https://doi.org/10.56093/JISAS.V80I1.8
Available online at https://isas.live/newsite
Journal of the Indian Society of Agricultural Statistics 80(1) 2026 67–76

A Quantitative Analysis of the Research Impact of India with Globe in Health and Nutrition: Facets and Way Forward

Ashwani Kumar Mishra, Bhawna, Pooja Singh, Shubham Shukla, Vaishali Singh and Saumya Dwivedi

National Drug Dependence Treatment Centre (NDDTC), All India Institute of Medical Sciences, New Delhi

Received 27 February 2026; Revised 25 March 2026; Accepted 31 March 2026

SUMMARY

As per the recent report of the Global Hunger Index (GHI), India falls into the serious category. GHI uses the composite index of four indicators, namely undernourishment, child stunting, child wasting, and Under-five Mortality Rate. Hence, it becomes imperative to understand these four dimensions that are closely related to health and nutrition. The present study uses a quantitative approach for a deeper understanding of the research impact of India with Globe in the field of Health and Nutrition. While assessing the impact, we relied on the top 100 cited papers in the field, and applied prompt-based theme clustering to reveal the domains of primary and secondary features. Our analysis provides the demonstrative evidence that the level of evidence and ratings of studies in health and nutrition from India resonate well with the global standards. A set of five and twelve themes emerged from the analysis, respectively for the Globe and India across four population settings. More such studies are required to explore the unexplored terrain in health and nutrition, especially the cognitive and social determinants.

Keywords: Health and nutrition; analysis; clustering; themes; research impact; publish or perish; cited.

1. INTRODUCTION

The modern century is seeing a major transformation in our daily lives, both internal and external. Such extrinsic and intrinsic features have impacted our social dynamics and even our nutrition. Owing to these transformational changes, the domain of health and nutrition has much more relevance than erstwhile. The World Health Organisation (WHO) definition of Health (Callahan, 1973) as – *health is a state of complete mental, physical, and social well-being and not merely the absence of disease or infirmity*, clearly indicate entanglement of dimensions of health and well-being. Hence, it will be right to say that health and nutrition are interwoven and complement one another.

Since time immemorial, our knowledge regarding the host, environment, causative factors, pathogens, and the direct or indirect linkages of nutrition with disease has been extensive. Neither the abundance nor the deficit of any particular ingredient is good for health. We are all aware of the concept of a balanced diet. Nonetheless, despite our exorbitant understanding of health and the related concept, the global situation of India with respect to Hunger Index is unwelcoming. As per the recent report (Lal *et al.,* 2025) of the Global Hunger Index (GHI) India falls into the serious category with index score of 25.8. This index is estimated by summing the four scores of undernourishments (foods devoid of rich in protein, calories, or micronutrients, leading to underweight), child stunting (short for age), child wasting (overweight), and child mortality (Under-five Mortality Rate). It is stated in the report that key maternal and child health indicators still require improvement. Even in 2025 more than one-third of the country's population is undernourished, more than one-

Corresponding author: Ashwani Kumar Mishra
E-mail address: akmaiims@gmail.com

fourth of children under five years are stunted, one-fifth of children under five years exhibit wasting, and child mortality (percent of children under five year) reported as 1.5%.

Contrary to the GHI report, a post by Press Information Bureau (PIB) encompassing the findings under the Sample Registration System Report 2021 (Akhtara, and Ansonb, 2022), states that India's progress outpaces global averages. India has demonstrated major improvement in key maternal and child health indicators such as – Maternal Mortality Ratio drops from 130 to 93 live births, Infant Mortality Rate declined from 39 per 1000 live births in 2014 to 27 per 1000 live birth in 2021, Neonatal Mortality Rate falls from 26 per 1000 live births in 2014 to 19 per 1000 live births in 2021, under five mortality rate has dropped from 45 per thousand live births in 2014 to 31 per 1000 live birth in 2021, fertility rate hovering around 2.0 in 2021, sex ratio increased from 899 to 913. These two reports seem slightly different. Such differences might be attributed to different methodologies for developing the index. The GHI is a weighted method where every four parameters do not possess equal weight, and time trend analysis of SRS are pure number based on key indicators. Hence, while interpreting the GHI, we should be mindful of the methodologies.

India started the first-ever national program in the year 1936, and hence it will be unfair to discount the overall improvement in aspects of health for India, as evident by the Sample Registration System Report 2021. Since the inception of the thought in 1936 to the implementation of the Nationwide Nutrition Program: Poshan Abhiyan (Pal and Maurya, 2023), India's journey in Health and Nutrition have been phenomenal. A recent review article (George 2025) provides a detailed account of the journey. Additionally, a study (Rai *et al.,* 2025) analysed the impact of India's nationwide supplementary nutrition programme for pregnant women on the birth weight of their newborns. This was done by adopting a quasi-experimental evaluation study design. The researchers concluded that administering supplementary nutrition to pregnant women under the Integrated Child Development Services (ICDS) might improve the burden ascribed due to the low birth weight (LBW), and Very Low Birth weight (VLBW).

Among the health experts, nutritionists, policy planners and other stakeholders, a close eye on the key Maternal and Child Health Indicators is paramount. Such evaluations are further warranted, especially from India. A periodic comparative evaluation of Indian literature, on aspects of Health and Nutrition and its comparison with the Globe will go a long way. Since GHI predominantly weighs on Maternal and Child Health Indicators, it becomes imperative to conduct more such evaluation studies by adopting different methodologies. Such a comparative analysis of literature (academic/scholarly publications) will help in detecting key domains of investigation like morbidity, type of population (vulnerable), settings, themes and other related aspects.

In the present study, we conduct a comprehensive comparative analysis of the research impact of India and Globe in Health and Nutrition, its facets and Way Forward. Primarily, the analysis is based on the top 100 cited papers both globally and from India. Our premise of 100 top-cited papers relies on the fact that citations received by a particular scholarly publication are demonstrative evidence of the research impact. Our prior experiences of such citation analysis in different health conditions (Parmar *et al.,* 2019a; Parmar *et al.,* 2019b; Dhua *et al.,* 2022a; Dhua *et al.,* 2022b; Vashney *et al.,* 2020; Mishra and Balhara 2013) provide the audacity to undertake such a study in the field of Health and Nutrition.

2. METHODOLOGY

2.1 Search Criteria

We used the Publish or Perish software (Harzing 2023). The search queries in the software (Google Scholar) were '*health and nutrition'*, *(health and nutrition AND India)* respectively, in the context of the globe and India. The software utilized for the analysis provides a CSV format (Comma Separated Values) which is exported into Ms. excel spreadsheet. The sequence of the records is arranged in the descending order of total citations. An exportable csv (comma-delimited) sheet was independently extracted (globe and India) for further analysis. Both the files yielded the 100 top cited documents along with the fields such as – cites, publication year, authors, title, year, publisher, article URL, cites/year, cites/paper, cites/

author, papers/author, authors/papers, h-index, g-index, hI-norm, hI-annual, and hA-index, abstract, document URL, full text URL, and related URL. Alonso and colleagues provide a more detailed explanation of these indices (Alonso *et al.,* 2010). Additionally, we curated fields involving the type of document (article, journal/ books), study design, disease states, and aspects of nutrition covered. Two different authors (AKM and B) extracted the secondary features independently. The date of database search was 21st January 2026. We excluded three records from Indian database as further details could not be located in the public domain.

2.2 Primary Features

In this analysis, the core set of indicators analysed was as follows:

1. *Cites*: this refers to the total number of citations that a particular document received.
2. *Publication year*: year ranging from the first ever citation of the top cited document till 2022.
3. Citation Years: total number of years elapsed between the first citation to the year 2022 for the globe, and 2024 for India.
4. *Cites/year*: this refers to the rate of cites per year for the specific document across the citation years as per 3) above.
5. *Cites/paper*: total number of citations divided by 100 (as the denominator is the top-100 cited papers).
6. *Cites/author*: calculated by dividing the citations for each publication by the number of authors and summing the resulting citations. In this way, we achieve the single-authored equivalent number of citations for the author of interest.
7. *Paper/authors*: Average number of papers per author.
8. *Authors/papers*: Average number of authors per paper.
9. *h-index*: An author has an index h if h of his/her Np papers have at least h citations each, and the remaining (Np-h) papers have more than Np-h citations each. An h-index of 15 means that the author published 15 documents, which are cited at least 15 times each.
10. *g-index*: This is an alternative to the h-index. This is based on a minimum of n citations for the least-cited document and thus ignores records achieving higher citations. A g-index of 10 means that the scholar has published at least 10 documents that have received at least XX number of citations. The XX is derived from a subset of the document.
11. *hI, norm*: Is an individual h –index. In this, we normalise the number of citations for every document with the number of authors for that paper, and then calculate the h-index of the normalized citation count.
12. *hI, annual*: This is a further refinement in the original h-index. This is calculated by taking the ratio of hI norm and academic age (denominator). Hence, this provides us with the exact academic age i.e., the number of years passed between the first publications till record availability in the database, and thus reflects the academic age of a particular published document.
13. *hA-index*: This is an improved version of the original h-index. By this metric, we normalise the number of citations by the number of authors for that paper, and calculate the h-index of the normalised citation counts.

2.3 Derived features

1. *Word Cloud*: This refers to the visual representation of the most common keywords extracted from the title.
2. *Study design*: One of the crucial elements of any scientific study refers to the appropriate research methods used for planning, conducting, executing, and completing the study. We summarised this information by the level of evidence (Level I/II/III/ IV/V/VI/VII) and Grading of Recommendations Assessment, Development, and Evaluation (GRADE) (Zeng *et al.,* 2021), categorised as High/ Moderate-High/ Moderate/Low/Very Low. This was done independently by four authors (AKM, SS, SD, VS). A parallel scan was performed across these labels for the records, and any ambiguity was resolved by consensus. Disagreements were discussed among all authors, and the study design classifications of discrepant records were independently re-evaluated by each author. Final

decisions regarding study design were based on majority consensus (i.e., agreement among four and more authors). By and large, the convergence rate for these secondary features was greater than 90.0%. Specifically, we defined operationally convergence rate as proportion of articles in total and across two data bases which were labelled with same research design. The total titles on which agreement was obtained were 178/197 (90.36%) (Globe 92/100 (92%), India 86/97 (88.367%). We also provide the 95% Confidence interval for these three convergences respectively as 86.32% - 94.50%, 86.7% - 97.3%.

3. *Cluster of themes:* In this, we used the keywords, diseased states, and aspects of nutrition covered to reveal the cluster themes. By cluster themes, we refer to the various spectra of conditions, the primary outcome of interest in the published document, and the population studied.
4. *Heat Map:* After obtaining the cluster themes, we created the Visual evidence Gap by a Heat Map for various combinations of the primary outcome variables, diseased combinations, and population studied with a varying range of shade regions from most studied to least studied themes.

3. STATISTICAL ANALYSIS

The evidence hierarchy used in this study is based on the Joanna Briggs Institute (JBI) Levels of Evidence for Effectiveness framework. JBI is an international organization that develops standardized tools to support evidence-based healthcare by assessing the quality and strength of research. Unlike a single universal hierarchy, JBI classifies evidence across different domains such as effectiveness, diagnostic accuracy, prognosis, economic evaluation, and meaningfulness, allowing a more context-specific and nuanced appraisal of evidence for healthcare decision-making (JBI, 2014). Although the original JBI framework proposes a five-level hierarchy, this study expands it into seven levels to improve methodological clarity, especially in distinguishing between diverse study designs encompassing both experimental and non-experimental study designs. The adapted system ranks evidence from Level 1 (highest) to Level 7 (lowest), where higher levels indicate more rigorous and controlled study designs, and lower levels reflect weaker methodologies with greater risk of bias and reduced certainty in establishing causal relationships.

The GRADE Working Group (The Grading of Recommendations Assessment, Development and Evaluation (GRADE) is a systematic and transparent framework used to assess the certainty of evidence, indicating the level of confidence that the estimated effects reported in studies are close to the true effect (Zeng *et al.,* 2021). It is widely applied in health research and evidence synthesis to support informed decision-making by evaluating factors such as risk of bias, inconsistency, indirectness, imprecision, and publication bias. GRADE was used in the present study to complement the hierarchical classification of levels of evidence by providing an independent assessment of evidence quality, thereby strengthening the overall evaluation of research outputs in health and nutrition. While the standard GRADE framework classifies evidence into four categories (high, moderate, low, and very low), it was adapted into five categories (very high, high, moderate, low, and very low) in this study. This modification was undertaken to introduce greater sensitivity in distinguishing variations in evidence quality across a heterogeneous set of study designs, particularly within highly cited literature. The expanded categorization allows for a more nuanced and context-specific assessment of certainty of evidence, enhancing the interpretability and comparative analysis of global and Indian research outputs.

The statistical significance of the primary features was assessed by performing Wald Z test on the log rate ratio (Banerjee and Wellner, 2005). The null hypothesis (H_o=1) tested was that the ratio of these primary indicators was equal to one (Globe/India) with the alternative hypothesis ($H_1 \neq 1$). We used the R Studio software version 1.1.463 and used libraries – writexl (Sanderson 2024), stats (Anderson 2021), respectively for importing the csv file into the R console, and applying the Wald Z test on the log rate ratio. Furthermore, the package mapply (Souza 2023) was embedded in the syntax form to create vector for the primary features related to the citation. The results of the Wald Z test on the log rate ratio are included in Table-1.

After summarizing the primary features (Table 1), we created the word cloud for Globe and India. This

provided the visual representation of the predominant keywords studied across the top-cited 100 published documents. For generating this, we used the Wooclap generator (Figure 1a, Figure 1b). This was generated by using the title of the published documents, converting them into text separated by commas, and subsequently plugging the string into the freely available template.

The percent distribution of the study design (evidence) and GRADE ratings are summarized by Table 2. Deriving the estimates of odds ratio (OR) and its 95% Confidence Interval (95% C.I.) and p value, of India and globe tests the odds of publishing the research studies by adopting a similar study designs (H_o: Odds Ratio=1, H_1: OR≠1).

The cluster themes were generated by prompt-based theme clustering (Achkar 2025). We labelled the individual studies by population, intervention/ exposure, comparison, outcome, and time (PICOT) (Elias 2015). These were combined subsequently by prompt-based theme clustering, separately (Globe and India). For this, we entrenched the text (titles: terms) into ChatGPT (McAdoo 2023) and provided the instructions to reveal the cluster name. This was further checked with the parent database for alignment with the diseased condition and aspects of nutrition. Any discrepancies noted entailed repeating the clustering themes. This method was performed iteratively, with a parallel scan of the visual evidence gap Heatmap of nutrition research themes by populations. A heat map is an analytical way of visualising data by using colour combination proportional to the quantum of the findings. Thus, it replaces a numeric feature with a different gamut of colours, thereby corresponding to the varying effect sizes. This simplifies the data sophistication and provides user-friendly two-dimensional figures rather than using comprehensible tables. In the Visual Evidence Gap Heatmap (Fredlund et., 2024), x axis refers to the type of population being studied, y axis states the aspects of nutrition, and the evidence density (relative) (Pokojski et l., 2021) signifies a particular combination of theme and population understudied or over studied (interspersed cell position) (Globe: Figure 2, and India: Figure 3a, 3b, 3c, 3d and 3e).

4. RESULTS AND DISCUSSION

4.1 Primary Features

It is quite clear from Table 1 that, except for the two primary features papers/authors and authors/papers, the quantum of remaining features [ranging from 2.36: hI, norm to 7.71: citations] was higher globally than in India, and the results were statistically significant (p value for Wald Rate Ratio test < 0.001). It is interesting to note that the citation years were respectively 45 and 94 globally and in India. The total number of citations received for the top 100 cited papers globally and in India was 93,298 (approximately eight times higher) and 12,106 (Table 1).

4.2 Derived Features

As per the word cloud, it is quite evident that for globe nutrition, health, examination, national, survey, prevalence, sample, etc., were the words profoundly visible (fig 1a). However, for India, after three primary search queries (health, nutrition, India), other abundant words were village, child, study, maternal, impact, reproductive, intervention, community-based, services, sanitation, health service assess, evaluation, community, and etc. (Fig. 1b).

Moreover, when these 100 top-cited documents were clubbed into the categories of evidence and GRADE, we noted almost an equitable distribution. The percent distribution of Level of evidence and GRADE rating was less than or equal to 10% for the top-most categories. Furthermore, the percent distribution in the mid categories of evidence and GRADE ratings, such as Moderate – Very Low, was equally poised both globally (n=100) and in India (n=97), as three of the 100 top cited documents were books). We tested this distribution formally by estimating the [OR (95% C.I.), p] by creating a specific 2X2 contingency table stratified by Level I-III evidence Vs others and Level IV-VII vs others. We got the [OR (95% C.I.), p] for two strata respectively as [1.63 (0.80, 3.32), 0.08] and [0.61 (0.31, 1.25), 0.23] by deriving the values of a, b, c, d from Table 2. In a nutshell, the values of India (a, b) and the globe (c, d) respectively for these two strata (level 1-3 Vs others, level IV-VII) were (23, 74), (16, 84), (74, 23), (84, 16).

By running the prompt-based theme clustering for the global dataset study, five populations were detected:

the general population, adults, children/adolescents, the elderly, and vulnerable groups. A total of 12 themes emerged (policy and public health, food systems, assessment and surveillance, functional foods, mental health, ageing and frailty, nutrition and development, maternal and life-course, micronutrients, hypertension and cardio-vascular diseases, dietary patterns and obesity and metabolic risk). Except for obesity and metabolic risk in the general population (yellow grid top left-hand side Fig. 2), other combinations were less commonly investigated among the available 100 top-cited papers globally. There is a significant scarcity of studies in the geriatric age and vulnerable (the least density noted).

When we extracted the cluster of themes specifically for India, a set of seven attributes was identified (population nutrition and development; health systems, governance and service delivery; health inequities and social determinants; adolescents and life-course nutrition; child morbidity, mortality and infections; micronutrient deficiencies and anaemia; and maternal, newborn and child undernutrition. The primary outcomes of interest considered across these themes were growth failure (Figure 3a), micronutrient deficiency (Figure 3b), morbidity/mortality (Figure 3c), cognitive/educational (Figure 3d), and health service access (Figure 3e). The themes provide strong evidence of growth failure studies for the combination of maternal, newborn and child undernutrition, and infants and vulnerable groups'↔health inequities and social determinants. Likewise, commonly studied combinations noted for micronutrient deficiency (Fig. 3b) were as – infants and children+ women (maternal)↔ micronutrients deficiencies. On aspects of morbidity and mortality (Fig. 3c), more studies were carried out among infants and children covered under themes of child mortality, morbidity, and infection; and maternal, newborn and child undernutrition. Only one strong theme emerged for the vulnerable group↔cognitive/educational (Figure 3d). The domain of health service access was clustered strongly with all population settings except for adolescents (Figure 3e).

In this study, we performed a comprehensive comparative analysis of the research impact of India and Globe in Health and Nutrition, its facets and Way Forward. The present analysis is based on the top 100 cited papers both globally and from India. After extracting the two databases we conducted a comprehensive analysis for the primary (cites, publication years, citations, cites/year, cites/paper, cites/author, papers/authors, authors/papers, h-index, g-index, hI, annual, and hA-index) and secondary features (word cloud, study design, and cluster of themes) both globally and India.

Our consideration for focusing on the 100 top-cited papers relies on the fact that citations received by a published document is an important indicator of research impact. Strong clustering of research themes across various population settings provides significant motivation to the researchers to move further with their research ideas. While reading strongly cited papers we get dive deeper and expand our horizontal and vertical knowledge for studies. A study by Abt (1998) provides the benefits of the technical results proved by the quantity of citation received by the article. Our earlier experiences in the citation analysis enabled us to undertake such study in the field of Health and Nutrition.

The quantitative figures in terms of total citations, cites/papers, h-index, hI, norm, hI.annual, and hA-index were found to be significantly higher globally. However, this is one side of the coin. With approximately 8 times higher count globally, still the level of evidence and grade ratings for India was found to be comparable with global standards. The [OR (95% C.I.), p] across two levels of stratification Level I-III evidence Vs others and Level IV-VII vs others were statistically insignificant. This is an important finding with respect to India. Additionally, the ratio tested by applying the Wald Z test were statistically insignificant for two primary features – *papers/authors*, and *authors/papers*. Hence, it is true that the total count of citations is low for India as compared to globe, but similarity for these two primary features indicates that individual contribution of experts in health and nutrition equates well with globe. Since three features such as hI.norm, hI.annual, and hA-index are derivatives of the original h-index, difference in these three are explainable. These indices provide a snap shot for India and can be viewed as performance of health nutritionist experts in India with global benchmark. Rodrigo and colleagues provides a more comprehensive advantages, limitation, and relation of h-index with other bibliometric indicators at the micro level (Costas *et al.,* 2007).

By the prompt-based theme clustering (Achkar 2025) the global dataset study on four populations were detected – general population, adults, child/ adolescents, elderly, and vulnerable groups with twelve themes of policy and public health, food systems, assessment and surveillance, functional foods, aging and frailty, nutrition and development, maternal and life-course, micronutrients, hypertension and cardio-vascular diseases, dietary patterns and obesity and metabolic risk. Evidence mapping indicated abundant concentration in adult metabolic and dietary outcomes, emancipated by conducting large cross-sectional national survey analyses (Fig. 2). Contrastingly, limited evidences were identified for mental health, aging related outcomes, and food system research, especially among vulnerable and elderly populations (Fig. 2).

For India a set of five primary outcomes were investigated among the 100 top cited papers, involving twelve themes (policy and public health, food systems, assessment and surveillance, functional foods, aging and frailty, nutrition and development, maternal and life-course, micronutrients, hypertension and cardio-vascular diseases, dietary patterns and obesity and metabolic risk) (Fig. 3a-Fig. 3e). A fresh insights was obtained for India by applying prompt-based theme clustering. There was strong clustering of studies examining biological nutritional outcomes, moderate coverage of social determinants and inequities which were just descriptive in nature rather than evaluative. A sparse integration of health systems and governance factors with downstream nutritional or health outcomes was noted. Moreover, limited longitudinal or life-course analyses existed among the 100 top cited papers with linkages to early nutrition to later adult health, productivity, or intergenerational outcomes.

The field of mental health (cognitive) was understudied across all population settings. When we revisit the definition of health as provided by WHO it encompasses dimensions of physical, mental, and social. Hence, it becomes imperative to undertake studies on mental health both globally and India. It is promising to witness growth failure and micronutrients deficiency being studies well in the context of India, but scarcity of studies across all population settings warrants a caution. Probably, the experts should intervene and encourage researchers to undertake studies on cognition and mental health across spectrum of population. These will provide a more comprehensive roadmap for way forward.

This is the first ever report that compared research impact of India with globe in the field of health and nutrition. It is a well-known fact that individual studies with specific study designs addresses few issues by performing literature review on limited scale. A full plethora of dimensions across multiple themes from the original studies have potential to guide the researchers further in their scholar publication. A quantitative comparison permits assessment of individual or country specific needs with the global context, and can go a long way in undertaking large population based studies in the general population.

We would also like to acknowledge the limitations of the present study. Firstly, this study is based on the 100 top-cited documents and utilized single platform. In the field of bibliometric analysis, there are multiple software too, and hence convergence of the findings across the multiple databases would have been beneficial. The use of a single bibliometric database may introduce selection bias, as studies indexed in other databases may not be captured. Hence, potential biases related to the use of a single bibliometric retrieval platform citation inflation databases such as Googles Scholar cannot be overruled. However, the user-friendly interface with quantitative primary features is alluring for such analysis as the present database provides an exportable CSV format data for further analysis. Therefore, data handling becomes more structured. Secondly, there is possibility for a more detailed analysis of the type of institution, subject domains of authors, type of collaborative studies also have a potential to add flavor to the results. But this was not the focus in the present study. Moreover, due to the possible time-lag effect in citation accumulation, the fundamental nature of the variables associated with bibliometric analysis becomes skewed. Statistically, this can be addressed by applying robust statistical method such as generalized linear model (GLM) with appropriate link function for dealing such skewed variables (Hammouri *et al.,* 2020).

Future studies can undertake ideas and build further upon handling such extreme value data to minimize time-lag effect and other associated attributes. Such procedures will enable in revealing further granularity regarding thematic evaluation of topics in health and nutrition.

5. CONCLUSION

To conclude, this is the first-ever attempt to understand the research impact of India and compare it with the globe in the field of health and nutrition. Quantitatively, the citations and the related primary features are lower for India the study design and GRADE are similar to the globe. A set of five primary outcomes (growth failure, micronutrient deficiency, child morbidity and mortality, cognitive/educational, and health service access) has been studied in India across twelve themes. More such studies are warranted to unravel hidden treasures in the field of health and nutrition that can generate profound evidence in the field.

REFERENCES

Abt, H.A. Why some papers have long citation lifetimes. *Nature* 1998, **395**, 756–757.

Achkar, P., Murugaboopathy, S., Kreuter, A., Gollub, T., Potthast, M., and Campbell, Y. (2025, November). From Keyterms to Context: Exploring Topic Description Generation in Scientific Corpora. In *Proceedings of The 5th New Frontiers in Summarization Workshop* (pp. 102-122).

Akhtara, S. N., and Ansonb, J. (2022). *How effective is death registration in India? Evidence from recent National Family Health Survey-5* (2019-2021) (No. gnydz_v1). Center for Open Science.

Alonso, S., Cabrerizo, F., Herrera-Viedma, E., and Herrera, F. (2010). hg-index: A new index to characterize the scientific output of researchers based on the h-and g-indices. *Scientometrics*, **82**(2), 391-400.

Andresen, M. A. (2021). R (statistical software). *CrimRxiv*.

Banerjee, M., and Wellner, J. A. (2005). Score statistics for current status data: comparisons with likelihood ratio and Wald statistics. *The International Journal of Biostatistics*, **1**(1), 1001.

Callahan, D. (1973). The WHO definition of'health'. *Hastings center studies*, 77-87.

Costas, R., and Bordons, M. (2007). The h-index: Advantages, limitations and its relation with other bibliometric indicators at the micro level. *Journal of informetrics*, **1**(3), 193-203.

Dhua, A. K., Garg, M., Mishra, A. K., Goel, P., Jain, V., and Yadav, D. K. (2022a). A Bibliometric Study of the Pediatric Inguinal Hernia Publication Landscape from the Web of Science Database. *Journal of Indian Association of Pediatric Surgeons*, **27**(6), 689-698.

Dhua, A.K., Kumar, V., Mishra, A.K., Jain, V., Yadav, D., Bajpai, M.,. and Goel, P. (2022b). Fifty most influential articles on anorectal malformations: a tribute through bibliometric ranking. *Journal of Indian Association of Pediatric Surgeons*, **27**(4), 419-427.

Elias, B. L., Polancich, S., Jones, C., and Colvin, S. (2015). Evolving the PICOT method for the digital age: The PICOT-D. *Journal of Nursing Education*, **54**(10), 594-599.

Fredlund, M., Rogers, M., Orr, N., Kneale, D., Allen, K., and Thompson Coon, J. (2024). What are the methodological characteristics of evidence and gap maps? A systematic review and evidence and gap map. *Cochrane Evidence Synthesis and Methods*, **2**(8), e12096.

George, S., Chandrakar, A., and Giri, A. K. (2025). Nutritional Health Programmes in India: How far have we reached?. *Indian Journal of Community Health*, **37**(1), 22-26.

Hammouri, H.M., Sabo, R.T., Alsaadawi, R., and Kheirallah, K.A. (2020). Handling skewed data: A comparison of two popular methods. *Applied Sciences*, **10**(18), 6247.

Harzing, A. (2023). *Using the publish or perish software*. 1833x3.

Joanna Briggs Institute. (2014). *JBI levels of evidence*. Joanna Briggs Institute.

Lal, S.P., Sushmita, K., Prakash, S., Kethavath, N., and Kumari, V. (2025). Food and Nutrition Security to Mitigate Global Hunger 'Index'apropos India.

McAdoo, T. (2023). How to cite ChatGPT. *APA Style Blog*, *7*.

Mishra, A.K., and Balhara, Y.P.S. (2013). Statistical methodology for the scientometric study of the growth of medical sciences in India. *Current Science*, 821-826.

Pal, P., and Maurya, N.K. (2023). National Nutrition Mission (Poshan Abhiyaan): An overview. *International Journal of Agricultural Invention*, **8**(2), 234-238.

Parmar, A., Ganesh, R., and Mishra, A.K. (2019a). The top 100 cited articles on Obsessive Compulsive Disorder (OCD): A citation analysis. *Asian journal of psychiatry*, **42**, 34-41.

Parmar, A., Kumar Dubey, D., Singh Balhara, Y. P., and Kumar Mishra, A. (2019b). Do addiction science journals endorse unbiased reporting of research? A systematic evaluation of Instructions for authors. *Substance Use & Misuse*, **54**(10), 1734-1742.

Pokojski, W., Panecki, T., and Słomska-Przech, K. (2021). Cartographic visualization of density: exploring the opportunities and constraints of Heat Maps. *Polish Cartographical Review*, **53**, 21-36.

Rai, R.K., Bromage, S., and Udomkesmalee, E. (2025). Impact of India's nationwide supplementary nutrition programme for pregnant women on birth weight of their newborns: a quasi-experimental evaluation. *J Epidemiol Community Health*, **79**(12), 913-918.

Sanderson, S., and Kun, D. (2024). *Extending Excel with Python and R: Unlock the potential of analytics languages for advanced data manipulation and visualization*. Packt Publishing Ltd.

Souza de Cursi, E. (2023). Some tips to use R and RStudio. In *Uncertainty Quantification using R* (pp. 1-108). Cham: Springer International Publishing.

Vashney, M., Parmar, A., and Mishra, A.K. (2020). The Past, present and future of literature pertaining to Betel (Areca) nut: A citation analysis. *Substance Use & Misuse*, **55**(9), 1403-1412.

Wooclap. (n.d.). Interactive pedagogic tools: Increase learner engagement. https://www.wooclap.com.

Zeng, L., Brignardello-Petersen, R., Hultcrantz, M., Siemieniuk, R. A., Santesso, N., Traversy, G., ... and Guyatt, G. H. (2021). GRADE guidelines 32: GRADE offers guidance on choosing targets of GRADE certainty of evidence ratings. Journal of clinical epidemiology, **137**, 163-175.

Table 1. Test of Significance for the Primary Features

Features*	Globe	India	Ratio	Test of Significance
Papers (n=197)	100	97	1.0	Not Applicable**
Citation Years	45 (1981-2026)	94 (1932-2026)	Not Applicable	Not Applicable**
Citations	93,298	12,106	**7.71**	<0.001
Cites/ papers	932.98	128.06	7.29	<0.001
Papers/ Authors	42.80	46.35	0.92	0.71
Authors/ Papers	3.22	3.02	1.07	0.94
h-index	97	53	1.83	<0.001
g-index	100	100	1.00	Not Applicable**
hI,norm	85	36	2.36	<0.001
hI,annual	1.89	0.38	4.97	<0.001
hA-index	39	14	2.79	<0.001

**Wald Z test for log ratio, Not applicable for citation years because of non-overlapping range (minimum value), and for g-index the ratio is equal to one and hence test of significance cannot be applied*

Fig. 1a. Globe (n=100)

Fig. 1b. India (n=100)

Fig. 1. Word cloud of keywords extracted from the two databases

Table 2. Distribution of top cited documents according to research evidence and GRADE rating

Evidence	GRADE Rating	Study Designs-Global	(%)
Globe (n=100)			
Level I	High	Systematic reviews, guidelines	5 (5.0)
Level II	Moderate–High	Prospective cohort studies	4 (4.0)
Level III	Moderate	Repeated cross-sectional, trends	7 (7.0)
Level IV	Low	Cross-sectional observational	38 (3.8)
Level V	Low	Methodological, validation	18 (1.8)
Level VI	Very Low	Narrative & conceptual reviews	20 (20.0)
Level VII	Very Low	Policy, economic, reference works	8 (8.0)
India (n=97)*			
Level I	Very High	Systematic reviews, meta-analyses, structured literature reviews	5 (5.2)
Level II	High	RCTs, Cluster-RCTs (cRCTs), field experiments	8 (8.2)
Level III	Moderate–High	Quasi-experimental studies, impact evaluations, cost-effectiveness analyses	9 (9.3)
Level IV	Moderate	Observational studies (cross-sectional, longitudinal, econometric, secondary data analysis)	25 (25.8)
Level V	Moderate–Low	Mixed-methods studies, program evaluations, implementation research, process evaluations, feasibility studies	20 (20.6)
Level VI	Low	Qualitative studies, case studies, systems analyses	14 (14.4)
Level VII	Very Low	Policy analysis, narrative reviews, historical analysis, working papers	16 (16.5)

**Denominator for India is 97 because three documents were book and hence cannot be labelled into evidence and GRADE ratings*

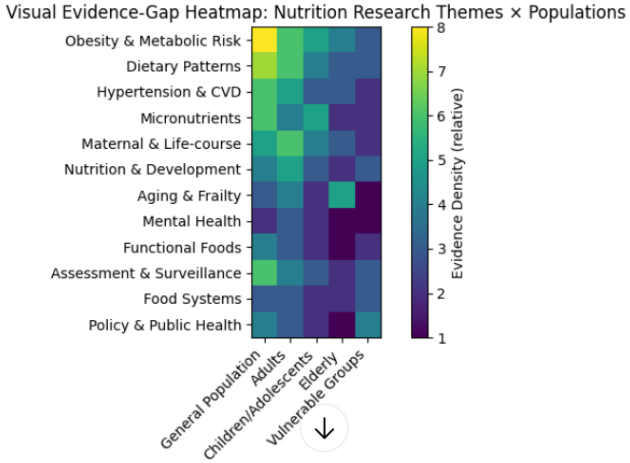

Fig. 2. Visual Evidence-Gap Heatmap for Global Nutrition Research Themes and Population

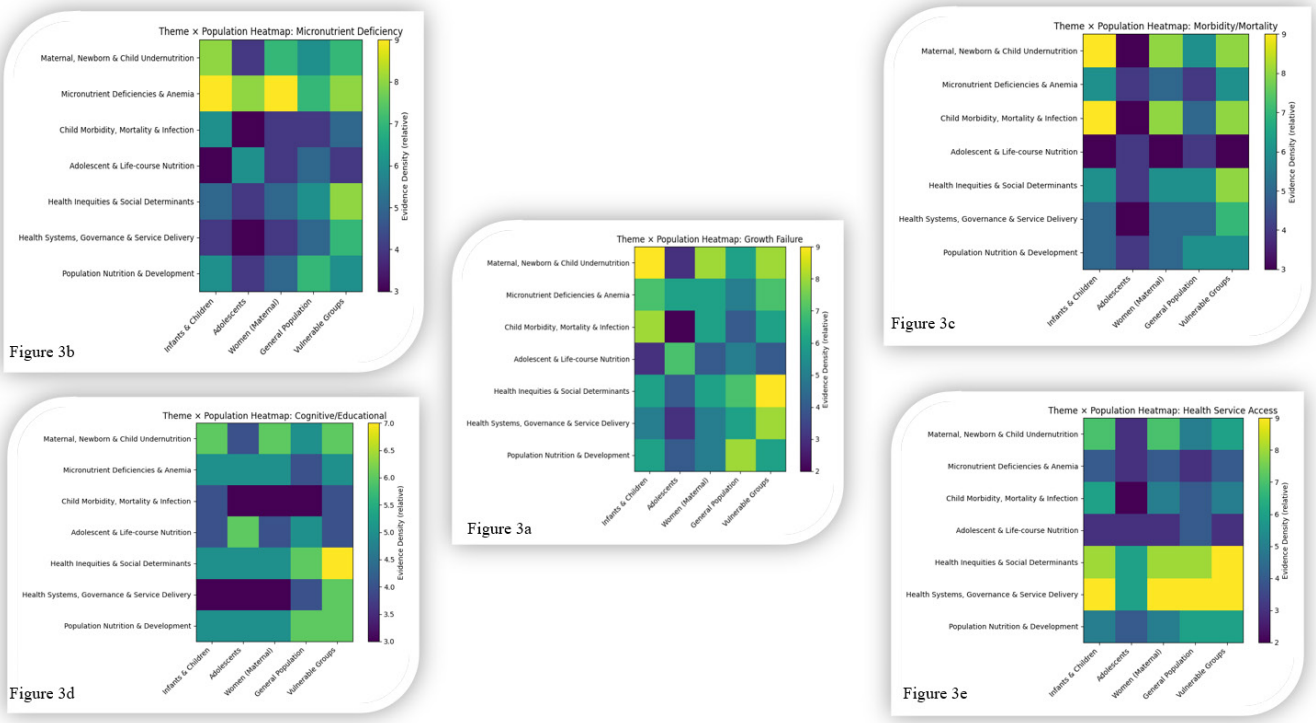

Fig. 3. Visual Evidence-Gap Heatmap for Global Nutrition Research Themes and Population