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Beyond the ECG

A remote mentorship model for empowering students to undertake electrocardiology research: effects on gender equity

Ronald Hang Kin Nam* [1], Gary Tse MD PhD FRCP FFPH* [1, 2, 3, 4], Tong Liu MD PhD FESC [2], Kamalan Jeevaratnam PhD # [4], Sharen Lee MBChB # [1]

[1] Medical Education Unit, Cardiovascular Analytics Group, Hong Kong, China-UK Collaboration
[2] Tianjin Key Laboratory of Ionic-Molecular Function of Cardiovascular Disease, Department of Cardiology, Tianjin Institute of Cardiology, Second Hospital of Tianjin Medical University, Tianjin 300211, China
[3] Kent and Medway Medical School, Canterbury, United Kingdom
[4] Faculty of Health and Medical Sciences, University of Surrey, Guildford, United Kingdom

*RHKN and GT contributed equally to this paper.

Correspondence to:

Kamalan Jeevaratnam

Faculty of Health and Medical Sciences, University of Surrey, Guildford, United Kingdom

Email: drkamalanjeeva@gmail.com

Sharen Lee

Cardiovascular Analytics Group, Hong Kong, China-UK Collaboration

Email: sharen212@gmail.com

Abstract

Over the past years, there has been increasing awareness on female representation in cardiology, in particular senior academic ranks. Given the gender disparity in cardiology, female talents in cardiovascular academic medicine are significantly under-represented. In addition, whilst women have a slightly higher frequency of earning first authorships, it has been reported that women are 50% less likely to hold a senior authorship position. The drop in female representation in senior ranks of academic medicine may be contributed by a lack of female talent engagement, particularly during their early-career advancement, in high-impact journals and leadership roles. We present a remote, accessible-distributed research team model to help raise the female representation and tackle the challenges faced by female academics in the field of cardiovascular medicine. The group celebrates accessibility through open communication and collaboration, where mentees can seek research advice and ideas virtually from senior members and principal investigators. The decentralized system allows easy access for research guidance and inspirationand break down barriers in the lack of mentorship for early-career female talents. Students are empowered to lead their projects, and be involved in all phases- from the generation of study ideas to publication. The early development of holistic independent research skills equips students to become principal investigators and leaders in the future. The distributive element of the group is demonstrated through the decentralized research approach employed. Authorship is allocated based on intellectual contribution rather than on the acquisition of funding or seniority level.

Abstract

Over the past years, there has been increasing awareness on female representation in cardiology, in particular senior academic ranks. Given the gender disparity in cardiology, female talents in cardiovascular academic medicine are significantly under-represented. In addition, whilst women have a slightly higher frequency of earning first authorships, it has been reported that women are 50% less likely to hold a senior authorship position. The drop in female representation in senior ranks of academic medicine may be contributed by a lack of female talent engagement, particularly during their early-career advancement, in high-impact journals and leadership roles. We present a remote, accessible-distributed research team model to help raise the female representation and tackle the challenges faced by female academics in the field of cardiovascular medicine. The group celebrates accessibility through open communication and collaboration, where mentees can seek research advice and ideas virtually from senior members and principal investigators. The decentralized system allows easy access for research guidance and inspirationand break down barriers in the lack of mentorship for early-career female talents. Students are empowered to lead their projects, and be involved in all phases- from the generation of study ideas to publication. The early development of holistic independent research skills equips students to become principal investigators and leaders in the future. The distributive element of the group is demonstrated through the decentralized research approach employed. Authorship is allocated based on intellectual contribution rather than on the acquisition of funding or seniority level.

Introduction

Over the past years, there has been increasing awareness on female representation in cardiology, in particular senior academic ranks [1, 2]. Given the gender disparity in cardiology, female talents in cardiovascular academic medicine are significantly under-represented. In addition, whilst women have a slightly higher frequency of earning first authorships, it has been reported that women are 50% less likely to hold a senior authorship position [3]. The drop in female representation in senior ranks of academic medicine may be contributed by a lack of female talent engagement, particularly during their early-career advancement, in high-impact journals and leadership roles. In light of these findings, we present an accessible-distributed research team model to help raise the female representation and tackle the challenges faced by female academics in the field of cardiovascular medicine.

The Cardiovascular Analytics Group is an international research group that aims to promote cardiovascular academic medicine early in medical careers, as early as medical students (https://cardiovascularanalyticsgroup.co.uk). The strategy of the research team can be divided into two elements- accessible and distributed (**Figure 1**). The group celebrates accessibility through open communication and collaboration, where mentees can seek research advice and ideas virtually from senior members and principal investigators. The decentralized system allows easy access for research guidance and inspiration, hence able to raise the interest of females in cardiovascular academic medicine, and break down barriers in the lack of mentorship for early-career female talents. The cumulative number of female mentees who joined Cardiovascular Analytics Group since its conception is shown in **Figure 2**. Students are empowered to lead their projects, and be involved in all phases- from study idea generation, data collection and analysis, to manuscript writing and submission. The early development of holistic independent research skills equips students to become principal investigators and leaders in the future.

The distributive element of the group is demonstrated through the decentralized research approach employed. Differ from the conventional approach of the principal researcher executing all elements of the project, the decentralized approach involves different talents at different aspects of the project, such as analysis and writing. Authorship is allocated based on intellectual contribution rather than on the acquisition of funding or seniority level. The distributed workload of the project increases the flexibility of individual involvement, which encourages the engagement of female talents. Furthermore, it increases the efficiency and productivity of the research group, hence promotes early career development and advancement into leadership roles.

The female-empowering effects of the accessible-distributed research team model are supported by evidence [4]. A member of the team (SL), who was new to academic medicine when she joined the team four years ago, now has an H-index of 11 with more than 60 publications, over 15 first/ co-first authorships on original research and systematic review articles published in peer-reviewed journals as a final year medical student. Notably, she has over five published papers as a corresponding or co-corresponding author. She has been leading junior mentees as a senior author of upcoming manuscripts from the team. She currently leads the International Brugada Electrocardiographic Indices Consortium comprising of investigators from more than 21 countries, which has published several articles on risk stratification in Brugada syndrome [5, 6]. She is also an active member of the International Society of Electrocardiology-Young Community, where she is involved in international research efforts on topics such as Coronavirus Disease- 2019 (COVID-19) [7, 8]. In the past six years, our research platform has mentored more than 110 members from all over the world (n=16 countries), most of whom are undergraduates when they enrolled into our mentorship programme. From these efforts, 109 unique publications were published, in which 52 female researchers have published as one of the the key authorship positions, defined as first author, co-first author, co-corresponding author or last author (**Figure 3)**.

Therefore, through the development of independent research skills and promotion of early-career leadership in female talents, the accessible-distributed research team model helps to raise the female representation in academic cardiovascular medicine.

Competing interests

None.

Contributorship

GT, RHKN, TL, KJ, SL: study conception, supervision, drafting and critical revision of manuscript

GT, RHKN: figure preparation

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Ethics and Ethics committee approval

N/A.

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Figures

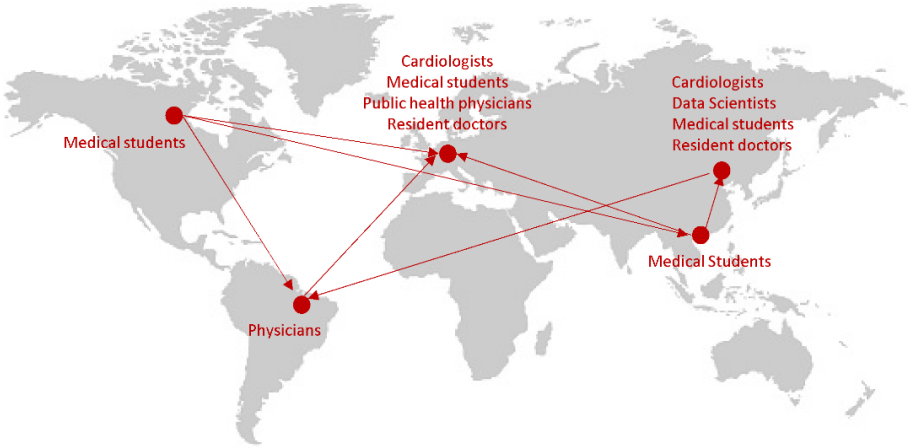

Figure 1. Distributed global network of junior and senior investigators (*top panel*). Accessibility is enhanced by interactions between group members and principal investigators (*bottom panel*). This

system allows gender equity to be achieved by breaking down institutional barriers and provides support and opportunities for students with no prior experience to enter cardiovascular research.

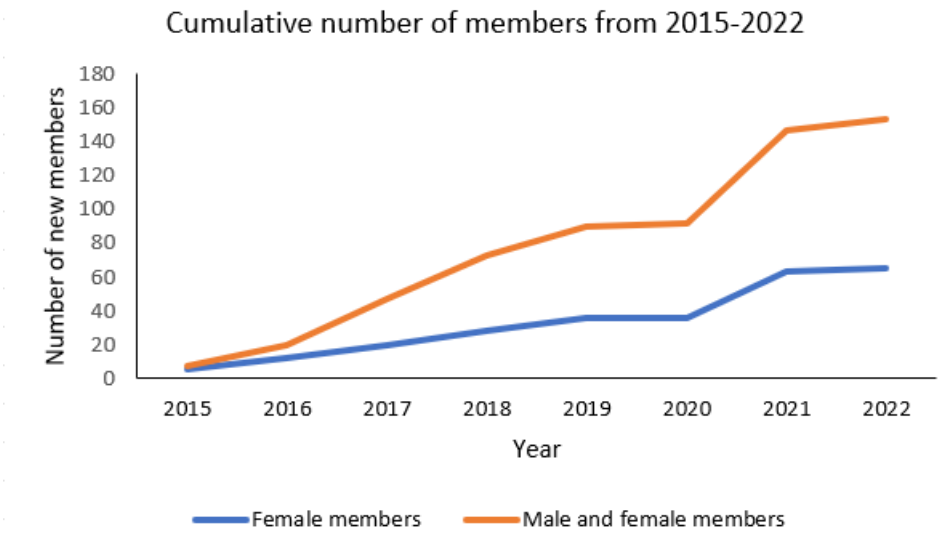

Figure 2. The cumulative number of members between 2016 and 2022.

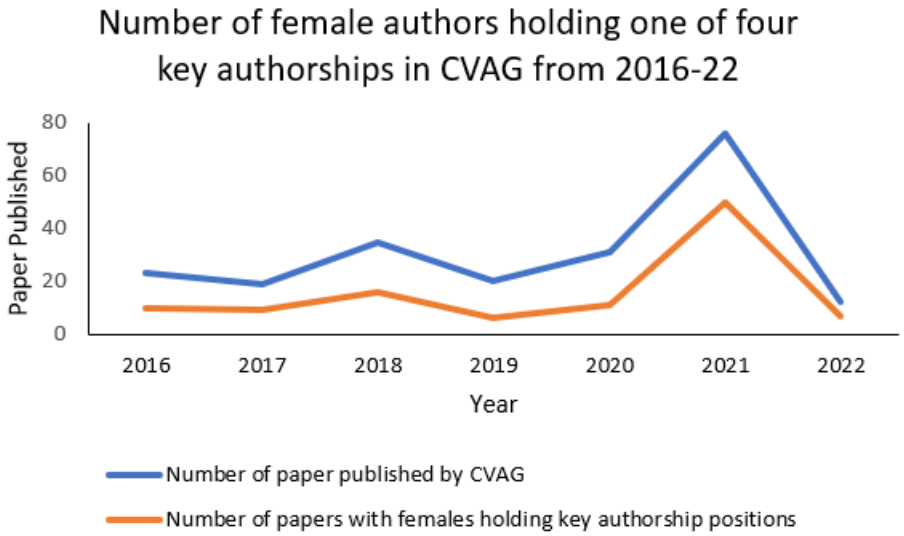

Figure 3. The number of female authors holding one of four key authorships in CVAG between 2016 and 2022.