

Analysis of the scientific production of the Nutrition Course of Federal University of Mato Grosso, Brazil

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Abstract

The Nutrition course at the Federal University of Mato Grosso, Brazil, was created in 1978 and implemented in 1979, growing gradually and slowly in its early years. This study aimed to evaluate the scientific production of the course over thirty years, since its creation. Data were collected online from the Lattes curriculum of active and retired teachers of the course. The survey identified significant increase in the total number of publications during the investigated period (1981-2011). Most of the publications (52.6%) consisted of abstracts published in conference proceedings, and the period 2001-2011 showed the highest scientific production, either by diversity of type or by quantity of production. The three thematic areas that prevailed during the studied period are related to the biological nature of research in nutrition, namely Basic and Experimental Nutrition, followed by Food Science and Technology and Clinical Nutrition, the latter sharing space with the field of Nutritional Assessment of Populations. Although inserted in the national context, the results are limited to the course, and it is not possible to extrapolate them or make conclusions about them, since they are part of the historical construction of the UFMT Nutrition course. Further studies should be made considering the small number of current studies, the analysis of scientific literature and way of publications on the national context.

Key words: Scientific Production. Health and Nutrition. Publications.

Introduction

The field of Food and Nutrition occupies a prominent position in national and international agendas on human development and the ecological sustainability of the planet. In Brazil, public agenda is materialized in the latest edition of the National Food and Nutrition Policy (PNAN).^{1,2} According to these guidelines, the nutritionist is the main agent of this field. The Federal University of Mato Grosso (UFMT), since the 1970s, when the course was created, has contributed to the development of critical, seriously thoughtful, highly skilled nutritionists.

The course of Nutrition, created in 1978 and implemented in 1979, as many other courses and public institutions engaged in the Nutrition education in the country, grew gradually and slowly in the first years. This can be explained by the low number of MS or PhD degrees among professionals and teachers, in either *lato sensu* graduate course or, especially, *stricto sensu*. However, in the last thirty years, scientific production in Brazil has been increasingly fostered, which could be explained by several factors, among them the growing number of graduate programs and the resulting teaching and technical qualification of professionals in master's and doctoral levels, as well as the valuation of the graduate system, availability of funding and quality of the educational background (*curricula vitae*).^{3,4}

The Brazilian scientific output has grown remarkably in the last decades. Yearly average of indexed works in a major international bibliographic database, and whose authors and co-authors were Brazilians, increased from less than one thousand in the 1980s to nearly 6,000 in 2000.⁵ According to data from the Brazilian Academy of Sciences,⁶ in 2009, Brazil produced 32 thousand papers in scientific publications, corresponding to 54% of the Latin-American production and 2.7% of world production. Today, Brazil is in the 13rd position in the ranking of the countries with highest scientific output in the world.⁷

Scientific development in the past decades has been significantly influenced by issues of great impact to humanity, such as environmental preservation, food and energy resources, health, transport, communications, as well as improved conditions of quality of life of humans in general.⁴ The Science of Nutrition, as a multidisciplinary field, is included in this context, and its research is shared by distinct sciences and professionals.⁸ The potential growth of the area can be illustrated by the recent discussions on the strengthening of graduate programs, the increasing number of research teams and publications in the area, discussions on the scientific fields that comprise the Nutrition science and, more recently, the creation of the area of Nutrition at CAPES.^{2,9,10}

Given the circumstances, one can expect that the scientific output of the course of Nutrition of this institution has absorbed the improvements achieved in the field and that a quantitative and qualitative increase in its production, consistent with the national scenario, has occurred. However, such advances must still be disclosed and assessed.

Moreno & Márdero Arellano¹¹ underline the importance of scientific publication within the cycle of scientific knowledge, which consists of knowledge production, communication and application of the outputs. In this cycle, the scientific publication plays a key role to the extent that the dissemination of the research outputs helps building knowledge. Knowledge, on the other hand, to be consolidated depends on the dissemination and transfer of information and needs to be reviewed in an interactive process of discussion and approval by peers, which ensures reliability to the research.

According to Mueller,¹² communication is inherent to every scientific research effort and is carried out according to established practices and can be recorded in formal media, such as books, periodicals or electronic means – the scientific literature. In recent decades, the access, or the mechanisms of disclosure of such literature have been enlarged with the evolution of the web and open software.¹¹ The CAPES website, by means of thesis/dissertations database – and journals of free access – as well as the CNPq website, via the *Lattes* Platform, consist of important tools for the recognition of existing certified research groups⁹ and their products.

Recognizing the complexity of the scientific production cycle, the proposal of this work, following discussions raised by Kac et al.,⁹ is the study of the scientific output of the course of Nutrition of the Federal University of Mato Grosso – i.e., the self-recognition of its output. An examination of what has been produced will allow planning future investigations and investments, besides promoting the growth and continuous qualification of the scientific production of the course of Nutrition of UFMT, which will affect the quality of college and graduate education.

Material and methods

It is a retrospective, descriptive study of the scientific production of the course of Nutrition of UFMT in the period of 1981 to 2011. For this purpose, data on the faculty (active and non-active teachers) of the course of Nutrition/FANUT/UFMT was gathered from the records in the administrative area.

Afterwards, a survey of the scientific production of each teacher was conducted. Only the production recorded by each teacher in the curriculum of the *Lattes* Platform was considered. The search consisted of identifying each curriculum in the period of October 2013 to February 2014. Finally, the following products were defined as scientific output of interest for the present study: complete papers published in scientific journals; thesis and dissertations of the teachers' own authorship; thesis and dissertations written under their supervision and co-supervision; books and chapters of books; complete works published in conference proceedings and abstracts published in such proceedings.

Then, the scientific output was classified into 11 thematic fields of Nutrition, adapted from Vasconcelos,¹³ as follows:

- 1- Basic and Experimental Nutrition: biological and experimental trials; studies with animals; metabolism;
- 2- Food Science and Technology: chemical and bromatological analysis; chemical and nutritional composition, calories, mineral and vitamin contents in foods, foods microbiology;
- 3- Clinical Nutrition (including physiology, pathology and diet therapy): studies with humans;
- 4- Nutrition and Dietetics: dietary technique, cooking, dietetics itself;
- 5- Nutritional Assessment of Populations: use of anthropometric, clinical, laboratory, dietetic, demographic and socioeconomic methods for nutritional diagnoses of communities;
- 6- Health, Food and Nutrition Policies and Planning: policies, food and nutrition programs, and food and nutrition security;
- 7- Epidemiology: study of diseases in a population;
- 8- Determinants of Nutritional and Health Conditions of Populations: beginning, reproduction and consequences of food, nutritional and health problems in Brazil;
- 9- Food and Nutritional Education: food choices, eating behavior, promotion of health and healthy eating;
- 10- Higher Education: education and training of health professionals, assessment, access to college, teaching-learning process;
- 11- Collective Food Services: good practices, planning and administration of food services, etc.;
- 12- Others.

For the scientific papers, the following analytical categories were also defined: type of study, method and subjects.

The collected data were entered in a database prepared by the software Microsoft Office Excel 2007®. Information were analyzed descriptively, by means of frequency measures (relative and absolute).

With the purpose of supporting and contextualizing the discussions, historical data on the Course of Nutrition of UFMT was gathered from documents and semi-structured interviews with the managers of the College of Nutrition and the course coordinator.

Results and discussion

The course of Nutrition of UFMT, as many other bachelor courses, was implemented at a historical moment following the university reform in 1968, which determined the creation of new courses in all fields of knowledge, particularly where there was the smallest number of college courses. The II PRONAN (National Program of Food and Nutrition) was also determinant in this policy, considering its specific guidelines for the development and training of human resources.^{13,14}

Created, then, within the organizational and operational logic established by the university reform, since its very beginning the course undertook scientific research as part of the university goals, as set by Law no. 5.540/1968, thus considering research as an indispensable product of higher education institutions.¹⁵

In this regard, when analyzing the scientific output of the course of Nutrition of UFMT in quantitative terms, it was possible to identify an expressive increase of publications in the period under investigation (1981-2011). Although research was expressly connected with the university scope, in practice, as expected, the scientific output was slower in the decade following the creation of the course (decade of 1980), increasing in the 1990s, as shown on Figure 1.

The gradual increase of scientific production in the period of investigation coincides with the development of the course and qualification of the teachers, who achieved the *stricto sensu* degree years after having started their career.

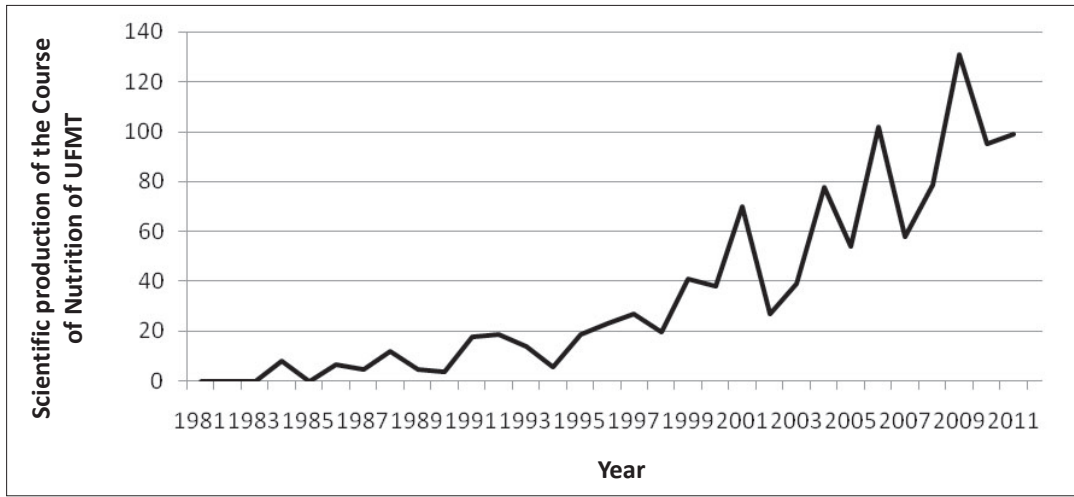


Figure 1. Scientific production of the Course of Nutrition of UFMT in the period of 1981 to 2011.

According to Kac,² the first *lato sensu* graduate courses (specializations) began in the 1960s, and the *stricto sensu* graduate courses (master's degree) in the early 1970s. From 1971 to 1991, four Master's courses and three doctoral courses were registered at CAPES, concentrated on the southeastern region of the country, and only one was found in the northeast region.²

Interestingly, the graduate Nutrition courses, because of the interdisciplinary nature of the studies developed in this area, are expanded into the most diverse areas of knowledge, allowing such professionals to achieve their qualification in the most different programs. However, the offer of graduate courses on Nutrition outside the south and southeast region is very recent, beginning in the early 2000s, along with the increased number of graduate courses, and has advanced especially with the creation of the Nutrition area at CAPES in 2006.⁹

If we consider all publications under study, we can see that most of them (52.6%) consisted of scientific abstracts published in conference proceedings, according to Figure 2. Figure 3 shows the predominance of scientific abstracts in intervals of 10 years, the period from 2001 to 2011 being the period of highest scientific production, either by typology diversity or production amount. This period coincides with the creation of the *stricto sensu* graduate program in the structure of the College of Nutrition, in 2006, enhancing the role played by the graduate programs in the development of research within the institution.

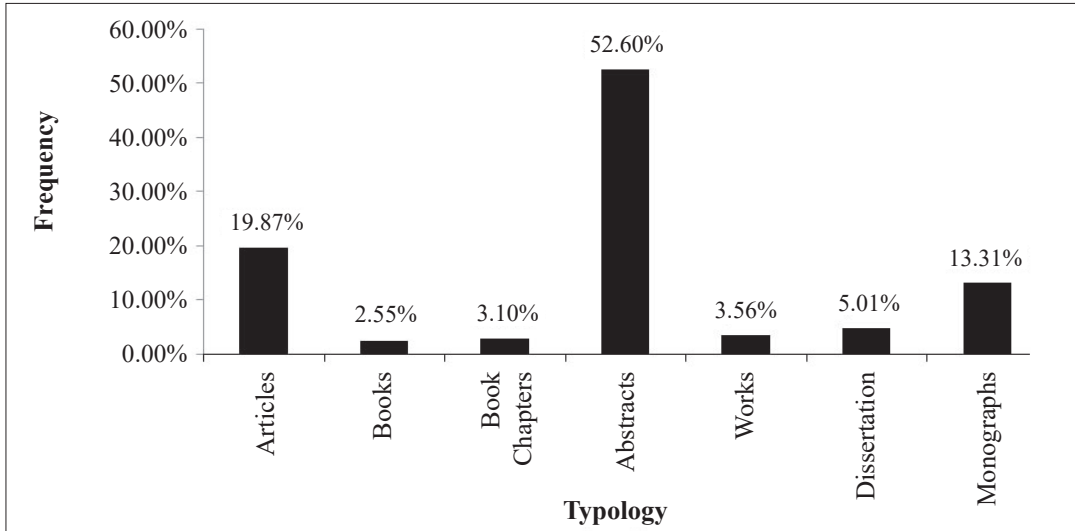


Figure 2. Frequency of the scientific production of the Course of Nutrition of UFMT in the period of 1981 to 2011, according to typology.

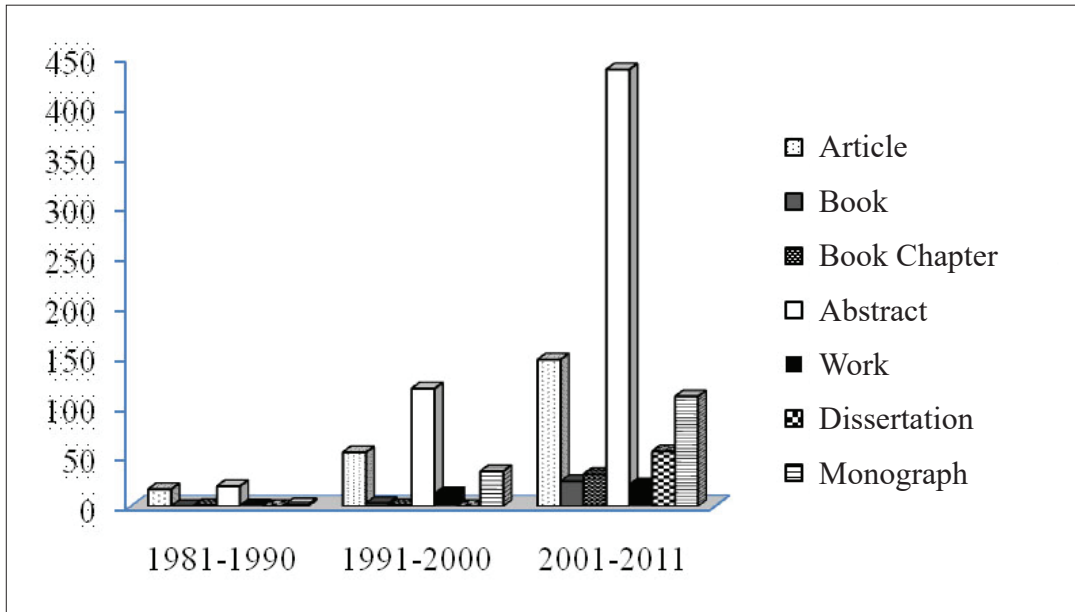


Figure 3. Scientific production of the Course of Nutrition of UFMT, according to typology, in the period from 1981 to 2011, in 10-year intervals.

When we analyze the scientific production according to thematic fields, we can see that three predominant fields in the period studied deal with the biological nature of Nutrition, namely Basic and Experimental Nutrition, followed by Food Science and Technology and Clinical Nutrition, the latter sharing space with the field of Nutritional Assessment of Populations (Figure 4). This result corroborates Vasconcelos' findings in a work published in 1999, although more than twenty years have passed since the author conducted the review on the Nutrition scientific production in specialized journals.¹⁶

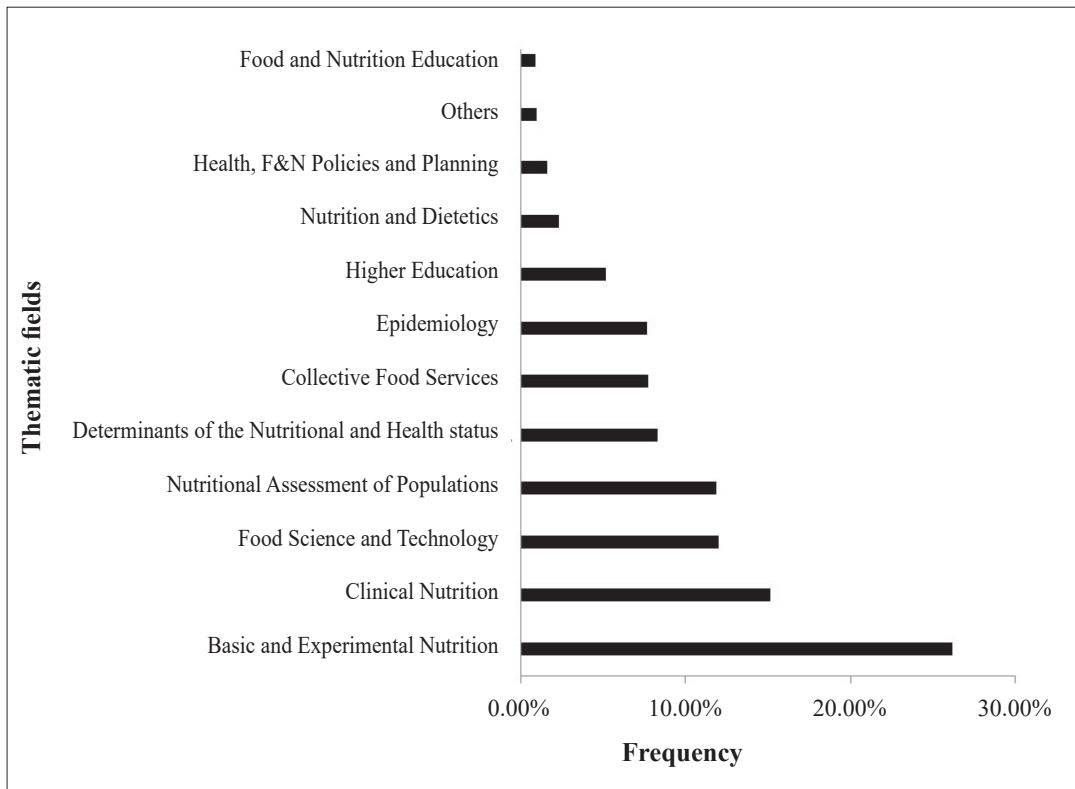


Figure 4. Distribution of the scientific production of the Course of Nutrition of UFMT according to thematic fields, from 1981 to 2011.

Although it does not allow generalizations, as the author claims,¹⁶ one can see that, with respect to the nature of the research, compared with the findings of the present study, the thematic fields under the biological perspective, concerning the scientific output of the course of Nutrition of UFMT, were created with the course. They were also influenced by historical and other circumstantial aspects of the period, having been consolidated and grown over time, sharing space with other thematic fields, especially Nutritional Assessment of Populations, as shown in Figure 5, when the frequency of publications by thematic fields was distributed in 10-year intervals.

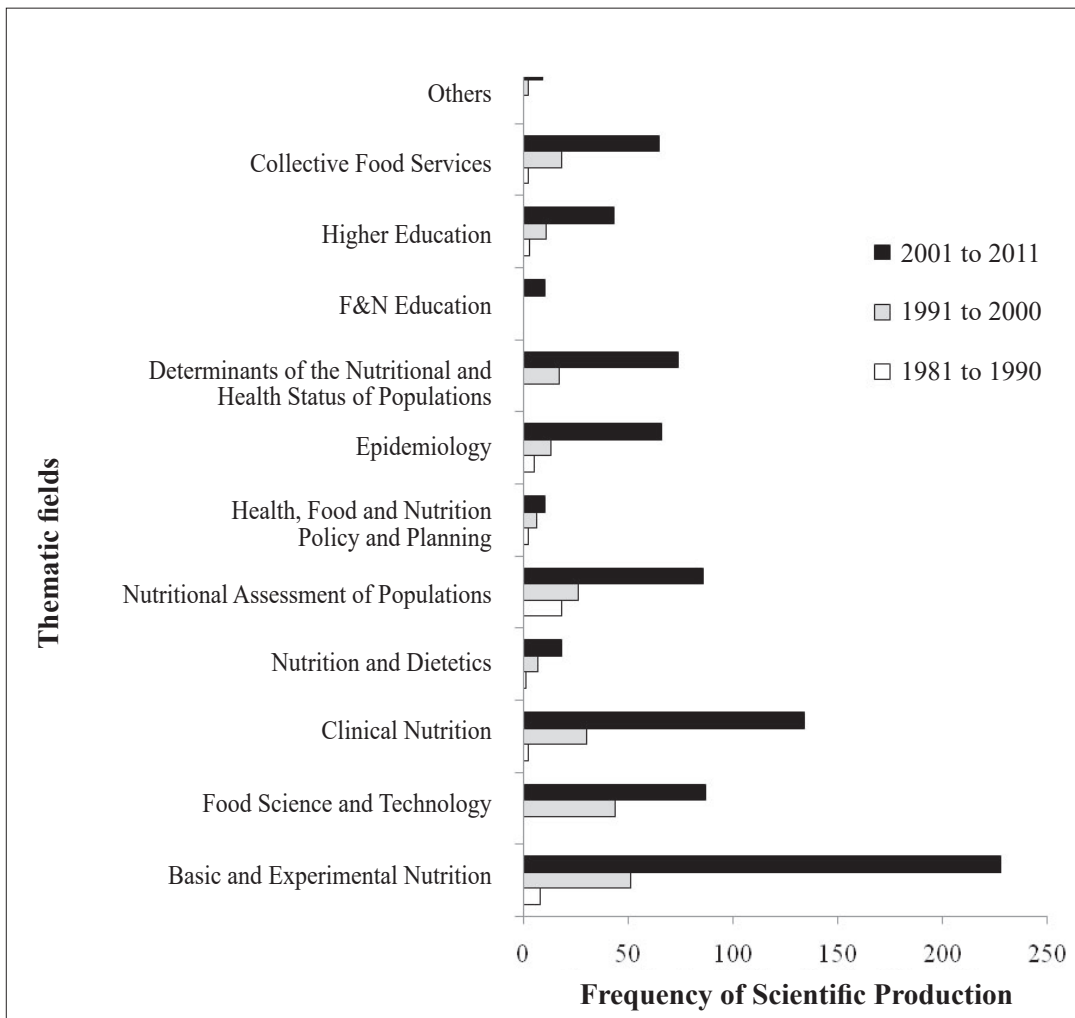


Figure 5. Scientific Production of the Course of Nutrition of UFMT according to thematic fields, from 1981 to 2011, in 10-year intervals.

A disconnection of the biological perspective from the social perspective also occurs in discussions about the nutritionists' professional education nationwide. Costa,¹⁷ in a work that investigated the studies and events that discussed the nutritionists' bachelor education since its implementation until the 1990s, reports that an "ever-present finding in events and studies on the nutritionist education is the existing 'gap between the biological and social' aspects in the college curriculum" (p. 17) (author's translation), pointing to the need for a change in the educational grid in order to deliver a professional engaged with social changes. Bosi,¹⁸ in a study that investigated the discourses on Nutrition as a science, policy and institutional discourse of the educational/certification apparatus, finds that the curriculum framework of the Nutrition courses not only prioritized the biological view of Nutrition but also influenced the dissemination of the scientific knowledge on Nutrition among the academic environment.

It is worth noting that such disconnection between the biological and social aspects and, as included by Costa,¹⁷ the technical and political aspects too, were not an exclusive experience of the higher education courses on nutrition but of all courses in the health area, taking into account the predominance of the biomedical model in the formal education.¹⁹

Still about the results described in Figure 5, they call attention to the fact of existing few researches on the thematic field of Food and Nutrition Education and Collective Food Services. We can infer from the historical context of that time, when hunger and malnutrition, the major nutritional problems, were associated with the population's low income, that nutritional education was assumed as unnecessary. Few publications on this area were found nationwide,²⁰ the same occurring in the course, as observed in the 1981-1990 period (Figure 5).

Regarding the Collective Food Service field, it calls our attention to the fact that although at the time Nutrition education was primarily focused on the planning of menus and inventory control (Food Services activities) and dietary therapy (Clinical Nutrition activity), the first coordinator of the course reported that the publications on both areas were insignificant until 2000. Specifically in the field of Collective Food Service, until now the national scientific output in the area is considered insufficient.²¹

Canella,²² in a study that assessed the Brazilian Nutrition scientific output in primary health care until 2011, also observed predominance of studies published in the last decade.

Regarding the analytical categories, the majority of the articles were original, of quantitative nature, and conducted with humans (Table 1), following the same tendency observed by Canella.²² The predominance of quantitative articles reflects what usually occurs in health-related researches, corresponding to the need to quantify events, causes and effects, many times neglecting the analysis of the complexity inherent to the phenomena related to Food and Nutrition, only possible with qualitative researches.

Table 1. Classification of the articles according to the analytical categories (N=218). Cuiabá-MT, 1981-2011.

| Analytical categories | Frequency | |
|--------------------------|-----------|-------|
| | N | (%) |
| Type of study | | |
| Original | 183 | 83.94 |
| Review | 15 | 06.88 |
| Case study | 1 | 00.46 |
| Experiment report | 3 | 01.38 |
| Not possible to identify | 16 | 07.34 |
| Method | | |
| Quantitative | 163 | 74.77 |
| Qualitative | 7 | 03.21 |
| Mixed | 1 | 00.46 |
| Not applied | 28 | 12.84 |
| Not possible to identify | 19 | 08.72 |
| Subject | | |
| Pregnant women | 2 | 00.92 |
| Children | 20 | 09.17 |
| Adolescents | 6 | 02.75 |
| Adults | 18 | 08.26 |
| Elderly | 3 | 01.38 |
| Health professionals | 2 | 00.92 |
| Mixed | 31 | 14.22 |
| Animals | 56 | 25.69 |
| Not applied | 60 | 27.52 |
| Not possible to identify | 20 | 09.17 |

The small production in the area of Social Nutrition – including studies in the thematic fields of Nutritional Assessment of Populations, Health and Nutrition Policy and Planning; Epidemiology; Determinants of the Nutritional and Health Status of Populations; and Food and Nutrition Education – may be related to the faculty curriculum of the time, more focused on the area of Food Sciences and Collective Food Services.

As observed in this study in relation to the increased scientific output over the years, we also observe a rise of Brazilian publications in the world rankings. However, through a more critical analysis, such rise, seen by Machado & Bianchetti²³ as a “consolation prize” to a teacher or researcher, is the result of a capitalist model of academic production, or academic productivism, which many times ends up (re)producing knowledge, when what is expected is just the opposite.²⁴

Research must allow teacher to be the main actor in his/her speech and contribute to society. It should consider the teacher as a “subject” and not an object or thing that is part of merely quantitative goals of scientific production. Thus, the search for knowledge, the subject’s education and training, and social transformation must be the primary focus of the academic investigation.²⁴ Therefore, an accurate assessment of an increase of scientific output should be made to avoid the risk of overvaluing quantity in detriment of quality.

An assessment of the knowledge output on institutional level, especially in developing countries, has a key role in determining the priorities in the allocation of human and material resources. Still, it consists of one of the main elements for the preparation and monitoring of national education and research policies, for allowing a situational diagnosis of the institution’s academic potential.²⁵ It allows showing how well the course has been progressing and how well it has contributed to the solution of problems related to the area of Food and Nutrition, and, as Vanti²⁶ states, how much it has succeeded in “dignifying knowledge”.

The complexity involving this kind of assessment requires attention, because, according to Oliveira et al.,²⁵ the field of Nutrition, although it consists of a single area of expertise, it covers a variety of topics as a result of various contributions derived from other fields of Science, making that the advances in research have an interdisciplinary and multi-skilled nature.

The analysis of the scientific output of the course of Nutrition of UFMT allowed us to identify the process of constitution of the field of Nutrition in the institution, as well as how the topics discussed have changed over the 30 year-period covered by this study. Although studies in the area of Nutritional Assessment of Populations and Basic and Experimental Nutrition have been leading since the beginning, in the last decade a higher expression of other thematic fields has been observed.

With regard to the reach of production, it is believed that much of what has been published did not get to the international scientific community because of the idiom of publication of most of the works.

Final considerations

Although being part of a countrywide context, the results found are restricted to the course, and it was not possible to extrapolate them or draw conclusions on the subject once they are part of the historical construction of the course of Nutrition at UFMT. Despite the limitations of the survey, the general objective of this study, i.e. showing the growth and trend of publications of the course of Nutrition of UFMT in its first thirty years of history, was attained, even though the number of works published (and conducted) would likely be higher than that observed in the present work.

Still, the study of the intellectual production of the course of Nutrition of UFMT, at the same time it provides a self-recognition of what has been produced in the period under study, it allows pointing to gaps, advances, needs for investment and planning of scientific production for the coming years. Further studies are suggested, considering the small number of studies existing today, the review of scientific production and the way of the publications in the national scenario.

References

1. Brasil. Ministério da Saúde. Política Nacional de Alimentação e Nutrição. Brasília: Ministério da Saúde; 2012.
2. Kac G, Proença RPC, Prado SD. A criação da área “nutrição” na Capes. *Rev. Nutr.* 2011; 24(6):905-916.
3. Velloso J. Mestres e doutores no país: destinos profissionais e políticas de pós-graduação. *Cad. Pesquisa* 2004; 34(123):583-611.
4. Brasil. Ministério da Educação. Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. Plano Nacional de Pós-graduação – PNPG 2011–2020. Brasília: Capes; 2010.
5. Mugnaini R, Jannuzzi PM, Quoniam L. Indicadores bibliométricos da produção científica brasileira: uma análise a partir da base Pascal. *Ci. Inf.* 2004; 33(2):123-131.
6. Academia Brasileira de Ciências. Aumento da produção científica brasileira não se reflete em maior número de patentes [Internet]. Rio de Janeiro: ABC; 2011. Acesso em: 28 mar. 2012. Disponível em: http://www.abc.org.br/article.php?id_article=1167

7. Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. Presidente da Capes participa de abertura do ano acadêmico do IOC/Fiocruz e assina acordo de cooperação [Internet]. Brasília: Assessoria de Comunicação Social da Capes; 2012. [Acesso em 28 de mar. 2012.]. Disponível em: <http://www.capes.gov.br/36-noticias/5278-presidente-da-capes-participa-de-abertura-do-ano-academico-do-iocfiocruz-e-assina-acordo-de-cooperacao>
8. Vasconcelos FAG. A ciência da nutrição em trânsito: da nutrição e dietética à nutrigenômica. *Rev. Nutr.* 2004; 23(6):935-945.
9. Kac G, Fialho E, Santos SMC, Assis AMO. Reflexões do I fórum de coordenadores de programas de pós-graduação em nutrição no Brasil. *Rev. Nutr.* 2006; 19(6):785-792.
10. Silva JK, Prado SD, Carvalho MCVS, Ornelas TFS, Oliveira PF. Alimentação e cultura como campo científico no Brasil. *Physis* 2010; 20(2):413-442.
11. Moreno FP, Márdero Arellano MÁ. Publicação científica em arquivos de acesso aberto. *Arquivística. net* 2005; 1(1):76-86.
12. Mueller SPM. O crescimento da ciência, o comportamento científico e a comunicação científica: algumas reflexões. *Rev. Esc. Bibliotecon. UFMG* 1995; 24(1):63-84.
13. Vasconcelos FAG, Calado CLA. Profissão nutricionista: 70 anos de história no Brasil. *Rev. Nutr.* 2011; 24(4): 605-617.
14. Associação Brasileira de Nutrição. Histórico do nutricionista no Brasil. 1939 a 1989. São Paulo: Atheneu; 1991. Coletânea de depoimentos e documentos.
15. Brasil. Lei nº 5.540. Fixa normas de organização e funcionamento do ensino superior e sua articulação com a escola média, e dá outras providências. 28 de nov. de 1968. *Diário Oficial da União* 29 nov. 1968, Seção 1:10369.
16. Vasconcelos FAG. Os Arquivos brasileiros de nutrição: uma revisão sobre produção científica em nutrição no Brasil (1944 a 1968). *Cad. Saúde Pública* 1999; 15(1):303-316.
17. Costa NMSC. Revisitando os estudos e eventos sobre a formação do nutricionista no Brasil. *Rev. Nutr.* 1999; 12(1):5-19.
18. Bosi MLM. A face oculta da nutrição: ciência e ideologia. Rio de Janeiro: Editora da Universidade Federal do Rio de Janeiro; 1998.
19. Amorim SP, Moreira H, Carraro TE. A formação de pediatras e nutricionistas: a dimensão humana. *Rev. Nutr.* 2011; 14(2):111-118.
20. Brasil. Ministério do Desenvolvimento Social e Combate à Fome. Marco de referência de educação alimentar e nutricional para as políticas públicas. Brasília: MDS; 2012.
21. Fonseca KZ, Santana GR. O nutricionista como promotor da saúde em unidades de alimentação e nutrição: dificuldades e desafios do fazer. *Enciclopédia Biosfera, Centro Científico Conhecer* 2011; 7(13):1466-1476.

22. Canella DS, Silva ACF, Jaime PC. Produção científica sobre nutrição no âmbito da Atenção Primária à Saúde no Brasil: uma revisão de literatura. *Ciênc. Saúde Coletiva* 2013; 18(2):297-308.
23. Machado AMN, Bianchetti L. (Des)feticização do produtivismo acadêmico: desafios para o trabalhador-pesquisador. *Revista de Administração de Empresas* 2011; 51(3):244-254.
24. Dias ED, Rorato R. O evolucionismo econômico na pós-graduação brasileira: uma análise a partir da ótica da educação. *Avaliação: Revista da Avaliação da Educação Superior* 2014; 19(1):193-226.
25. Oliveira AC, Dórea JG, Domene SMA. Bibliometria na avaliação da produção científica da área de nutrição registrada no Cíbran: período de 1984-1989. *Ci. Inf.* 1992; 21(3):239-242.
26. Vanti NAP. Da bibliometria à webometria: uma exploração conceitual dos mecanismos utilizados para medir o registro da informação e a difusão do conhecimento. *Ci. Inf.* 2002; 31(2):152-162.

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