ASSESSING THE GAP IN FEMALE AUTHORSHIP IN RADIOLOGY: Trends over the Past Two Decades

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We have nothing to disclose.
INTRODUCTION

• In the past 20 years, the number of women entering and working in the medical profession has been increasing.
  – In 2012, women made up 50% of medical school applicants, but only 34% of practicing physicians.

• However, has this growth been reflected in representation of female radiologists?
  – Criticism has recognized that females only account for roughly 22% of practicing radiologists.

Gender Trends (2012)

Medical Students
- Male: 50%
- Female: 50%

Practicing Physicians
- Male: 66%
- Female: 34%

Practicing Radiologists
- Male: 78%
- Female: 22%

Howell W. Diagnostic Imaging 2013.
AAMC 2012 Physician Specialty Data Book.
Women Physicians (2010)

Radiology: 22%
All specialties: 30.4%

AAMC 2012 Physician Specialty Data Book.

Women in Academia (2013)

Radiology: 26.9%
All specialties: 32.8%

AAMC 2013, Distribution of U.S. Medical School Faculty by Sex, Rank, and Department.
• Quantify the presence of female authorship within prominent radiology literature to determine if proportions of female authorship have changed over the past two decades.
MATERIALS & METHODS

• Conducted comprehensive online search of all articles in 1993, 2003, and 2013 from the highest Impact Factors general radiology journals (Radiology, AJR, European Radiology and Investigative Radiology)
  – Research studies, case reports, review articles and pictorial essays

• Gender of first and last authors and continent where papers were written were collected

• Exclusion criteria:
  • Uncertain genders after internet search

• Statistics analysis: chi squared test and p<0.05 significant
# RESULTS

- **3786 articles reviewed:**

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</thead>
<tbody>
<tr>
<td><strong>Radiology: First Author</strong></td>
<td>16.5</td>
<td>24.4</td>
<td>30.4</td>
<td>&lt;0.0001</td>
<td>0.0930</td>
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<td><strong>Radiology: Last Author</strong></td>
<td>12.1</td>
<td>17.1</td>
<td>19.2</td>
<td>0.0040</td>
<td>0.4887</td>
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<tr>
<td><strong>AJR: First Author</strong></td>
<td>20.7</td>
<td>25.9</td>
<td>34.8</td>
<td>&lt;0.0001</td>
<td>0.0104</td>
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<td><strong>AJR: Last Author</strong></td>
<td>17.5</td>
<td>14.1</td>
<td>23.2</td>
<td>0.0510</td>
<td>0.0016</td>
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<tr>
<td><strong>Euro Radiology: First Author</strong></td>
<td>29.1</td>
<td>15.9</td>
<td>31.6</td>
<td>0.7237</td>
<td>&lt;0.0001</td>
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<tr>
<td><strong>Euro Radiology: Last Author</strong></td>
<td>4.3</td>
<td>5.7</td>
<td>15.5</td>
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<td>0.0001</td>
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<tr>
<td><strong>Invest Rad: First Author</strong></td>
<td>21.2</td>
<td>12.0</td>
<td>29.1</td>
<td>0.1739</td>
<td>0.0330</td>
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<tr>
<td><strong>Invest Rad: Last Author</strong></td>
<td>11.7</td>
<td>3.2</td>
<td>15.6</td>
<td>0.4369</td>
<td>0.0037</td>
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<td>Indeterminate Authors (excluded)</td>
<td>10.6</td>
<td>16.1</td>
<td>12.1</td>
<td>N/A</td>
<td>N/A</td>
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RESULTS

1. Women constituted **20%** of the overall authorship:
   - 17% (1993) → 26% (2013)
2. Women constituted **25%** of first authorship:
   - 20% (1993) → 32% (2013)
3. Women constituted **15%** of last authorship:
   - 13% (1993) → 19% (2013)
DISCUSSION

1. Overall, female authorship grew proportionally with practicing female radiologists in past two decades.
   
   • Relative to overall % of practicing female radiologists,
     - % female first authors were consistently greater.
     - % female senior authors were consistently less.

   • Maintained growth of female academic radiologists, but potential lag in research supervision by lower % in senior authorship.
2. Similar studies in other medical disciplines have demonstrated comparable increases in authorship:

<table>
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<tr>
<th>Specialty</th>
<th>Percentages (%)</th>
<th>Years</th>
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<tr>
<td>ENT – first author</td>
<td>13 → 21</td>
<td>1998 to 2008</td>
</tr>
<tr>
<td>Dermatology – first author</td>
<td>12 → 48</td>
<td>1976 to 2006</td>
</tr>
<tr>
<td>Dermatology – senior author</td>
<td>6 → 31</td>
<td></td>
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<tr>
<td>Ophthalmology – first author</td>
<td>21 → 24</td>
<td>2000 to 2009</td>
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<tr>
<td>Ophthalmology – senior author</td>
<td>19 → 21</td>
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- Similar to other non-female dominated specialties, female authorship, in particular senior authorship, continues to remain a minority.

**DISCUSSION**

- **Limitations of study**
  - Four highest Impact Factor general Radiology journals based mostly in North America, thus, may not reflect global trends
  - High (Up to 16%) of indeterminate authors (especially in Asian backgrounds)
  - Only analyzed literature in 10 year increments from 1993 to 2013
  - No further analysis of radiology subspecialties
  - Positions of authors not further analyzed (e.g. academic radiologist, clinician, basic scientist..)
DISCUSSION

• Potential barriers to increase female authorship:

1. Escalation of women to senior faculty (common trend in academic medicine)
2. Stagnant growth of % female radiology residents
   • Lack of female Radiology mentors
   • Lack of Radiology undergraduate medical education:
     – Later exposure to specialty
     – Perpetuation of various misconceptions
       • Lifelong radiation exposure
       • No patient contact
       • Heavy focus on physics
Gender Trends in Radiology Residency

Males & females in Radiology Residency have equalized since ~1994!

Magrane, AAMC 2005.
CONCLUSION

• Women’s growth in overall authorship in radiology literature is proportional to their growth in the specialty, however they continue to remain a minority in senior authorship, similar to other specialties.
CONCLUSION

• Potential solutions
  – Redefining senior academic positions in radiology so that our specialty can be a leader in improving gender gap in medicine
  – Increasing medical education to ensure continuous presence of female radiologists

• Further possible research directions
  – Expand literature search to include globally based journals
  – Expand literature search further back for better assessment of longer-term trends
  – Include subspecialty analysis
  – Division of authors into clinicians or basic scientists or into levels of training
REFERENCES