

## **PhD Theses in Chemistry: A Gender Study Covering the Year (2000-2014)**

By

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### **Abstract**

*This paper introduces an examination of the doctoral research output of a sample of 99 PhD theses which were awarded their doctorate at the Department of Chemistry, Banaras Hindu University during (2000-2014). Results show that gender equality in 99 PhD theses 62(62.63%) male and 37(37.37%) female were awarded their doctorate in Chemistry. The outcomes demonstrate more noteworthy uniformity in gender equality in the number of male and female who successfully completed their doctoral studies.*

**Keywords:** Gender equality, Higher Education, Chemistry, PhD Thesis

### **Introduction**

Gender equality is a worldwide priority for UNESCO and is inseparably linked to UNESCO's endeavors to elevate the privilege to education and support the achievement of the Education for All (EFA) and extensive development goals. Gender inequality in education takes numerous forms depending on the context. In spite of the fact that gender disparity influences girls and boys, women and men alike, girls and women are still more often disadvantaged (UNESCO: Gender equality in education). Gender equality is presently all around acknowledged just like an essential for sustainable human development. In India, even though some advancement in women's improvement has been made, women keep on lagging behind men. The unfavorable sex proportion, poor educational and nutritional status, disparity in wages and the pervasiveness of brutality against women are all pointers to the reality of glaring sex imbalances in key ranges of social, monetary and political support and basic leadership. As an outcome, the possibilities, viewpoints and commitments of one portion of the populace remain to a great extent imperceptible and unacknowledged (Center for Rural Education and Development Action). "Higher education is the threshold where future decision-makers and policymakers by and large get training and exposed to principles." (Turmaine, 2009).

## Background Information

The Department of Chemistry is one of those in couple of Departments, which were established soon after the inception of the Banaras Hindu University in 1916. Over the period, the Department has been supported under the capable guidance of the famous educationist/chemists like Prof. S. S. Bhatnagar, Prof. Bawa Kartar Singh, Prof. S. S. Joshi and Padmabhusan Prof. Gurubaksh Singh. Prof. C. N. R. Rao, Prof. V. Krishnan, Prof. J. S. Yadav, Dr. Ganesh Pandey, Prof. D. Basavaiah, Dr. Pradeep Kumar to name a few, are the alumni of this Department. The present faculty members are actively engaged, beside their teaching programme, in pursuing research in frontier areas of chemistry. As a result, during the last decade nearly 150 students were awarded Ph.D degree and around 500 research papers were published from this Department in reputed National and International Journals. To keep a pace with the advancement in frontier areas of Chemistry, our faculty members have been visiting laboratories of renowned chemists of foreign countries (USA, UK, Germany, France, Japan, Australia, Canada, Spain etc. and have collaborative projects with them. At present, there are 17 ongoing projects sponsored by different funding agencies like DST, CSIR, UGC, MHRD, DAE, DBT, DRDO, etc. with total outlay worth Rs. 3 Crore. Recognizing the research outcome, the Department has received special financial assistance under COSIST, DST-FIST and UGC-SAP(Pase I,II,III) to the tune of Rs.3.32 crore. This has helped the Department in establishing Chemistry Instrumentation Service Centre (CISC) equipped with a number of modern, sophisticated instruments which have generated funds amounting Rs.1, 28,035 during 2005-06. This has brought the Department to a level where we can venture to pursue research in frontier areas of chemistry. Research areas being pursued in the Department are mainly focused on the development of materials of technological and biological importance (<http://www.bhu.ac.in/science/chemistry/>).

## Literature Review

Jayachandran (2014) addresses the roots of gender disparity in creating nations. This paper additionally examined the several key points through which the financial advancement could enhance the relative results of women and gender orientation gaps can be decreased as nation develops. Raju (2014) considers the gender discrimination in India on the premise of

demographic, social, monetary and political setting. Further, this paper highlights few measures under taken by the International and national associations were additionally discussed in this paper. Thomas (2013) states gender based imbalance in the modern India. It enumerates a few realities and figures which representing the imbalance practiced in India and its correlation with other Asian and Western nations. Kretschmer & Kretschmer (2013) reported that gender imbalances are common in science despite numerous initiatives to attempt to eradicate them. Dandapat & Sengupta (2012) suggested that gender inequality in higher education is not one homogeneous phenomenon, but a collection of disparate and interlinked problems in our society. Das and Pathak (2013) considered the distinction amongst sex and gender was acquainted with manage the general propensity to credit women's' subordination to their life systems. Ramachandran (2010) states mainstreaming in higher education requires high-level commitment among advocates and champions at different levels in universities and institutions. Villarroya et.al. (2008) surveyed gender equality of PhD theses in Spain in the period 1990-2004. The results indicate a tendency towards greater equality in the number of male and female who have successfully completed their doctoral studies. Kabeer (2005) illustrates the concept of women's strengthening and highlights ways in which the indicators associated with this Goal, for example, education, employment, and political participation can add to it. Chanana (2004) acknowledges that Women gained access to higher education gradually during the first four decades after independence in 1947. Further, he stated that socio-cultural and economic factors acted as barriers to their ability to access higher education. Jacobs (1996) explains gender disparity in higher education should distinguish between these diverse aspects of education and should clarify those settings in which women have attained equality as well as those in which they continue to lag behind men.

## Objectives

1. To find out total number of PhD awarded in chemistry
2. To identify gender equality of research scholar
3. To identify gender equality of research supervisor
4. To explore the theses and their main areas of research.
5. To classify reference and length wise distribution of theses

## Methodology

We analyzed a sample of doctoral theses Chemistry available in Central library, Banaras Hindu University during (2000-2014). The investigator has used library catalogue as a tool for identifying this data. After gathering of information from library catalogue, it was verified by looking at individual thesis. Finally, data were compiled by the investigator for the study during (2000-2014) a total of 99 scholars received their doctorate degree in chemistry. A Sample of 99 theses were presented decade wise in below given (Table 1).

## Data Analysis

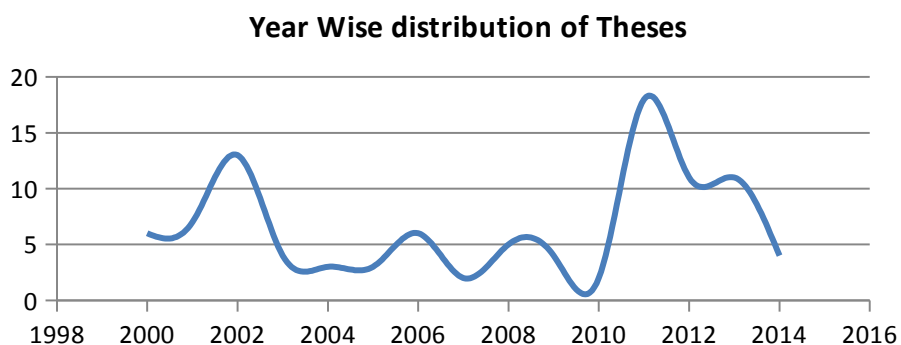
### *Year wise Distribution of Theses*

Table.1 shows year wise distribution of thesis and their percentage in chemistry. It also indicates that 2011 was more productive year (18%), followed by the other years 2002 (13%), 2012(11%) and 2013 (11%).

**Table.1: Year wise Distribution of Theses**

Year	No. of Thesis	%
2000	6	6
2001	7	7
2002	13	13
2003	4	4
2004	3	3
2005	3	3
2006	6	6
2007	2	2
2008	5	5
2009	4	4
2010	2	2
2011	18	18
2012	11	11
2013	11	11
2014	4	4
Total	99	100

Analysis shows that out of 99 PhD research scholars 62 (62.63%) male and 37(37.37%) female were awarded their doctorate in chemistry, Banaras Hindu University during (2000-2014).



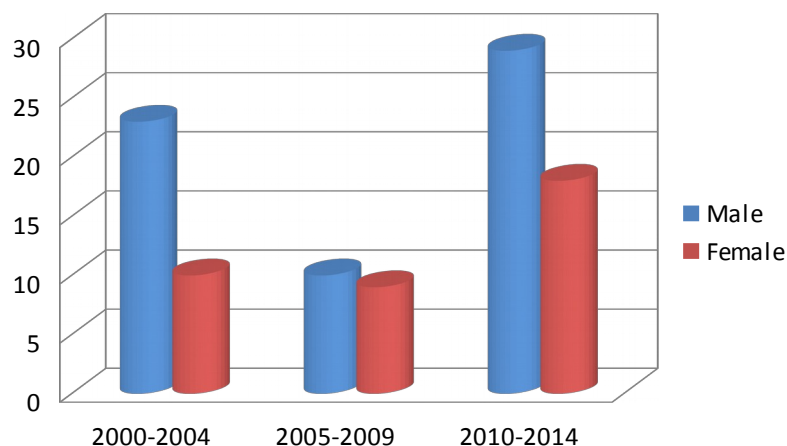
**Fig.1: Year wise distribution of Theses**

#### *Gender wise distribution of Research Scholars*

**Table.2: Gender wise distribution of Research Scholar**

Gender	2000-2004	2005-2009	2010-2014	Total	%
Male	23	10	29	62	62.63
Female	10	9	18	37	37.37
Total	33	19	47	99	100.00

Table 2 shows that the number and percentage of male research scholars 62 (62.63%) who have awarded their doctor is higher than the percentage of female research scholars 37(37.37%) for the last 15 years. However, (2010-2014) was the most prolific decade in which 29 male and 18 female research scholars who have awarded their doctoral degree.



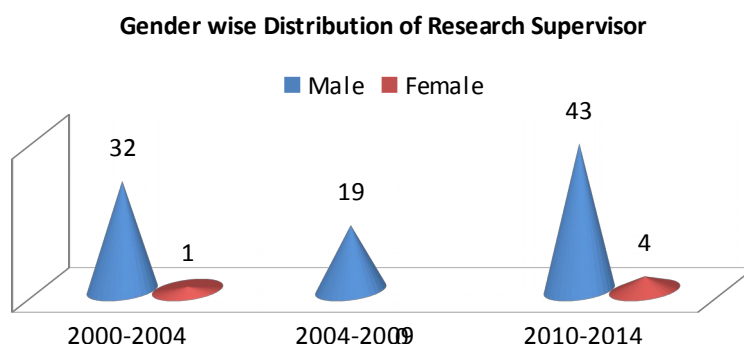
**Fig.2: Gender wise distribution of Research Scholar**

#### *Gender wise Distribution of Research Supervisors*

**Table.3: Gender wise Distribution of Research Supervisor**

Gender	2000-2004	2004-2009	2010-2014	Total	%
Male	32	19	43	94	94.95
Female	1	0	4	5	5.05
Total	33	19	47	99	100

Here, investigator has also compiled data on the gender of the research supervisor. Table 3 shows that the number and percentage of gender of research supervisor. It further, shows a clear predominance of male 94(94.95%) than female research supervisor 5(5.05%).



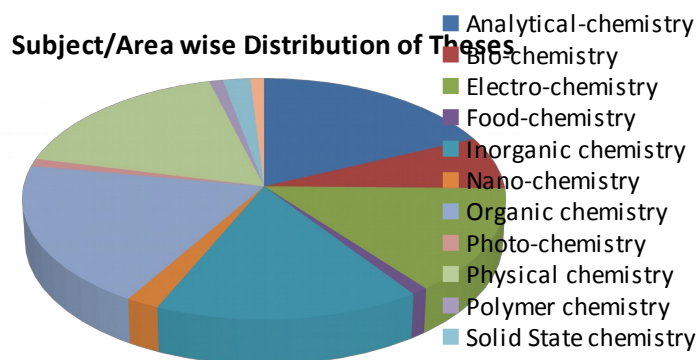
**Fig.3: Gender wise distribution of Research Supervisor**

*Subject/Area wise distribution of Theses*

**Table.4 Subject/Area wise Distribution of Theses**

Domain	No. of Thesis	%
Analytical-chemistry	18	18.18
Bio-chemistry	7	7.07
Electro-chemistry	14	14.14
Food-chemistry	1	1.01
Inorganic chemistry	16	16.16
Nano-chemistry	2	2.02
Organic chemistry	19	19.19
Photo-chemistry	1	1.01
Physical chemistry	17	17.17
Polymer chemistry	1	1.01
Solid State chemistry	2	2.02
Spectroscopy chemistry	1	1.01
Total	99	100.00

Table 4 shows that the number and percentage of theses distributed as per their subject/area of research. Out of 99 theses 19 (19.19%) fall under the category of organic chemistry, 18(18.18%) analytical-chemistry, 17(17.17%) physical-chemistry, 16(16.16%) inorganic chemistry and 14(14.14%) electro-chemistry. Though, remaining areas of study were less investigated in contrast with different areas given in the (Table 4).



**Fig.4: Subject/Area wise distribution of Thesis**

## Conclusions

In summary, Department of chemistry, Banaras Hindu University, Varanasi has chosen for conducting of research work at doctoral degree level in order to see gender equality in respective subject. Study shows that the numbers of male and female research scholars who successfully completed their doctoral are more imbalanced. However, in the case of research supervisors and research scholars, which are more dominated by male. There is more scope to conducting of research for determine the underlying imbalances between research scholar and research supervisor in the University level as well as national level. In this regards gender equality will play significant role for every spare of development. Such study will help policy maker to focus the particular area which is seen still unexplored.

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