate infrastructure for research could result in decreased number of single authored publications. Moreover, the multiple authorship pattern has several advantages. Division of labor and the collaborative nature of research can increase the efficiency and quality research output. Added to this, multidisciplinary collaborations also bring a more holistic approach to research. The findings of this study reveal that a majority of papers published in the year 2020 were authored by four or more researchers. In previous studies, conducted in the fields of Audiology and Autism; in specific Asperger's Syndrome, the most frequently occurring authorship patterns were identified as three authored or two authored patterns respectively (Lorenzo et al., 2016; Nandeesha & Begum, 2017).

The authorship patterns were further analysed using scientometric indicators like Collaborative Index (CI), Degree of Collaboration (DC), and Collaboration Coefficient (CC). The results of the current study showed that the average number of authors per paper ranged from 2.5 to 14.00. Interpretation based on the collaboration index are difficult to make since this measure does not have an upper limit. Hence, degree of Collaboration (DC) was selected. DC is considered a proportional metric. DC and CC (Collaboration coefficient) values approaching one indicates the presence of more multi-authored papers. In the year 2020, 8 out 12 issues showed a DC value of 1 and all 12 issues had a CC (collaboration coefficient) value over 0.5 highlighting once again, the preference of collaborative and multi-authored research over uncollaborated independent research.

Contrary to the findings mentioned above, a similar study conducted in the field of Phonology reported that the majority of publications identified between the years 2000-2017 were single authored papers (Batcha & Chaturbhuj, 2019) suggesting that collaborative research in the field may be limited. The incongruity between these results may have arisen due the difference between the time period selected for review. The study referenced above reviewed 17 years of publications (2000-2017) in the field of Phonology whereas the current study only reviewed articles published by the journal in one year (2020). Thus, considering a longer time period could yield different results. Further, the inherent differences between the fields, differences in the research trends within the fields and the use of different research methodologies may also explain these contradicting results.

The results of another parameter considered, author wise productivity, revealed that the maximum number of articles published by an author in the 2020 was three. Eight authors with three (3) publications each were identified. Author wise productivity could be affected by a number of factors such as, the professional background of the author i.e. whether they are full time academicians or researchers, type of research conducted i.e. whether the research is theoretical or experimental in nature, availability of adequate resources for research i.e. infrastructure and equipment, and presence of funding.

In the current study, the analysis of collaboration patterns revealed that majority of publications were authored by researchers belonging to the same institute/organization. This suggests that authors preferred local collaboration, over national and international collaborations. While the results indicate an overall preference for collaborative research, factors such as ease of communication,

dispersion of work, convenience, travel and financial costs may be reasons that limit the type of collaborations to local and at the most, national collaborations. In addition, to this difference in income, language, culture, and politics also play a role in limiting international collaborations. (Gazni et. al, 2012). While international collaborations between researchers often produce unique and interesting results, setting up such a collaboration can be challenging. Establishing an international collaboration for research requires the host institute to obtain permission from their respective university/government. Mutual agreement and cooperation between the researchers in key aspects of several matters must be achieved prior to the research. This process can be both laborious and time consuming and hence, more researchers may prefer to collaborate locally.

The results of country wise productivity in research correlate with the findings of several previous studies conducted in various other fields such as Autism, Phonology, and Audiology (Lorenzo et. al, 2016; Batcha & Chaturbhuj, 2019; Nandeesha & Begum, 2017). The United States of America ranked first and was identified as the country with the maximum number of publications in *Aphasiology* in the year 2020. The United Kingdom, followed by Australia ranked 2nd and 3rd in country wise research productivity. The research productivity of these countries can be attributed to the fact that they are developed nations and prioritize education, scientific research and intellectual dominance in all fields of academia. USA in particular, provide state of the art infrastructure, offer adequate financial assistance for research projects and promote academicians to become full time research scholars. Ensuring ease and autonomy in carrying out scientific research while maintaining the quality and ethical standards of research output require the establishment of a governing body with individuals who are both experienced and show expertise in the field. Needless to say,

setting up such establishments cannot be achieved without legal and financial aid from the government of the country. These reasons may also explain the relatively low research productivity observed in some countries such as India. The lack of participation in international collaborative research may also contribute to India's low research productivity. Further, unlike western countries where multidisciplinary collaborations in research are widespread. In India however, multidisciplinary and transdisciplinary approaches to both rehabilitation and research are still in the emerging phase.

The parameters age and type of participant wise classification of articles published in Aphasiology in 2020 revealed the type of disorders, type of individuals and age group of individuals considered for research studies. the findings of the current study revealed that the studies published in the journal 2020, were all carried out on adult populations; specifically, on the geriatric age group. Studies on children with Aphasia and other acquired language disorders post brain injury may be limited due relatively lower incidence and prevalence of Childhood Aphasia (Rothenberger, 1986). Further, the misdiagnosis of the acquired language disorders such as childhood aphasia in children are not uncommon and have been reported (Abhinand & Kumar, 2022; Penn et al. 1990). Added to this, the paediatrics population is often considered to be a vulnerable subject population and conducting research with them can be challenging(Bloomfield, 2015). As one would expect in a journal dedicated to publishing research related to all aspects of Aphasia, the most frequently considered type of participant group by the researchers in the year 2020, was identified to be persons with Aphasia.

The number of citations for all publications in Volume 34 was checked using Google scholar, a web search engine (Google Inc., 2017). The highest cited publication in the journal Aphasiology, in the year 2020 is an article titled:" 'It was really dark': the experiences and preferences of people with aphasia to manage mood changes and depression ' authored by Caroline Baker, Linda Worrall, Miranda Rose and Brooke Ryan. This article highlights the importance of psychological well-being in stroke rehabilitation and the adverse effect of neglected psychological needs in recovering from a stroke. The higher number of citations received by this article may be because it has relevant clinical implications for both Aphasia assessment and rehabilitation. The multidisciplinary nature of this research and the inclusion of patient perspectives could also be added factors.

The results of this study also showed that approximately 62% of the articles published in the year 2020 were funded. The highest number of articles funded by a single agency was 8, and this funding source was identified to be the National Institutes of Health's National Institute on Deafness and Other Communication Disorders (NIH NIDCD). The National Institute on Deafness and Other Communication Disorders (NIDCD) has conducted and supported research training on standard and disordered communication processes since 1988 (Mission | NIDCD, n.d).

This study provides a brief overview of the emerging research trends in the field of Aphasia. The study also reveals the status of research in India and discussed the various factors contributing to research productivity. Further, the need for a more elaborate study in the field considering a longer duration and larger database is also emphasized.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Aphasiology is a peer reviewed journal solely dedicated to publish and promote research in the field of Aphasia. Hence, the aim of this study was to determine the quality of articles published in the journal Aphasiology in 2020. The quality of the articles was analyzed and quantified using scientometric tools.

The objectives of this study were to assess the number of articles, publication type, topic-wise distribution type and age of participants, number of authors, authorship pattern, author-wise productivity, collaborative pattern, country-wise productivity, identification of the funding agencies, and number of citations per article in the journal Aphasiology in 2020. The collection and review of the collected data was carried out using the E-journal facility provided by Library and Information Centre of All India Institute of Speech and Hearing, Mysore. The data required was available online, thus, the soft copies of the articles were used. The process involved documenting and tabulating the details of all articles published in the journal Aphasiology in the year 2020.The information gathered after review was entered and stored in Excel spreadsheets powered by Microsoft. The articles were categorized and segregated issue-wise. The collected data was analyzed in terms of the parameters mentioned in the objectives of the study. Further, scientometric tools such as Collaboration Index, Degree if Collaboration and Collaboration Coefficient were used to for further analysis of collaboration and authorship patterns. The summary of the results obtained are as follow:

1)   The journal *Aphasiology*, published a total of seventy-two (72) articles in 2020.

2)   The majority of documents published in this year were Scientific articles, constituting 86.11% of the total number of publications.

3)   The highest number of articles were identified under the category of management. The articles in this category constituted 33.33% (24) of the total number of publications.

4)   Majority of articles (61.11%) published in 2020 considered the participant group 'PWA' (Persons with Aphasia) for their study.

5)   The participants considered in 55.56% of the articles published that year fell in the combined age group consisting of adults and geriatric individuals.

6)   Majority (94.44%) of the articles published in 2020 were authored by multiple authors. Most articles published in that year were authored by a minimum of 4 authors (61.38%).

7)   Most of the articles published in the year 2020 showed collaboration and 5.56% of the publications were single authored or had no collaboration.

8)   In the year 2020, local collaborations were found to be maximum in number (45.28%) and hence was the most frequently occurring collaboration pattern. national collaboration ranked 2nd and international collaborations ranked 3rd.

9)   Collaboration Index values of the articles ranged from 2.25 to 14.00. Issue wise collaboration coefficient values indicate that all issues had articles that were more or less multi authored. The degree of collaboration value of 8 out of 12 issues is one, indicating that all articles in those issues showed some type of collaboration.

10)   The maximum number of papers published per author was founf8d to be three. Eight authors with three (3) publications each were identified.

11) USA ranked 1st when in country wise research productivity with 30 publications in the year 2020.

12) As of 13th July, 2020, the maximum number of citations received per articles was 45 and Issue no.1 was identified to have had the maximum number of citations per issue in the year 2020.

13) The National Institutes of Health's National Institute on Deafness and Other Communication Disorders ranked first among the funding agencies by funding a maximum of 8 articles published in the year 2020.

6.1 Implications

a) This research can assist other researchers in identifying research gaps and research trends in Aphasiology.

b) It provides a framework for future scientometric studies in the both Aphasia and other communication disorders.

c) The information obtained from this research can be useful for other researchers to identify funding sources and agencies.

6.2 Limitations

1) The study has only reviewed the articles published by the journal in one year. A minimum of 10-20-year period is considered ideal when carrying out scientometric reviews. Hence, the generalizability of the results obtained from this study is poor.

2) Parameter like doubling time, growth rate and relative growth rate of scientific research in the field couldn't be calculated since the time frame considered was too short.

3)   The generalizability is further compromised since only one journal was considered for review.

6.3 Future Directions

1)   Scientometric studies in the field of communication disorders are limited. This method used in this study can be adopted and modified to carry out similar studies in disorders such as Stuttering or Traumatic Brain Injury.

2)   The results of this study could be used as a foundation to carry out a scientometric study in the same field by including more number of journals and considering a longer time period i.e. 10-20 years for reviewing.

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