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**KNOWLEDGE, AWARENESS AND PERCEPTION OF NOVICE RESEARCHERS OF
AYURVEDA TOWARDS SCIENTOMETRIC ANALYSIS AND MAPPING OF
SCIENTIFIC RESEARCH ARTICLES ON HIRUDOTHERAPY WITH RESPECT TO
MEDICINAL LEECH THERAPY**

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ABSTRACT

Background: Scientometrics also known as the “science of science,” is a term used for the evaluation and investigation of all aspects of scientific literature. Scientometric studies are more extensive than bibliometric research, which only analyses the documents in a certain body of literature. No information was available on Knowledge, Awareness and Perception of Research Scholars of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with Respect to Medicinal Leech Therapy in India. Aim: The objective of this study was to explore the knowledge, awareness, and perception of research scholars of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy in India. Methods: This cross-sectional study was conducted between 18 to 25 January-2022, using convenient sampling targeting novice researchers from Parul Institute of Ayurveda (PIA) College and Parul Institute of Ayurveda and Research (PIAR) College, Vadodara, Gujarat. This study utilised a self-administered, online questionnaire that was created, designed and disseminated using the Google Forms® platform and distributed through Email and WhatsApp. Participants were those currently only novice research scholars

who were affiliated with Parul University, given informed consent and successfully completed the questionnaire was included in the study (n=138). The questionnaire consisted of four major sections, including sociodemographic variables, knowledge, awareness, and perception of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy. Results: This study achieved a high response rate (69%). There was a high female preponderance (61.59%). More than three-fourths of respondents (78.99%) were young (20–29 years). About 66.67% of respondents answered correctly about understanding the term ‘Mapping of Scientific Research Articles’. A total of 58.69% of the participants (n = 81) understood the term ‘Scientometric Analysis’. A total of 92.75% believed that India as a nation needs to increase its research productivity and efficiency in Ayurveda domains. A total of 92.03% were aware that leech has been used for medicinal purposes. More than half of the respondents (58.70%) were not aware of the terms scientometric analysis and citation metrics. Conclusion: Assessment of the knowledge, awareness, and perception of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech Therapy among novice researchers revealed that the majority of them were not aware of Scientometric Analysis. Further research is required to establish the results of this study on a national level. I also come to the conclusion that organisations need to conduct awareness programmes on Scientometric and information technology topics for Ayurvedic novice researchers.

Keywords: KAP Survey, Ayurveda, Scientometrics, Hirudo therapy, Medicinal leech therapy

INTRODUCTION:

Scientometrics also known as “science of science”, is a term used for the evaluation and investigation of all aspects of scientific literature. Scientometric studies are more extensive than bibliometric research that only analyze the documents in a certain literature [1-3].

Science Mapping Analysis of scientific research articles aims at displaying the structural and dynamic aspects of scientific research. A science map is used to represent the cognitive structure of a research field [4-7].

Hirudotherapy or medicinal leech therapy is a traditional, complementary and integrative treatment. The first application of this technique was painted in the hieroglyphics from the ancient Egypt over 3500 years ago [8]. Hirudotherapy was also mentioned in ancient historical documents of Arabic, Chinese, Greek and Roman medicine to treat conditions such as headache, hypertension, osteoarthritis and hemorrhoids [9].

Leech therapy is also an Ayurvedic procedure called Jalaukavacharana or Jalauka and documented in the Sushruta Samhita, an

ancient Sanskrit text on medicine and surgery dated 2nd BC in India. Jalaukavacharana is a painless, minimal invasive technique of controlled bloodletting (Raktamokshana). Acharya Sushruta, a physician in ancient India, also known as “father of surgery” (7th or 6th century BC) stated that one who undergoes Raktamokshana periodically does not suffer with Sopha roga (edema), Twak roga (skin diseases) and Granthi roga (diseases with nodules). In the last several decades, hirudotherapy has become a popular part of complementary medicine [10, 11].

Since, no information was available on Knowledge, Awareness and Perception of Research Scholars of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy in India, we felt that it was very important to conduct research. Based on the above, this research was conducted to explore the Knowledge, Awareness and Perception of Research Scholars of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy in India.

MATERIAL AND METHODS:

Study Design and Study Population

This is a cross-sectional study conducted

between 18-January-2022 to 25-January-2022 using convenient sampling targeting the novice researchers from two Ayurveda colleges.

Study setting and sampling

This cross-sectional study was conducted across novice research scholars from two Ayurveda colleges Parul Institute of Ayurved and Parul institute of Ayurved and Research, from Parul University, Vadodara, Gujarat. This study utilized a self-administered, online questionnaire which was distributed through Email and WhatsApp across novice research scholar from, using convenient sampling targeting the novice researchers from Parul Institute of Ayurveda (PIA) College and Parul Institute of Ayurveda and Research (PIAR) College, conducted between 18 to 25 January-2022. The questionnaire was created, designed and disseminated using the Google Forms® platform. Participants were encouraged to fill out the form. Participants were recruited by a convenient sampling technique. Moreover, participants were limited to one response to avoid duplicated or exaggerated data. Included participants were those currently affiliated to Parul University as novice research scholar, had given an informed consent and successfully completed the questionnaire. Participants from outside the

Parul University, and incomplete questionnaires were excluded.

Data collection

The study tool was designed based on currently available information about Scientometric Analysis according to the literature and available recommendations. Validity of constructs was evaluated by a professional researcher heavily involved in research practices. The questionnaire consisted of four major sections.

The first section measured sociodemographic variables including gender, age and educational level. The second section included items that are designed to measure respondents' knowledge of the following: Which Country in the world gives the highest prominence to scientific research? Which Country in the world gives the highest prominence to Scientific research on Ayurveda? What do you understand by the term 'Scientometric Analysis', What do you understand by the term 'Mapping of Scientific Research Articles', What challenges do you face while 'Literature search' while conducting your research and how do you approach for 'Literature search' while conducting your research. The third section included items that are designed to measure respondents' awareness of the following: The term 'scientometric analysis',

'Hirudotherapy', 'Medicinal leech therapy', 'citation metrics', 'Journal impact factors', 'Scientific Databases' and others. Next section included items that are designed to measure respondents' perception of the following: India is not promoting its Ayurvedic medicinal concepts on a larger scale, Does Ayurveda has the potential to alleviate majority of human ailments, India as a nation needs to increase its research productivity and efficiency in Ayurvedic domain, Need of Scientometric Analysis while conducting any research in Ayurveda, Need of Mapping of Scientific Research Articles while conducting any research in Ayurveda, Awareness towards 'Scientometric Analysis' and 'Mapping of Scientific Research Articles' is the need of the hour. Participants responded to each objective statement with either "Yes" or "No" and explained themselves in subjective statements.

Data analysis

All data was exported and analyzed through the Statistical Package for Social Sciences (SPSS) version 23. All the study results are reported in descriptive statistics including frequencies and percentages.

Ethics approval and consent to participate

Ethical approval was obtained from the Institution at the Parul University. Participants

were informed about the aim of the study, voluntary nature of participation, and their right to refuse or withdraw from the study at any point, and the potential benefit of participation in the study. All of the aforementioned information was included in a digitally written consent form that was attached with the online questionnaire. Upon accepting the conditions and statements included in the form, participants were redirected to the questionnaire. Thus, the consent form itself acted as a barrier to survey completion if rejected by the participant. This ensures that the participants, who had completed the survey, had already read and accepted its associated consent form. High level of confidentiality and anonymity was maintained throughout the study.

The definitions of some concepts, such as perception, knowledge and awareness are as follows:

Perception of Scientometric Analysis: ability to perceive *Scientometric Analysis* in the real-world, based on memory and influenced by prior experience. For example, ‘I have faced challenges while *Scientometric Analysis* in my research.’

Knowledge of Scientometric Analysis: a body of facts and principles concerning *Scientometric Analysis* that have been accumulated by mankind through study. For

example, ‘I know the process of *Scientometric Analysis*’

Awareness of Scientometric Analysis: the attention, concern (mindful or heedful) and sensitivity of the respondents to *Scientometric Analysis*. For example, ‘I think *Scientometric Analysis* needs to be studied extensively.’

RESULTS

A total of 200 questionnaires were distributed, and 138 were returned. A response rate of 69% was achieved. Majority of the participants in this study were females (61.59%). All the respondents in this study were novice researchers. All the demographic data are tabulated in **Table 1**.

The complete response of participants toward knowledge questions is presented in **Table 2**. The results showed that 66.67% respondents answered correctly about understanding the term ‘Mapping of Scientific Research Articles’. A total of 58.69% of the participants (n = 81) understood the term ‘*Scientometric Analysis*’. Next, a total of 56.52% correctly identified the Country in the world gives the highest prominence to scientific research.

Above **Table 3** represents the participants’ responses toward the questions regarding perception of *Scientometric analysis*. From the observations of the respondents in above **Table 3**, a large number of participants disagreed or strongly disagreed (20.28%) that

India is not promoting its Ayurveda medicinal concepts on a larger scale. Similarly, a large number of participants agreed or strongly agreed (92.75%) that India as a nation needs to increase its research productivity and efficiency in Ayurveda domains. Majority of participants were neutral (15.21%) over their

belief that awareness towards Scientometric Analysis and Mapping of Scientific Research Articles is the need of the hour.

Table 1: Demographic data of study population

Characteristics	Number of respondents	Percentage (%)
Age class (years old)		
20-29	109	78.99
30-39	25	18.12
50-59	3	2.17
50-59	1	0.72
Gender		
Male	53	38.41
Female	85	61.59
Education		
Not-finished Bachelors	103	74.64
Finished Bachelors	2	1.45
Not finished Masters	4	2.90
Finished Masters	15	10.87
Not finished PhD	11	7.97
Finished PhD	3	2.17

Data presented as number (%) of participants

Table 2: Knowledge of Novice Researchers towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy among participants

Sr. No.	Statements	Correct responses	Incorrect responses
1	Which Country in the world gives the highest prominence to Scientific research?	78 (56.52%)	60 (43.47%)
2	Which Country in the world gives the highest prominence to Scientific research on Ayurveda?	23 (16.67%)	115 (83.33%)
3	What do you understand by the term 'Scientometric Analysis'?	81 (58.69%)	57 (41.30%)
4	What do you understand by the term 'Mapping of Scientific Research Articles'?	92 (66.67%)	46 (33.33%)
5	What challenges do you face while 'Literature search' while conducting your research?	34 (24.63%)	104 (75.36%)
6	How do you approach for 'Literature search' while conducting your research?	38 (27.53%)	100 (72.46%)

Data presented as number (%) of participants

Table 3: Perception of Novice Researchers towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy among participants among participants

Sr. No	Question	Participants' response				
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Do you think that India is not promoting its Ayurveda medicinal concepts on a larger scale	43 (31.15%)	45 (32.60%)	22 (15.94%)	16 (11.59%)	12 (8.69%)
	2	Do you think Ayurveda has the potential to alleviate majority of human ailments	74 (53.62%)	48 (34.78%)	12 (8.69%)	3 (2.17%)
3	Do you think India as a nation needs to increase its research productivity and efficiency in Ayurveda	73 (52.89%)	55 (39.85%)	8 (5.79%)	2 (1.44%)	0 (0%)
	4	Do you think there is need of Scientometric Analysis while conducting any research in Ayurveda?	60 (43.47%)	62 (44.92%)	13 (9.42%)	3 (2.17%)
5	Do you think there is need of Mapping of Scientific Research Articles while conducting any research in Ayurveda?	52 (37.68%)	65 (47.10%)	19 (13.76%)	2 (1.44%)	0 (%)
	6	Do you believe awareness towards Scientometric Analysis and Mapping of Scientific Research Articles is the need of the hour?	54 (39.13%)	60 (43.47%)	21 (15.21%)	2 (1.44%)

Data presented as number (%) of participants

Table 4: Awareness of Novice Researchers towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy among participants among participants

Sr.no	Question	Response	Frequency	%
1	Are you aware of the term Scientometric analysis?	Yes	57	41.30
		No	81	58.70
	2	Are you aware of Leech been used for medicinal purposes?	Yes	127
		No	11	7.97
3	Are you aware that Medicinal Leech therapy is also known as Hirudo therapy?	Yes	104	75.36
		No	34	24.64
	4	Are you aware of the term citation metrics?	Yes	57
		No	81	58.70
5	Are you aware of the term Journal impact factor?	Yes	77	55.80
		No	61	44.20
	6	Are you aware of any Scientific Database?	Yes	63
		No	75	54.35
7	Do you face any challenges while literature search on the database of your choice?	Yes	97	70.29
		No	41	29.71
	8	Would you like to have Mobile App for literature search on Leech therapy research articles	Yes	106
		No	32	23.19

Data presented as number (%) of participants

Above **Table 4** represents the participants' responses toward the questions regarding awareness of Scientometric analysis. From the observations of the respondents in above table 4, it becomes clear that majority of the respondents (92.03%) were aware of Leech been used for medicinal purposes and majority of the respondents (75.36%) were aware that Medicinal Leech therapy is also known as Hirudo therapy. Around 76.81% of the respondents would you like to have Mobile App for literature search on Leech therapy research articles. More than half of the respondents (58.70%) were not aware of the term Scientometric analysis and citation metrics. A total of 54.35% of the respondents were not aware of the Scientific Databases.

DISCUSSION

This study was conducted to assess the knowledge, awareness, and perception of Ayurveda towards Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy among novice researchers. According to research USA is the country in the world gives the highest prominence to Scientific research. However, the results of this study suggest that few participants were more knowledgeable about scientific research as per countries. Nepal is the country in the world which gives the highest prominence to

scientific research on Ayurveda. However, the results of this study showed that only 16.67% of the participants responded correctly to this question.

Limitations:

This study is not without limitations. The conclusions were drawn from a convenience sample representing a private sector university in India. These findings might not be generalizable for novice researchers all over India. Further, the study's methodology, despite being appropriate for response collection, may fall prey to a number of inherent biases. Online surveys are usually engaging to younger populations which might excluded or underestimated the responses of older participants due to their limited accessibility to technology. Moreover, the use of online surveys, that are primarily disseminated through social media platforms, enabled us to recruit a larger and more diverse sample of participants within a short period of time. However, they may have resulted in a demographic selection bias, manifesting as an over representation of females and younger age groups, while under representing older people and those with limited internet or social media access. The close ended nature of the study's questionnaire might have missed significant unavailable responses or failed to

accommodate for the wide ranges of perspective.

CONCLUSION:

This study provides a valuable insight about knowledge, awareness, and perception about Scientometric Analysis and Mapping of Scientific Research Articles on Hirudotherapy with respect to Medicinal Leech therapy among novice researchers. Further research is required to establish the results of this study to the wider population.

Recommendation to Ayurveda researchers:

Ayurveda is gaining popularity and global acceptance, interest in Ayurveda and its public demand is rapidly increasing. Such demand can only be fulfilled by doing more research in Ayurveda and publishing in good publications. All Ayurveda researchers should update their knowledge and awareness in Scientometric, real data bases related to research new key words in Hirudotherapy available online.

Recommendation to organization:

In recent years knowledge of Scientometric is playing a major role in the measurement and evaluation of research performance hence its recommended that organization must take initiation by way of awareness program they need to impart knowledge of Scientometric in leech therapy

and boost the confidence in aspiring Ayurveda novice researchers

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Author Contributions

Corresponding author contributed for data collecting, analysis and drafting the manuscript. Second author contributed towards proofreading the final draft.

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Conflict of Interest

There are no conflicts of interest.

Data and materials availability

All data associated with this study are present in the paper.

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