Contributions of Women's Scientific Research in the Social Sciences: A Literature Review with Emphasis on Peru

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Abstract

This study evaluates female scientific production focused on the social sciences in Peru. The methodology used was through the PRISMA statement, 48 scientific articles published during the period 2007-2024 were evaluated, the literature review was conducted in Scopus to determine the annual growth of scientific production was calculated in a digital tool and data analysis was performed with Microsoft Office Excel, minitab 2019 and VOSviewer software. The annual growth of scientific production (2007 and 2024) was 25.5%, with 14 and 13 scientific publications in 2022 and 2023, respectively. The geographical distribution of studies per year was concentrated in the Lima region as the main center of scientific contribution, with a total of 38 articles, representing 79.17% of the total. The university with the highest scientific production in this area was the Pontificia Universidad Católica del Perú (PUCP) with a total of 25% and only 34.57% were renacyt researchers. The social sciences are clearly understudied, and policy makers have yet to take into consideration emerging disciplines that can provide an updated perspective on development policies for Peru.

Keywords: *Peru, female scientific contribution, gender gaps, public policy, public policies.*

Introduction

The contribution of scientific research at world level is one of the foundations on which integral education is based, specifically the social sciences is an important field in scientific education at world level (Rodríguez Abrahantes et al., 2016; Thuy, 2022). However, considerable advances in science and technology have been noted, the underrepresentation of women is a harsh reality worldwide, which prevents taking into account their perspectives and substantial contributions to scientific innovations (Founou et al., 2023), hindering progress in achieving the Sustainable Development Goals to reduce gender inequalities (Ojwala et al., 2024); this underrepresentation of women in science, technology, engineering and mathematics (STEM), is related to personal, family, educational, social, organizational and socioeconomic factors (Avolio et al., 2020, 2023) making it a complex and interdependent problem reflecting a significant gender gap.

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Under this general approach, seeking to reflect female representation in the field of science (Bendels, Müller, et al., 2018), they mention that the authorship indicator in scientific publications quantifies the contributions of women in science, because it is based on a hierarchical order that gives a higher reputation to first and last authorships and a lower one to co-authorships. Likewise, Bendels, Dietz, et al., (2018), point out that in all scientific disciplines, women publish fewer articles in high-impact journals, are underrepresented in productivity levels, and have a lower chance of receiving public funding, compared to men.

Research conducted on female representation in scientific disciplines, have determined that at the South American level the production of female authorship is 36. 4% and 33.1% correspond to first authorship (Bendels, Müller, et al., 2018), for example, in sciences related to the medical ones, they determine that 43% correspond to female authorship, highlighting that the gender gap in the last decade has been reduced and a further reduction is expected in the future. On the other hand, Madison & Sundell, (2024) mention that in the disciplines of education, nursing, care sciences, psychology, public health, sociology and social work, the number of publications and citations per publication of female researchers show an inversely proportional relationship with the level of productivity and performance, compared to men, i.e., the higher the level of performance the female proportion decreases, these results were associated with socio-environmental factors and psychological traits.

The representation of women researchers varies by discipline, with the highest proportion of principal authors being in Health and Public Services with 36.1%, Communication and Textual Studies with 33.7%, Psychology and Cognitive Sciences with 27.5% and Social Sciences with 23% (Chan & Torgler, 2020).

At the national level, according to the National Registry of Science, Technology and Technological Innovation (RENACYT) of the National Council for Science, Technology and Technological Innovation (CONCYTEC), as of 2023 in Peru the percentage of women in science was 32% of the total number of researchers, while worldwide they represent only 29.3%, also indicating that 40% of these researchers are dedicated to medical sciences (Concytec, 2023); However, there are no figures on the number of women dedicated to research in the field of social sciences as defined by the Organization for Economic Cooperation and Development (OECD) and their contributions are little studied and remain unquantified, being a task of public and private institutions to cover scientific knowledge and social needs (Silva et al., 2022). In this sense, the following research questions arise:

1. What will be the trend of female-authored publications in Peru?

2. What will be the distribution and collaboration of women's publications by regions of Peru?

3. What is the representativeness of female publications by Peruvian universities?

4. What will be the number of journals and number of female researchers registered in RENACYT?

Based on the above, the objective of this research was to determine the contributions of women's scientific research in the social sciences, with emphasis on Peru, because recognizing and incorporating the knowledge produced by women generates diverse perspectives that can be applied to solve the social, economic and environmental challenges that occur today.

MATERIAL AND METHODS

This study was conducted according to the preferred reporting elements for systematic reviews and meta-analyses (the PRISMA statement) (Page et al., 2021), designed to report why the research was conducted, what was done, and what was found (Migliorini et al., 2024).

Search procedure and strategy

In order to address the research objective, scientific articles were identified that explored the contribution of women in science, specifically in the field of Research and Development (OECD), focusing this analysis on the social sciences. For this purpose, we consulted the Scopus database, selected for its high quality and reliable content in the scientific community (Baas et al., 2020). The bibliographic search focused on articles whose scope of application was within the social sciences. In each search, the following inclusion criteria were rigorously applied: original research articles and reviews, articles located in the field of social science research and development, articles with female main authorship and articles with affiliation to a Peruvian institution. As well as articles published from 2007 to January 31, 2024.

Articles related to conference paper, conference review, book chapter, book, book, letter, notes, brief communication, and gray literature were excluded as they did not go through a rigorous peer review process (Adams et al., 2017). In the search matrix, the following combination of English descriptors was used to obtain a broader scope: TITLE-ABS-KEY (social AND sciences).

Selection of articles

After performing searches using the aforementioned descriptors, 211 articles were initially identified, 163 of which were excluded because they did not meet the inclusion criteria established for the development of the research. As a result, 48 articles were selected for analysis (Figure 1).
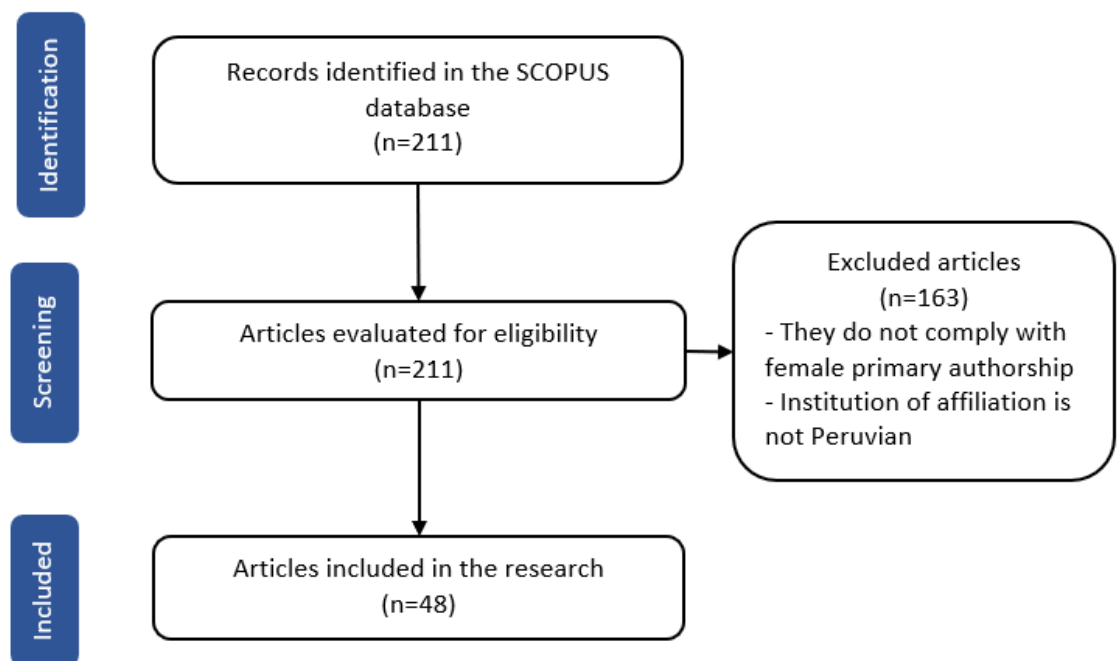

Figure 1. Flow chart for item identification.

Compound Annual Growth Rate (CAGR)

The Compound Annual Growth Rate (CAGR) used to evaluate the annual increase of a variable over a period exceeding one year (Campbell et al., 2023; Castillo & Powell, 2019). In this context, it was applied to calculate the annual growth of scientific production from 2007 to January 31, 2024, using the digital tool (Van Genuchten & Hatton, 2012), selected for its accessibility, speed and ease of use (Reategui-Inga et al., 2023).

Data analysis procedure

The bibliographic corpus was downloaded in CSV format and processed using Microsoft Office Professional Plus version 16 to analyze its distribution according to the type of article, year of publication, language and affiliations of the first author. The evolution of female scientific production distributed by regions, universities in Peru, citation analysis, types of journals was used Minitab 19 statistical software (EPN, 2019), while for the verification of female researchers registered in Renacyt was through the CONCYTEC website and to verify the number of citations per author a heat map was constructed using the "complete count" method of VOSviewer v.1.6.17 software (Van Eck and WaltmanCitation, 2010).

RESULTS AND DISCUSSION

Type of publication and publication tren

In this study, 48 scientific articles related to the social sciences were identified, which were extracted from the SCOPUS database and covered the period between 2007 and 2024. These findings provide a comprehensive overview of the scientific contribution of women in Peru. Scopus is one of the providers of publication metadata and bibliometric indicators universally used for both research evaluation practices and the advancement of academic institutions (Pranckutė, 2021).

The trend in scientific publications shows a gradual increase over the period analyzed. Between 2007 and 2021, an average of two articles were published annually. However, the exponential growth observed in the most recent years is remarkable, with a total of 14 articles published in 2022 and 13 in 2023. According to Mendoza-Chuctaya et al., (2021) this increase indicates greater participation and recognition of women researchers in the social sciences and the promotion of spaces conducive to scientific production. The increase in scientific production may be associated with the promotion of research in the social sciences by the National Program for Scientific Research and Advanced Studies - PROCIENCIA (E--, 2022). Regarding the type of publication, the equal distribution between original articles (52.08%) and review articles (47.92%) suggests that researchers are not only generating new knowledge, but also contributing to the analysis and synthesis of existing research. Review articles also help to keep researchers updated on specific topics in science (Cué et al., 2008; McMahan & McFarland, 2021). Another aspect to consider is the language of publication. Although English prevails as the dominant language with 58.33%, the significant presence of Spanish, with 41.67%, is noteworthy Mendoza-Chuctaya et al., (2021) mention that this trend represents a challenge and an opportunity, since the mastery of the English language is oriented to the internationalization of research, likewise, it is important to ensure that the findings are accessible to the local community.

Figure 2 shows the growth trend of scientific publications with female lead authorship in the last 17 years (Avolio & Chávez, 2023) affirm that Latin America has registered a positive trend with respect to women researchers in STEM (Science, Technology, Engineering and Mathematics), however, there are still enormous barriers (Family, Social, Economic, Individual) for those who wish to continue developing professionally in this

field. In relation to Peru, less than 34% of researchers dedicated to scientific production are women, existing a huge gap in the participation of women in research (Concytec, 2016). Specifically in the social sciences, only 7.7% of scientific production is focused on research in these areas (Turpo-Gebera et al., 2021).

According to the I National Census of Research and Development to Research Centers, conducted in 2016, a gender disparity is observed in various areas of the Science, Technology and Innovation (STI) field. For every female researcher in agricultural sciences, 2.2 men are registered. In the medical and health sciences, for every female researcher, there are 1.1 men. In the natural sciences, the ratio is 1.9 men for every woman researcher. Finally, in engineering and technology, the gender gap is even wider, with 4.2 men for every female researcher (Concytec, 2016).

Under this approach, a low rate of publications in the field of social sciences is evident between the years 2007 to 2021 (between 1 and 5 publications per year), and in the years 2008, 2009, 2012, 2013, 2014, 2016 no scientific publications were identified.

However, there is significant growth in the years 2022 and 2023, with 14 and 13 scientific publications, respectively. This result is consistent with the CAGR values. Taking into account the annual growth rate of 25.5%, a significant increase in the number of articles in the field of social sciences can be expected in the coming years.
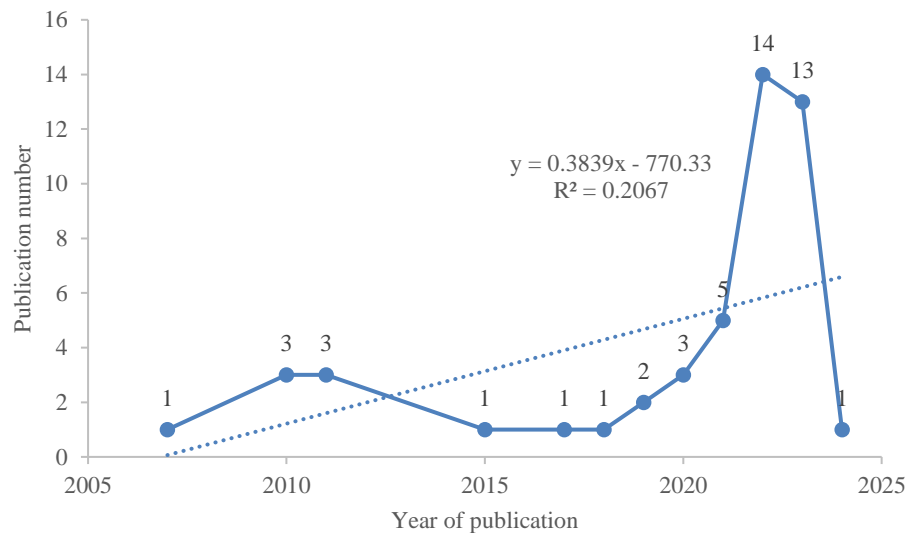

$$y = 0.3839x - 770.33$$
$$R^2 = 0.2067$$

Figure 2. Trend of growth of research articles.

Comparing these results with previous studies, a global trend towards greater inclusion and recognition of women in scientific production is evident. For Morales-Inga & Morales-Tristán, (2020) it is essential to continue addressing specific challenges that may still limit the full participation of women in research, such as institutional barriers or entrenched gender stereotypes. The growing publication trend and the diversity in types of papers underline the importance of continuing to promote scientific excellence, gender equity and the social impact of research.

Distribution and collaboration of publications by region of Peru

The regional distribution of publications on women's scientific contribution to the social sciences in Peru reveals significant patterns, with research activity centered in three main regions: Lima, Arequipa and Puno (Figure 3). Out of a total of 48 articles reviewed, 91.67% of these come from the aforementioned regions. The Lima region stands out as the main center of scientific contribution, with a total of 38 articles, representing 79.17 % of the total. Arequipa and Puno, on the other hand, each contribute 3 articles, equivalent

to 6.25% of the total number of publications. In addition, the regions of Ancash, San Martin, Lambayeque and Libertad each registered 1 article.
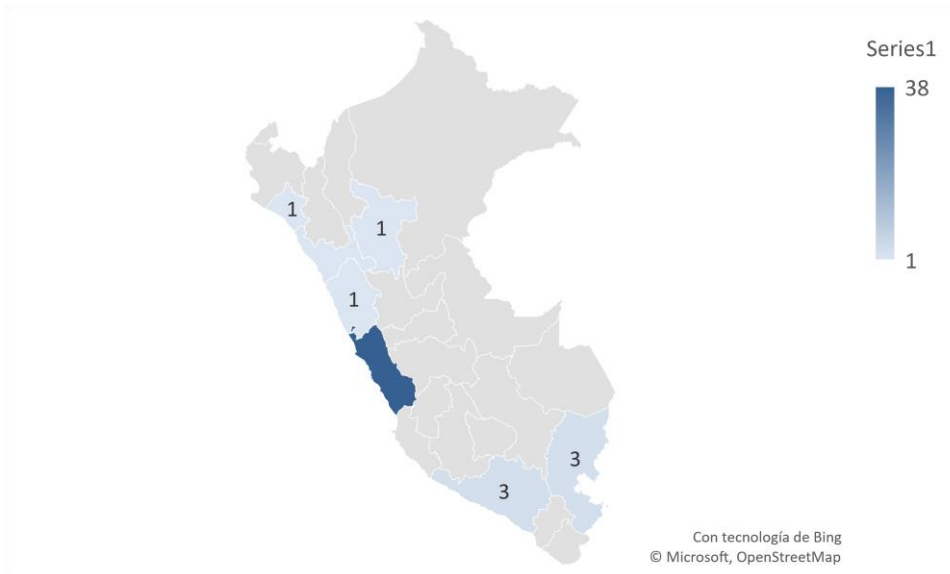

Figure 3. Main regions that recorded scientific contributions with first authorship by women

The predominance of the Lima region as a research center is not surprising, given its status as the capital and nerve center of the country, where the main educational and research institutions are concentrated. This phenomenon is consistent with what has been observed in similar studies in other contexts, where capital cities and cities with prominent universities tend to lead in scientific production (Dańska-Borsiak, 2018;Männasoo et al., 2018). The concentration of resources, infrastructure and opportunities in certain regions of Peru can largely explain the unequal distribution of scientific production.

On the other hand, Arequipa and Puno emerge as regions with notably lower contributions, each contributing 6.25% of the articles. These numbers suggest a geographic gap in female scientific research, which could be related to limitations of resources and access to research opportunities in the regions of Peru (Panihuara, 2023). It is the responsibility of regional entities including government, universities, industry, non-profit organizations, among others, to ensure that research topics are addressed that cover diverse dimensions of scientific knowledge and also meet social needs (Silva et al., 2022).

The uneven distribution of female scientific research also raises questions about interregional collaboration. It is critical to explore whether female researchers from different regions work collaboratively to address common problems or whether there is a lack of interconnectedness between academic communities (Cervantes-Liñán et al., 2020). Collaborative networking could be key to overcoming disparities and fostering a more equitable sharing of knowledge and resources.

Comparing these results with international studies, it is evident that the concentration of scientific production in capital cities or specific regions is a global phenomenon, reflecting inequalities in access to financial, human and material resources for research (Männasoo et al., 2018). Moreover, studies on women's participation in science highlight additional barriers they may face in accessing research and publication opportunities, such as gender bias and unshared care responsibilities (Arroyo-Hernández, 2022).

Publications by universities in Peru

The PUCP is one of the universities with the greatest scientific contribution in Peru, positioning itself as the second university with the greatest scientific production in 2023 with 738 documents, of which 64.9% have been published in Q1 and Q2 journals and 10.6% are in the top most cited journals. The Universidad Cesar Vallejo (UCV) is in fourth place with 687 documents; 36.2% of its production is in Q1 and Q2 journals and only 4.2% in the top most cited journals (Científica Divulga, 2023). In the context of the social sciences, the PUCP is the university with the highest scientific production in this area, with a total of 25% (12 articles), 83.33% of which have been published in journals classified as Q1, Q2 and Q3. In second place, the UCV presents 5 scientific articles, of which 80% have been published in journals classified as Q1, Q2 and Q3 and the Universidad San Ignacio de Loyola is in third place, contributing 4 scientific articles, all of them published in journals classified as Q1, Q2 and Q3. In this sense, the group of the top five institutions, both the Universidad Nacional de San Agustín de Arequipa and the Universidad Nacional del Altiplano de Puno have three papers each. It should be noted that, in all these institutions, all of the scientific articles have been published in highly ranked journals (Q1, Q2 and Q3), evidencing a commitment to quality and impact in the dissemination of research in the field of social sciences (Figure 4).
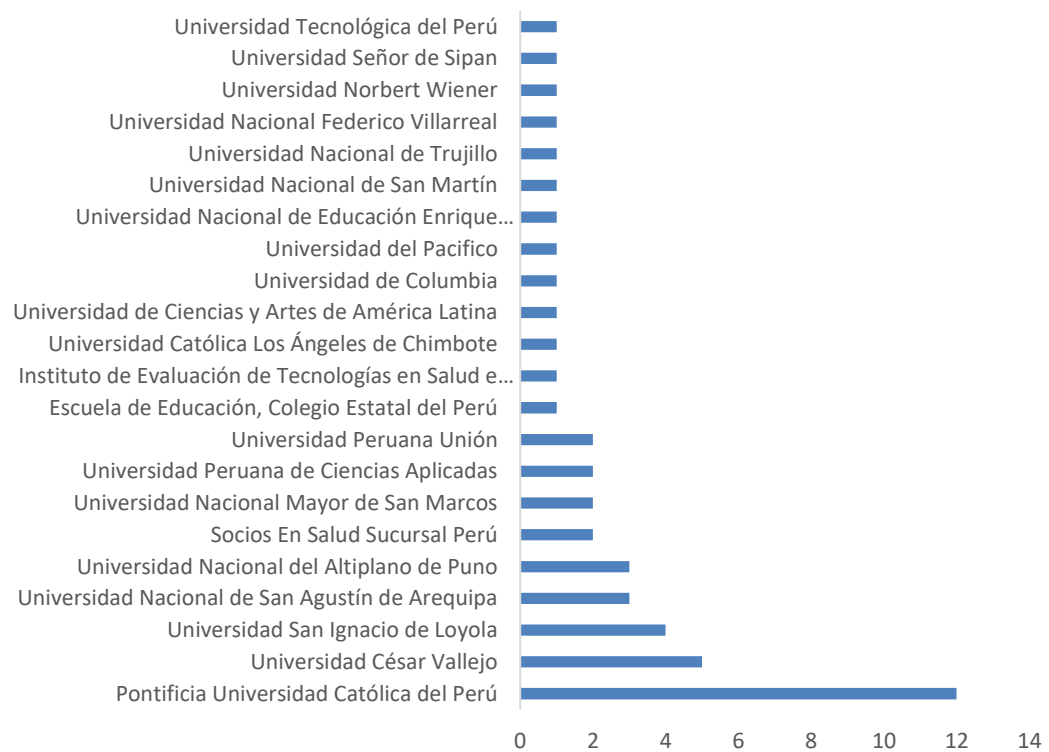

Figure 4. Universities with scientific contribution in the social sciences

PUCP reflects patterns of academic excellence in the field of social sciences (Scimago, 2023). The high percentage of publications in Q1, Q2 and Q3 ranked journals suggests an orientation towards academic excellence and a strong commitment to impactful research. This emphasis on publication quality is fundamental, given that highly ranked journals tend to have higher impact factors and offer greater visibility to research results (Rivas-Castillo & Lechuca Cardozo, 2021).

Comparing these findings with the existing literature, it is evident that while there are significant advances in female scientific production in the social sciences in Peru, there is still room for improvement in terms of inter-institutional and multidisciplinary

collaboration (Avolio, 2021). These collaborations could further enhance the quality and impact of research, extending its reach across disciplines and geographic boundaries.

Citation and productivity análisis

The bibliographic analysis carried out in Scopus made it possible to identify the number of publications and H index of the first authors of the 48 articles selected for this research, in order to measure their productivity and the impact of their publications (Figure 5). The six largest contributions by scientific publications are by i) Gallardo-Echenique, Eliana (58 articles); ii) Palacios Garay, Jessica Paola (36 articles); iii) Suyo-Vega, Josefina Amanda (35 articles); iv) Kuschel, Katherina (34 articles); v) Muñoz, Maribel (31 articles) and vi) Avolio, Beatrice (29 articles). Likewise, in terms of the H index, the highest value is for Muñoz, Maribel (15); Kuschel, Katherina (9); Suyo-Vega, Josefina Amanda and Avolio, Beatrice (8) and Tenorio-Mucha, Janeth (6); these indicators can be attributed to various factors such as the quality of the research, collaborations with other authors, the impact of the journals where they are published and academic visibility (Lois Adetunji et al., 2024).
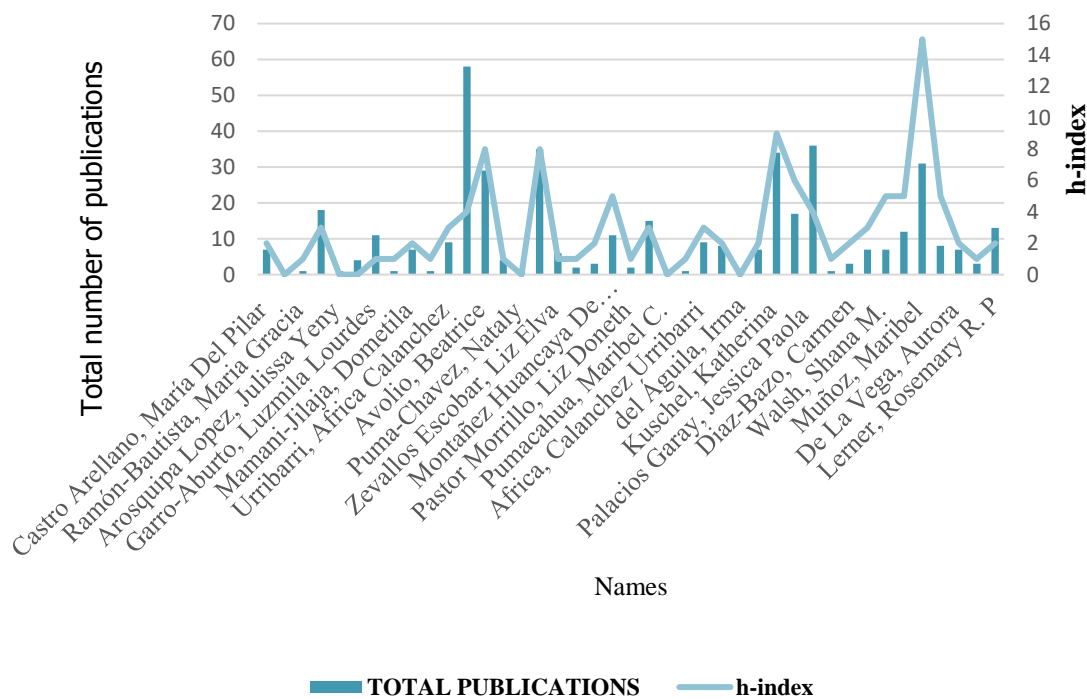

Figure 5. Number of publications and h-index of first authorship

The results obtained suggest a notable contribution of Peruvian women researchers in scientific production, standing out in various areas of study. The high number of publications and the significant H indexes of some authors reflect their dedication and the impact of their work in the academic community (Rivero-Guerra, 2021). These findings are consistent with previous studies that highlight the increasingly relevant role of women in science (Vargas et al., 2020). It is important to highlight that the presence of women in leadership positions within scientific research to promote a more inclusive and diverse environment, which in turn positively influences the quality and breadth of research conducted (Bardales & Manuel, 2021).

Likewise, the contributions of Peruvian women researchers in the field of social sciences were studied through the analysis of the first authorship of the articles. Figure 6 shows the distribution of these contributions, highlighting that Avolio, Beatrice is the author with the highest number of publications in this area, with a total of 5 articles out of a total of

29 publications (see Figure 5). On the other hand, the rest of the authors present between 1 and 2 articles related to the social sciences.
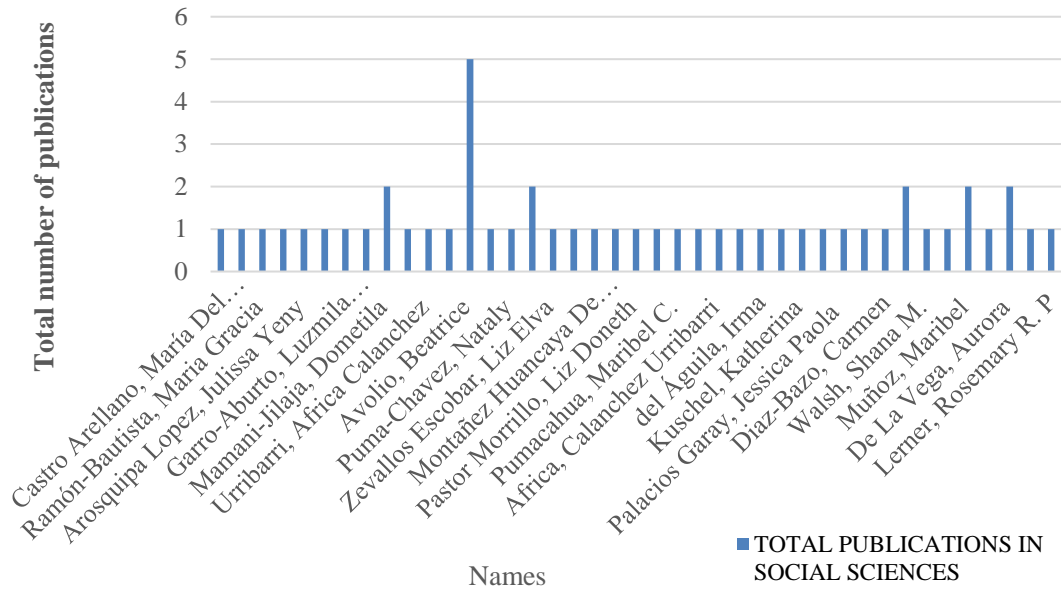

Figure 6. Total number of first authored social science publications.

The analysis of contributions in the social sciences reflects an interesting pattern in the scientific production of Peruvian women researchers. The prominent presence of Avolio, Beatrice suggests a particularly significant focus in this area by this researcher. The finding is indicative of a specialized interest or specific expertise in the social sciences on the part of Avolio, which deserves further attention and analysis to understand the implications and impact of her work in this field (Vallejo López, 2020).

On the other hand, the analysis of the number of citations per document, represented in Figure 7, reveals the most influential articles in scientific research conducted by women in Peru. It is observed that the most cited articles are those by Muñoz M. (2011, 2012), Kuschel K. (2020), Pease M.A. (2011) and Avolio B. (2020). The color density in the figure reflects the number of citations per paper, highlighting the relevance and impact of these papers in the scientific community (Garay Suárez et al., 2023).
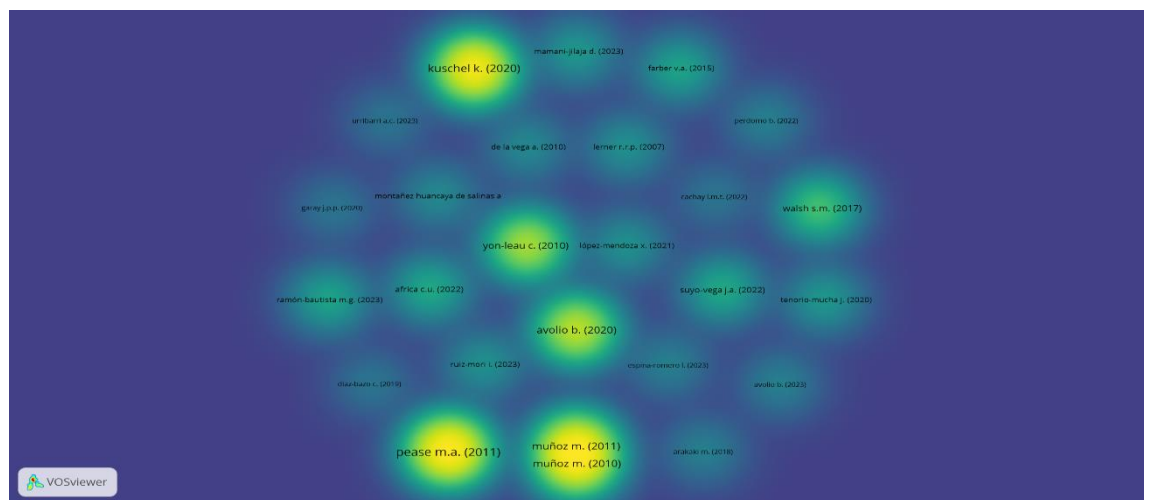

Figure 7. Number of citations per article

The identification of the most cited articles in women's scientific research in Peru provides valuable information on the predominant thematic areas and topics of interest in this field (Lois Adetunji et al., 2024). The works of Muñoz M. (2011,2012), Kuschel K. (2020), Pease M.A. (2011) and Avolio B. (2020) emerge as outstanding contributions, suggesting priority and relevant areas of study in the Peruvian context.

The fact that these articles are the most cited could indicate that they address significant problems or research questions and offer findings or insights that have had a lasting impact on the field (Gil-Quintana et al., 2023). This is consistent with previous studies suggesting that research quality and relevance are key factors influencing the number of citations an article receives (Repiso et al., 2020).

It is important to note that, among the most cited articles, a diversity of female authors is observed, suggesting that female scientific research in Peru encompasses a variety of voices and perspectives (Beizaga-Luna et al., 2022). This finding is encouraging, as it reflects the richness and breadth of the contribution of Peruvian female researchers to the production of knowledge in various fields (Livia et al., 2021).

Types of journals

The eight journals with the highest scientific production in terms of number of articles published are: i). Revista de Ciencias Sociales; ii). University and Society with 4 articles each; iii). Social Psychology of Education; iv). AIDS and Behavior; v). Global Business Review; vi). Libraries, Research Annals; vii). Revista Venezolana de Gerencia; viii). Journal of Higher Education Theory and Practice, each with 2 articles. In terms of impact factor (IF), which serves as an indicator of the relevance and influence of a journal in its field, AIDS and Behavior stands out with an impact factor of 123, being the journal with the highest IF among those mentioned. Social Psychology of Education follows with an IF of 59, indicating considerable influence in the field of social education.

Table 1. Journals with publications with female lead authorship in the social sciences.

N°	Sources	Articles	Journal Indicator	H-Index
1	Revista de Ciencias Sociales	4	Q2	18
2	Universidad y Sociedad	4	Q3*	9
3	Social Psychology of Education	2	Q1	59
4	AIDS and Behavior	2	Q1	123
5	Global Business Review	2	Q2	37
6	Bibliotecas, Anales de Investigacion	2	Q3	4
7	Revista Venezolana de Gerencia	2	Q3	13
8	Journal of Higher Education Theory and Practice	2	Q4	5
9	Dialogo Andino	1	Q1	9
10	Frontiers in Sociology	1	Q1	19
11	International Entrepreneurship and Management Journal	1	Q1	71
12	Science Education	1	Q1	127
13	Sustainability	1	Q1*	136
14	Sexuality Research and Social Policy	1	Q1	45
15	Human Studies	1	Q1	34

16	American Journal of Health Behavior	1	Q2	74
17	Journal of Entrepreneurship and Innovation in Emerging Economies	1	Q2	9
18	Journal of Women and Minorities in Science and Engineering	1	Q2	27
19	Libri	1	Q2	28
20	Migration Letters	1	Q2	18
21	Revista Espanola de Orientacion y Psicopedagogia	1	Q2	15
22	Education Sciences	1	Q2	40
23	Mundo Agrario	1	Q3	10
24	Publicaciones de la Facultad de Educacion y Humanidades del Campus de Melilla	1	Q3	9
25	Retos	1	Q3	24
26	Revista Interamericana de Bibliotecologia	1	Q3	11
27	International Journal of Learning, Teaching and Educational Research	1	Q3	13
28	Investigacion Bibliotecologica	1	Q3	11
29	Revista del Cuerpo Medico Hospital Nacional Almanzor Aguinaga Asenjo	1	Q4	5
30	Health Education and Health Promotion	1	Q4	3
31	Interdisciplinaria	1	Q4	13
32	International Journal of Business and Systems Research	1	Q4	17
33	WSEAS Transactions on Business and Economics	1	Q4	20
34	Revista Lusofona de Educacao	1	Q4	10
35	Anales de Documentacion	1	No assigned, descontinuado 2020	7
36	International Journal of Higher Education	1	No assigned, descontinuado 2020	13

* Discontinued magazines

The analysis of the journals with the highest scientific production and impact factor in Peru provides an overview of the most active and relevant research areas in the country (Acosta et al., 2020). It is essential not only to consider the quantity of publications, but also the quality and influence of research on the advancement of knowledge and the improvement of society (Chávez, 2021). Likewise, it should be noted that, although some journals may have a lower impact factor compared to others, this does not necessarily indicate a lower quality of the research published in them, since there are several factors that influence the impact of a journal such as subject category, specialty, language, target audience (Repiso et al., 2020).

Pattern of researchers registered in RENACYT

Female scientific research in Peru still faces challenges in terms of representation and recognition. According to data from the National Scientific, Technological and Technological Innovation Registry (Renacyt), women constitute 32.1% of the total number of registered researchers in the country, equivalent to 2,724 women out of a total of 8,487 researchers.

In the specific context of the social sciences, the situation is no different; of 1594 researchers registered in this area of knowledge, only 34.57% are women. This percentage reveals a notable gender inequality in this area of knowledge, which could influence the diversity of perspectives and approaches within social research (Figure 8).
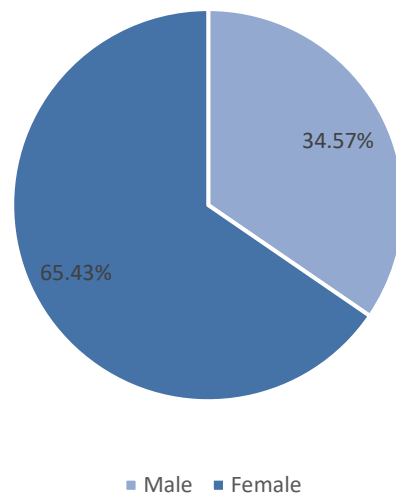

■ Male ■ Female

Figure 8. Female researchers in social sciences by gender. Adapted from Registro Nacional Científico, Tecnológico y de Innovación Tecnológica (Renacyt), January 2024.

When analyzing the participation of women in leadership roles or as principal authors in research, a relatively low representation is observed. Of the 48 female authors analyzed in this study, only 56.25% are registered in Renacyt. This suggests that a significant portion of Peruvian women researchers may not be receiving official recognition for their contribution to science. The lack of registration in Renacyt may have implications in terms of visibility, access to resources and funding opportunities for these researchers (Velasco-Meises, 2022).

The results reflect the persistence of significant challenges in terms of gender equity in the field of scientific research in Peru. The low representation of women researchers, especially in areas such as the social sciences, raises questions about the structural and cultural barriers that limit their participation and advancement in this field (Arroyo-Hernández, 2022). And although female representation in Peruvian science is in line with the world average, we lag behind compared to other Latin American countries, which reaches 45.1%, with countries such as Uruguay (49.9%), Argentina (53.1%), Venezuela (55.3%) and Trinidad and Tobago (56.5%) leading the list (Concytec, 2023). It is important to note that these figures reflect a persistent reality in which women are underrepresented in scientific research (Santin & Caregnato, 2020). Concrete policies and actions are required to address these gaps and promote greater participation and recognition of women in scientific research in the country.

Conclusions

The greatest contribution of female scientific production was during the year 2022 (registering 14 articles), with an annual growth rate of 25.5%. The highest scientific production was observed in the Lima region, as this phenomenon is consistent with the fact that the most prestigious universities are located in the capital. The PUCP is the university with the highest scientific production with a total of 25%, 83.33% of which has been published in journals classified as Q1, Q2 and Q3. In second place, UCV and San Ignacio de Loyola University are in third place. It was found that the most preferred journals are Revista de Ciencias Sociales (RCS) and Universidad y Sociedad.

Of the 48 female authors analyzed in this study, only 56.25% are registered in Renacyt. This suggests that a significant portion of Peruvian female researchers may not be receiving official recognition for their contribution to science. these numbers indicate a persistent gender gap in this field, where for every three Peruvian researchers barely one is a woman.

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