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# Scientific medical conferences can be easily modified to improve female inclusion: a prospective study

Women remain starkly under-represented in senior medical faculty positions despite representing half of undergraduates in medicine for longer than should have been necessary to correct this imbalance.[1] 35% of consultants in Endocrinology in the UK are women, and gender parity is seen at training (registrar) grades (43% women, 57% men), making it an apposite speciality in which to examine under-representation of women in medicine.[2] Medical and scientific conferences are important platforms for clinicians and academics to increase their professional visibility.[3]

We investigated female participation at the UK Society for Endocrinology's (SfE) annual national conference, the SfE BES. We quantitively (number and duration) and qualitatively (language and style) analysed 444 questions and comments from 43 sessions at the 2017 SfE BES and 419 questions from 32 sessions at the 2018 SfE BES, using transcribed audio recordings of the audience participation at the conferences. For the 2018 conference, we carried out an intervention intended to improve female inclusion. A single email was sent to the conference organising team requesting them to invite more female society members to chair sessions (sessions have two chairs who field or encourage questions), and a single email to all invited chairs reminding them to offer the opening question to a female audience member if there is the option to do so. The SfE included a written statement in the 2018 delegate pack informing that it was supporting a study to improve inclusion at the conference, but no further details were known to the delegates. We also undertook a web-based survey of society members' opinions about audience participation at the SfE BES conference after the 2017 event and undertook a Focus Group of interested delegates at the 2018 event. Full details of the methods and analyses are provided in the appendix (pp 2–4).

1098 delegates attended SfE BES in 2017, of whom 516 (47%) were women. In 2018, 962 delegates attended and 481 (50%) were women. In 2017, 25% of the sessions were directly observed, which confirmed that most sessions were attended by similar numbers of male and female delegates, and that there was no relation between the gender of those asking questions and audience composition. 944 (86%) of 1098 delegates were from the UK, 66 (6%) from Europe, and 88 (8%) were from the rest of the world.

Despite this gender-balanced delegacy, we found that women asked fewer questions at both the 2017 and 2018 conferences. In 2017, 24% of all questions and comments at the conference were from women, and 48% of these questions were from session chairs. Only 30% of questions from men were from session chairs. Thus, even with a gender-balanced audience, women are less likely than men to ask a question (odds ratio [OR] 1·71, 95% CI 1·30–2·26, p<0·0001), and women in the audience are least likely to ask a question (figure A, B). Participation increased with age for both men and women, but given that, in 2017, 217 (42%) of 516 female delegates were at consultant or professorial grade (compared with 363 [62%] of 582 male delegates), differences in seniority are unlikely to account for the lower female contribution (figure C). Questions and comments from men were also significantly longer than from women (figure D), lasting a median of 21 s (IQR 10–31) compared with 15 s (IQR 8–21) for women (p=0·0009). Questions from men lasted a combined total of 2 h and 54 mins, and 56 min for women, during the entire duration of both conferences. In 2017, 59 (10·1%) of 582 men and only 19 (3·7%) of 516 women spoke for more than 60 s.

As a result of our intervention, in 2018, there were more sessions with at least one woman in a chair position (20 [47%] of 43 sessions were male-only chaired in 2017, compared with 11 [34%] of 32 sessions in 2018). In 2018, the proportion of questions from women (35%) was significantly greater than in 2017 (24%; OR 1·80, 95% CI 1·23–1·86, p<0·001). The proportion of questions from women coming from session chairs did not change between 2017 (48%) and 2018 (45%). Thus, based on these observations, we suggest that more female chairs resulted in an increase in female audience questions (figure B). Most of our data were collected from audio transcripts, but it would be interesting for future studies to observe whether female chairs are more likely to offer the microphone to a female audience member when a male and female questioner both raise their hands at the same time.

In sessions with male-only chairs, 9% of questions were from female audience members. Conversely, in sessions with female-only chairs, 29% of questions were from female audience members. Including both audience members and the chairs themselves, 57% of all questions in these female-only chaired sessions were from women.

These data suggest that increasing the number or visibility of female chairs increases the number of questions from women. We also investigated whether an opening question coming from a woman increases the chances of subsequent questions in that session coming from other women. We found that 76% of first questions in the sessions we studied were from a man (audience member or chair). If the first question in a session was from a man, the second question was

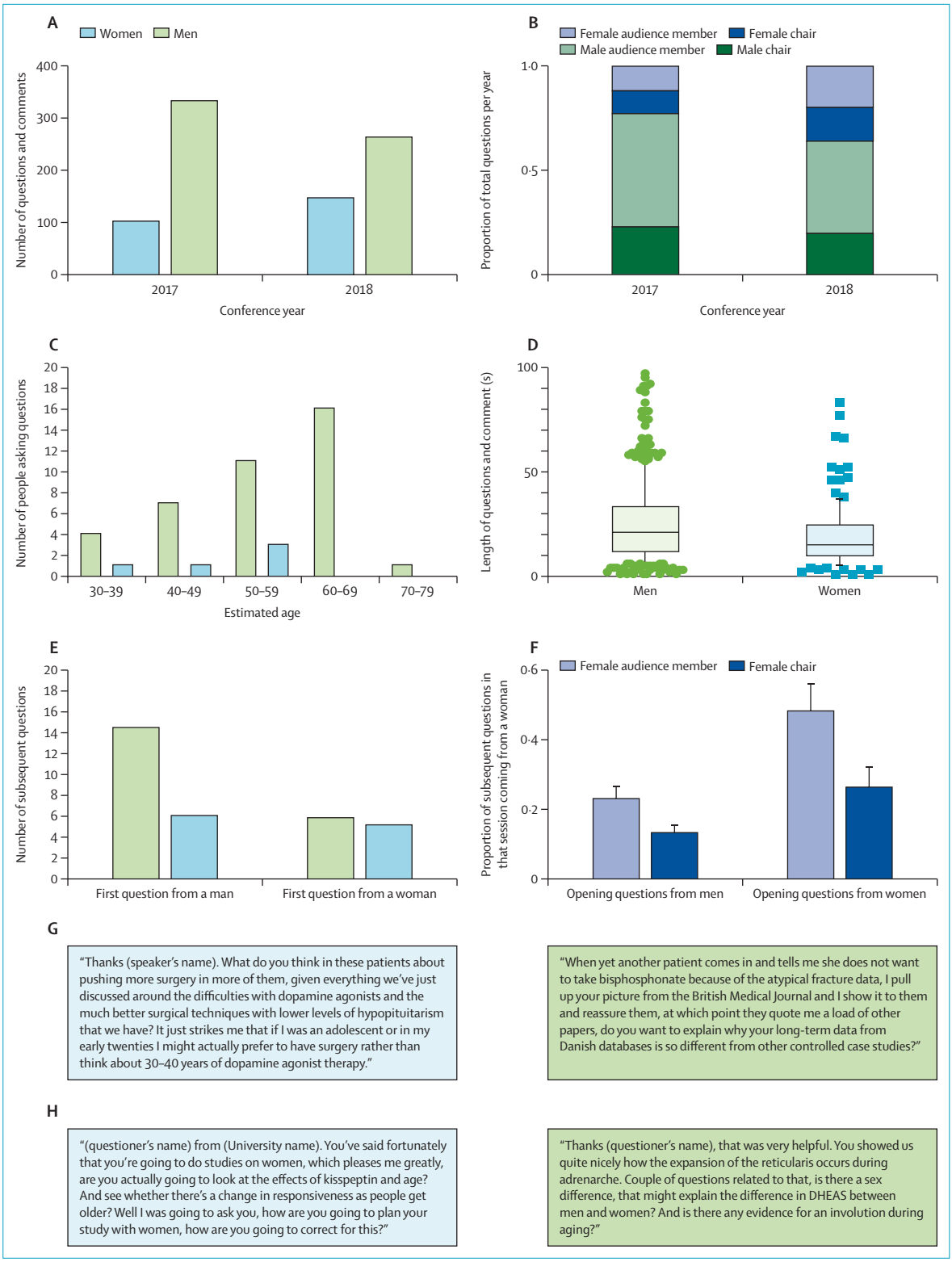


***Figure*: Quantitative and qualitative analysis of audience interaction at the UK's leading medical and scientific conference for endocrinologists (SfE BES)**
(A) Total questions by gender during 2017 and 2018 (conference delegacy was gender balanced in both years). (B) Proportions of all questions asked per year by audience member or session chair separated by conference year and sex. (C) Age of audience members asking questions over 11 sessions at the 2017 conference was estimated by an investigator. (D) The length of audience questions was measured in seconds and represented by sex ($p<0·001$). (E) The number of subsequent questions in a session from men or women stratified by whether the opening question in a session was from a man or a woman ($p<0·01$). (F) For each session (in 2017 and in 2018) the proportion of subsequent questions from women in that session is aggregated according to whether the opening question in that session was from a man or a woman. This is further split by whether the subsequent questions were from a female audience member or female chair. (G) and (H) Exemplar quotes highlighting the difference in female (blue) and male (green) language when asking questions at a medical or scientific conference.

from a man 86% of the time (with only 9% of second questions coming from a woman in the audience); if the first question was from a woman, 50% of second questions were from women (22% of these from a female audience member; figure E). Thus, an opening question coming from a woman significantly increases the likelihood of subsequent questions in that session coming from a (different) woman (OR 4·36, 95% CI 1·45–13·48, p=0·02; figure F).

The SfE BES attracts both clinicians and basic scientists with an interest in endocrinology. In 2018, the proportion of questions from women in clinical or career development sessions was 32%, which was not significantly higher than the 28% observed in the scientific sessions. This finding suggests that the conference atmosphere in general, and not the subject of the discourse, inhibits women from speaking up. Our findings, which were consistent across session type (clinical, basic science, and early career), could be generalised to other medical and scientific meetings.[4,5]

Although session type does not affect the likelihood of women asking a question, the qualitative analysis of a transcript of all questions revealed gendered differences in style and content (appendix p 5). 11·4% of questions from a female audience were blindly judged to be expressively empathic (compared with 2·6% from an audience of men) and women tended to raise specific patient experiences (figure G). Tailoring and delivering talks with a more empathetic tone to better engage women might be possible. Women also tended to specifically ask about the gendered implications of the data (figure H). This supports encouraging greater diversity in senior academic positions as a means of counteracting historical biases in biomedical research.[6] Finally, although 11·7% of questions from men opened with a statement of scientific fact, only 3·8% of all questions from women did (RR 3·05, 95% CI 1·70–5·78, p=0·0001). This finding might reflect reluctance in women to speak up authoritatively in public arenas, a phenomenon that has been described elsewhere,[7] which might be driven by several factors, including self-confidence and lower societal tolerance of assertive behaviour from women.

We sent an online survey to gather perceptions of SfE members regarding audience participation at BES, and received responses from 35 members, of whom 19 (54%) were men and 16 (46%) were women (appendix pp 6–7). These society members unanimously reported perceiving that junior delegates were particularly disempowered from asking questions at the conference. However, 10 (29%) respondents reported perceiving that questions at the SfE BES conference were either gender balanced or more commonly were from women. This suggests that awareness needs to be raised in both men and women regarding under-representation of women at scientific conferences.

Looking at the free-text comments, a perception was noted that academia was dominated by experienced older men who have more confidence to use questions to showcase their knowledge and work. Both men and women reported thinking that women could step-up and ask more questions. However, barriers to female (clinical) academic progression are both intrinsic[8] (confidence, ambition, work–life balance) and extrinsic (sexism, culture, and the workplace).[8] Organisational changes that support women to achieve their career goals are as important as encouraging women to self-promote.[9]

To the best of our knowledge, this is the first study of audience participation at a UK medical conference, and suggests an interventional effect to improve female inclusion. These findings should be considered in the future planning of academic conferences. If women are not visible at conferences, they cannot act as role models for junior academics, creating a self-perpetuating cycle.[1,8] In the future, it will be important to understand what interventions might positively affect participation among other under-represented groups. In highlighting the differences in question style at the conference, we also highlight the need for all delegates to be mindful of how they can best support inclusivity across the medical and scientific culture.

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