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Research Trends Of Nutrition In India Since 2017-2021

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***Abstract*:** The focus of this study is to analyze trends in doctoral research output in the field of nutrition science in India from 2017 to 2021. With the help of control vocabulary like DDC (Dewey Decimal Classification), Sear's List of subject headings etc. we first chose relevant keywords of nutrition . Next, we used the Sodhganga Database to search for doctorate theses using the keywords we had chosen between 2017 and 2021. Next, we examine its growth patterns and plot its movement from 2017 to 2021 using a variety of Bibliometrics techniques. Nutrition theses output show positive growth but the relative growth using RGR (Relative Growth Rate) and the growth trends using the linear growth model suggested growth is delayed in the year 2017 to 2021. A total of 249 theses output are counted in this period and the highest number of thesis outputs is observed in 2017 with a maximum number of 60 theses outputs. 14 relevance topics related to Nutritional science are the focus research areas in India. Out of these 14, the highest number of 59 theses output related to Food Science is observed with a maximum of 23.69 %. Next Child Nutrition has a maximum of 38 thesis outputs related to it followed by Health and Nutrition with a maximum of 13.25 %. South Zone theses output show a maximum of 88 theses outputs with a maximum of 35.2%. University of mysore recorded 30 theses submitted during the year 2017 to 2021 which is the highest among other universities.It is concluded that while growth in Nutritional Science was primarily observed during the pre-COVID-19 phase, its growth over time indicates a delayed nature. Further research is needed to uncover the underlying cause of this phenomenon. This study only focused on pre-COVID-19 Nutritional Science, but post-covid-19 research is needed to gain a better understanding of the overall theses submission scenario in Nutritional Science.

***Index Terms* - Food Science, Health and Nutrition, Nutritional Science, Research trend of Nutrition, India-Nutrition Research Trend, Sodhganga.**

I. INTRODUCTION

Nutrition is essential for growth and development, health and wellbeing. Eating a healthy diet contributes to preventing future illness and improving quality and length of life. Nutritional status is the state of your health as determined by what you eat. There are several ways of assessing nutritional status, including anthropometric (i.e. physical body measurement), food intake and biochemical measurement. Nutritional anthropology, according to S. Uijaszek (2018), is the study of human subsistence, diet, and nutrition from a comparative social and evolutionary standpoint. Humans are the culmination of their current social, cultural, and biological life histories, as well as their more recent evolutionary, epigenetic, and sociological pasts, in terms of nutrition. Food preferences, dietary choices, and population nutritional health are influenced by a multitude of factors.

The study covers research work in Nutrition and food science at the PhD level which have been already awarded for doctoral theses by Indian Universities . The period of coverage is from 2017 to 2021, a period of 5 years . It has considered only those titles of doctoral theses appeared in the INFLIBNET-Indcat (http://incat.inflibnet.ac.in/indcat). Searching individual various universities which has Nutrition department those are uploaded theses in INFLIBNET and collect data through year wise . The study represents research trend of Nutrition in the basis of broader term and narrower term wise.

II. METHODS

2.1 Keyword Selection

The intricate fields of biology, chemistry, technology, and animal science are all related to nutrition. Since describing a term is difficult, we listed 14 relevant keywords that are related to the broad topic of nutrition using standard control vocabulary such as DDC (Dewey Decimal Classification), Sear's List of subject headings, etc. These are the keywords.

1. Food science
2. Nutritional deficiency
3. Health and Nutrition
4. Dietetics
5. Disease
6. Food commodity
7. Nutritional bioscience
8. Nutritional science
9. Child Nutrition
10. Adult Nutrition
11. Animal nutrition
12. Sports Nutrition
13. Woman nutrition
14. Nutritional education

2.2 Data Collection

To obtain Nutrition theses that were submitted in India between 2017 and 2021, we utilize An open source digital repository called Shodhganga@INFLIBNET holds theses and dissertations that have been turned in to Indian universities. There are about 500,000 theses and 13,000 synopses in the archive. We have retrieved 249 doctorate theses on nutrition from the Sodhganga portal between 2017 and 2021 using these 14 keywords. Every PhD thesis has been enumerated and carefully reviewed.

2.3 Data Analysis

We analyzed 249 titles and divided them into four categories: 1) Productivity growth trending on Doctoral Theses in Nutrition 2) Relevant Keyword wise Doctoral Theses in Nutrition Growth Trending 3) Zone wise Growth trending. 4) India's top five universities.This study used a combination of cross-sectional and longitudinal bibliometrics techniques, all handled in Microsoft Excel.

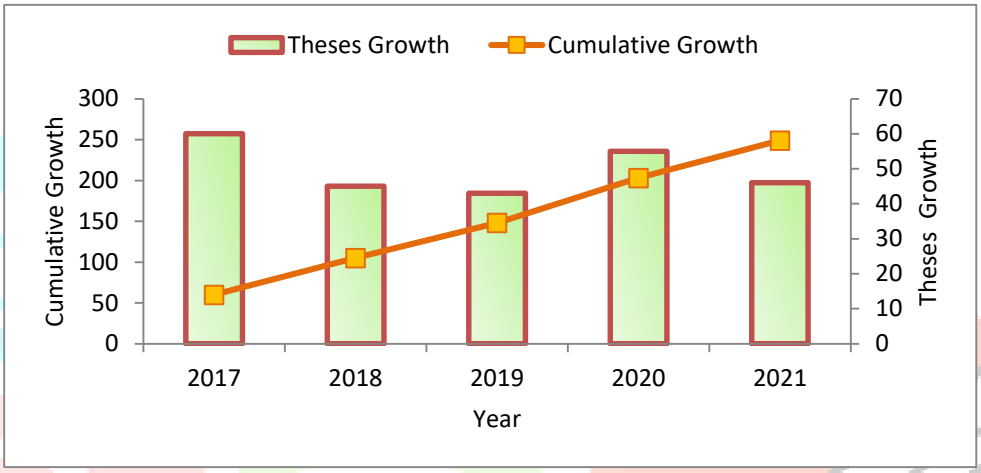
III. RESULT & DISCUSSION

Between 2017 and 2021, 249 doctoral theses on nutrition research were submitted. The year 2017 saw the submission of the greatest number of doctoral theses (60), accounting for 24.10% of all theses. The second-highest number, 55, was submitted in 2020. The annual growth and cumulative growth of publications are shown in Table 1 and Figure 1. We also note that the 2021 submission total is less than the 2020 total, which could be due to COVID-19.

Table-1: Year-wise Growth of Theses on Nutrition Research

Theses Submission Year	No of Theses	% of Theses growth	Cumulative Growth of Theses
2017	60	24.10	60
2018	45	18.07	105
2019	43	17.27	148
2020	55	22.09	203
2021	46	18.47	249
TOTAL	249	100	
Standard Deviation (SD)		7.328028	
Mean		49.8	
Median		46	

Figure-1: Year-wise Growth of Theses on Nutrition Research



The values of Relative Growth Rate (RGR) and Doubling Time (D_t) for Theses submission important indicators to study and understand growth trends of in the current research domain in some period of time (2017-2021). The growth rate of all publications has been measured on the basis of the RGR and D_t model, the particular model is developed by Mahapatra (1985). RGR is calculated to analyze the increase in the number of publications on time and the D_t is directly related to RGR.
In classical growth analysis RGR is calculated as:

$$RGR = (\ln N_2 - \ln N_1) / (t_2 - t_1)$$

Where N_2 and N_1 are cumulative number of publications in the years t_2 and t_1. In our case the time difference $t_2 - t_1$ is taken as 1 year. Therefore $RGR = \ln (N_2/N_1)$.

The Dt is the time required for publications to double in numbers for given RGR. This is expressed as:

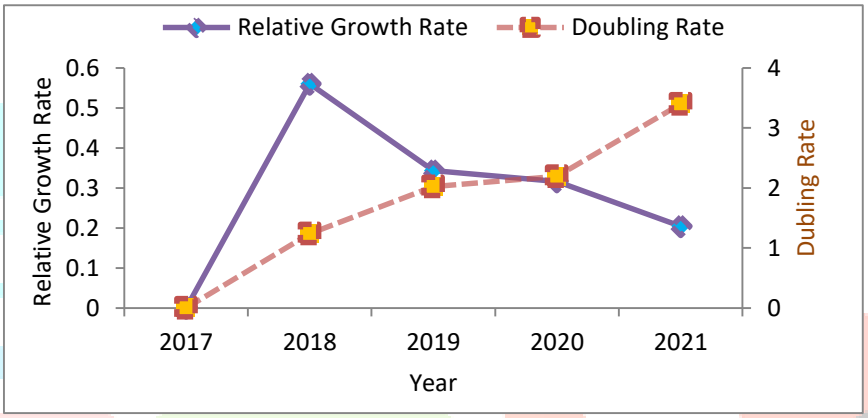
$$Dt = (t_2 - t_1) \ln 2 / (\ln N_2 - \ln N_1)$$
(or)
$$Dt = \ln 2 / RGR$$

Table 2 and Figure 2 Relative Growth Rate (RGR) and Doubling Time (D_t) for these submission trends of Nutrition. It was observed that the Relative Growth Rate (RGR) of Nutrition doctoral theses submission drops from 056 for the year 2017 to 0.204 for 2021 that's the reason Doubling value Time rises 3.40. we concluded that its relative growth rate has shown a declining trend, which means the rate of increased theses submission is low in terms of proportion, and this has been highlighted by the doubling time for publications, which is more than the relative growth rate.

Table-2: Relative Growth Rate and doubling Time (RGR and DT) on Nutrition Theses

SL No.	Year	Publication	Cumulative Total	W1	W2	RGR	Doubling Rate
1	2017	60	60		4.094	0	0
2	2018	45	105	4.094	4.654	0.56	1.24
3	2019	43	148	4.654	4.997	0.343	2.02
4	2020	55	203	4.997	5.313	0.316	2.19
5	2021	46	249	5.313	5.517	0.204	3.40

Figure 2: Relative growth rate and doubling Time (RGT and DT) on Nutrition Theses

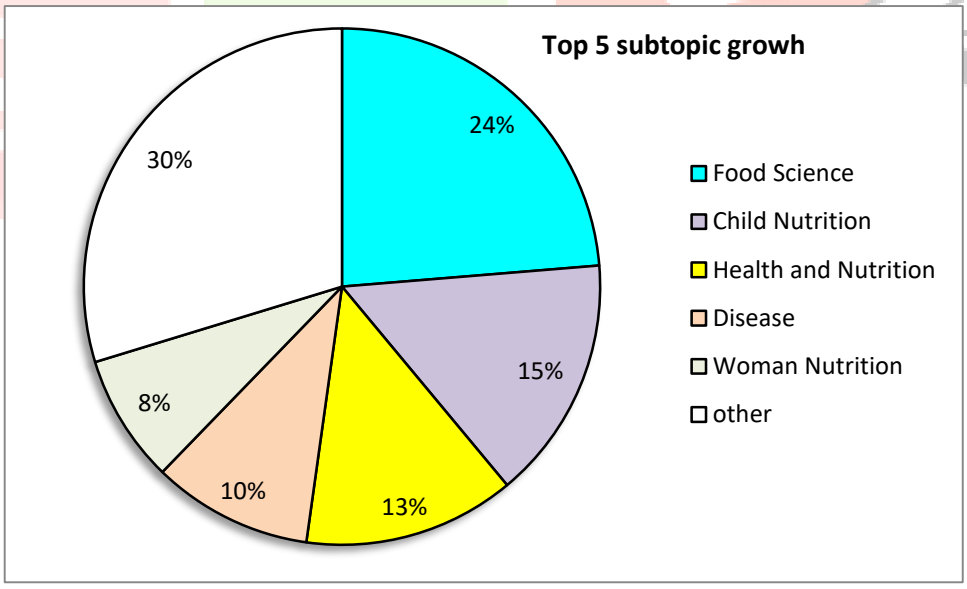


Upon closely examining the relevant 14 keyword-wise growth of theses submissions in Table 3 and Figure 3, we deduced that the top five subjects submitted in the "Nutrition" branch are "Food Science," with 59 submissions, accounting for 23.69% of the total values. Next in order of importance are "Child Nutrition," with 38, or 15.26% of the total value, "Health and Nutrition," with 33, or 13.25% of the total values, "Disease," with 25 (or 10.04%), and "Women Nutrition," with 20 (or 8.03%). Therefore, we can draw the conclusion that while animal nutrition and nutritional education are still developing fields within nutrition, these areas of the field are hot study issues.

Table-3: Keyword-wise Distribution of theses submission in Nutrition

Sub Topic	2017	2018	2019	2020	2021	Total	Percentage (%)
Food Science	15	12	10	13	9	59	23.69
Nutritional Deficiency	3	2	1	3	5	14	5.62
Health and Nutrition	5	5	8	11	4	33	13.25
Dietetics	3	4	5	2	1	15	6.02
Disease	7	5	5	4	4	25	10.04
Food Commodity	2	0	1	2	1	6	2.41
Nutritional Bioscience	2	1	0	4	1	8	3.21
Nutritional Science	1	2	1	3	1	8	3.21
Child Nutrition	11	8	0	10	9	38	15.26
Adult Nutrition	1	0	0	1	1	3	1.20
Animal Nutrition	0	0	2	1	2	5	2.01
Sports Nutrition	3	2	2	1	2	10	4.02
Woman Nutrition	6	4	7	0	3	20	8.03
Nutritional Education	1	0	1	1	2	5	2.01
Total	60	45	43	56	45	249	100

Figure- 3: Top Five Keyword-Wise Distribution on Nutrition theses



From this Table-4 we get almost half of the universities had done almost 5 theses, followed by 24 universities have produced 6-10 theses and so on. Only 3 universities have completed 26-30 theses.

Number of Theses Submitted	Number of University
1-5	46
6-10	24
11-15	11
16-20	5
21-25	9
26-30	3

Table-4: University-wise Distribution of theses submission in Nutrition

From the Table-5 we get highest number of theses produced in south zone (35.2 %) followed by central zone (27.2 %) and the lowest research article is published in north zone having a mere 5.2%.

Table-5: Zone-wise Distribution of theses submission in Nutrition

Zone	No. of Theses	Percentage
South	88	35.2
North	13	5.2
East	32	12.8
Central	68	27.2
West	49	19.6

Among these top 5 universities in Table-6 , University of Mysore gets 1st place by producing highest number (30) of theses with 32.6 % rate , followed by SNDT university and University of Baroda and lastly BHU have been published 10 theses articles making it to 10.9 % .

Table-6: University-wise Distribution of theses submission in Nutrition

Top Five Universities	No. Of These Produced	Percentage
University of Mysore	30	32.6
SNDT University	20	21.4
Maharaja Sayajirao University Of Baroda	17	18.7
Abinashi Lingan Deemed University for Women	15	16.4
Benaras Hindu University	10	10.9

IV. CONCLUSION

This study has been limited to various works on "Trend on research in Nutrition science in India" during 2017-2021 basis on the thesis uploaded to Sodhganga repository. The data has been analysis in various aspects like broad Subject wise, year wise distribution, university wise and also state wise. In the area of "Food science" maximum research had under food biochemistry which acquired 50.8 %. In year wisein this area 2020 has highest research. Lowest research having in the area of adult nutrition. We clearly see out of 250 research articles, most (59) of the research was done in "Food Science" area followed by 2nd most (38) in area of child nutrition and 3rd most is done in "Health and Science" (33). And afterwards in "Dietetics" and 'Women nutrition" number of researchers is average than others . It is also found that submission rate of Ph.D thesis is very high in few universities in India . It is due to poor infrastructure as well as faculty divide shown clearly in various universities . There is unequal distribution of teacher-student ratio, infrastructural facilities among various departments. 98 universities had been completed researches on nutrition in the year 2017 to 2021 . Name of the universities which had produce highest number of theses in INFLIBNET are University of Mysore , SNDT University , Maharaja Sayajirao University of Baroda, Abinashi-Lingan deemed university for women, Benaras Hindu University . Highest number of theses are uploaded from Karnataka and Tamilnadu. North zone had done lowest number of only 13 in last five years.

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