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Good practice or positive action? Using Q methodology to identify competing views on improving gender equality in academic medicine

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Good practice or positive action? Using Q methodology to identify competing views on improving gender equality in academic medicine

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ABSTRACT

Objectives: The number of women entering medicine has increased significantly in recent years yet women are still under-represented at a senior level in academic medicine. To support one School of Medicine's gender equality action plan, this study sought to identify the range of viewpoints held by academics on how to address gender inequality.

Design: Q methodology. 50 potential interventions representing good practice or positive action, and addressing cultural, organisational and individual barriers to gender equality, were ranked by participants according to their perception of priority.

Setting: A large medical school in the UK

Participants: 55 staff members were purposively sampled to represent gender and academic pay grade.

Results: Principal components analysis identified six competing viewpoints on how to address gender inequality. Four viewpoints favoured positive action interventions to 1) Support careers of women with childcare commitments, 2) Support progression of women into leadership roles rather than focus on women with children, 3) Support careers of all women rather than just those aiming for leadership, 4) Drive change for women via high level financial and strategic initiatives. Two viewpoints favoured good practice with no specific focus on women by 5) Recognising merit irrespective of gender, and 6) Improving existing career development practice for all. No viewpoint was strongly associated with gender, pay grade, or role, however latent class analysis identified that female staff were more likely than men to prioritise the setting of equality targets. Attitudinal barriers to some initiatives were identified and it was clear that not all staff supported positive action approaches.

Conclusions: The findings and the approach have utility for those involved in gender equality work in other medical and academic institutions. However, the impact of such initiatives needs to be evaluated in the longer term.

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Strengths and limitations of this study

- The first ever study to apply Q methodology to the area of gender inequality in Medical Schools.
- Q methodology is an ideal approach to evidencing the range of views on gender inequality in the academic workplace, which are already known to be multiple and contested.
- The inclusion of latent class analysis strengthened the Q methodology findings by providing further insight into where key differences about gender equality initiatives lie.
- The research was limited to one (large) medical school and additional viewpoints may exist in other institutions.
- As a qualitative approach Q methodology describes the nature and landscape of viewpoints rather than their prevalence in the population.

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Improving gender equality in academic medicine: A Q methodology study of staff viewpoints on 'good practice' versus positive action

INTRODUCTION

Women remain underrepresented at senior levels in virtually all levels of academic medicine.(1, 2) For example, fewer than 20% of Clinical Academic Professors in the UK are female, compared with 41% of Clinical Lecturers,(3) evidence of what has been called the 'leaky pipeline'.(4) Women also tend to progress through pay grades more slowly than men and are paid less than men overall.(5) There are significant female attrition rates in particular specialisms such as academic surgery.(6) It is likely that many women's career choices in medicine and medical research reflect constraints attributable to an accumulation of gendered disadvantage, both perceived and actual.(7, 8)

Few women in academic medicine report overt gender discrimination but more women than men perceive inequities in promotion, salary, access to resources, and fellowship opportunities.(7) Women are less likely to report a sense of belonging in medical academia and are less confident about their career advancement than men.(9) Although some argue that female academic clinicians make an active choice to prioritise family over career, women report being as eager as men to assume leadership positions.(9, 10)

This waste of female academic talent is widely acknowledged as a concern.(11, 12) The Athena SWAN initiative was launched in the UK in 2005 to accelerate change and advance the careers of women in STEMM (Science, Technology, Engineering, Maths and Medicine) higher education and research. This initiative has gained momentum in UK medical schools since achievement of Silver chartered status ("a significant record of activity and achievement by the institution in promoting gender equality"(13)), became a prerequisite for government funding for Biomedical Research Centres.(14)

This study was undertaken in 2014 as part of a strategy for achieving gender equality in one UK medical school. The aim of the study was to provide evidence to inform the development and implementation of an action plan to address gender equality challenges in the school. This study had two objectives; firstly to identify staff priorities and attitudes towards gender equality interventions in the workplace and secondly to identify barriers and facilitators to implementing these interventions.

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METHODS

Materials and Methods

Q methodology is designed to explore diversity of understanding and actively facilitate the expression of competing equivalent stories about a socially available topic. (15, 16) It is a sensitive method for exploring tension between socially acceptable views and personal beliefs and values.(17) These inherent qualities made Q methodology an ideal approach to explore views on gender equality initiatives and positive action in the workplace, initiatives which are known to be debated and contested.(18)

Q methodology starts from the assumption that for each social topic, for example gender equality in the workplace, there is a 'flow of communicability' called the concourse.(19) The concourse consists of the things that are written or said about a topic that can be "socially contested, argued about and debated…. matters of values and beliefs".(17) The Q method requires participants to consider and respond to a set of pre-defined statements sampled from the concourse (called the Q set) using a ranking technique called Q sorting.

The method is concerned with the relationships between individuals' views as expressed in their Q sorts and uses factor analytic techniques to identify how viewpoints cluster together.(20) The techniques used are an inversion of the usual factor analytic approach because the participants are the variables central to the factoring process rather than the items in the Q set. The pattern of statement placement for each factor is interpreted qualitatively and a narrative is created that represents a distinct point of view on the topic under study.

Developing the Q set

For this study the concourse was defined as interventions which had already been tried or suggested as ways to address gender inequality in academic medicine and related STEM disciplines. Candidate interventions were identified from a review of the academic and grey literature on gender equality interventions in the workplace, which was not confined to the UK. From this review 154 candidate interventions were initially identified. In a series of research meetings these interventions were organised using a framework that categorised interventions along two dimensions that had emerged from a detailed reading of the concourse materials. The first dimension was *intervention target* (good practice or positive

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action): the target of good practice interventions was all staff members (equal treatment) whereas the target of positive action interventions was specifically women.(21) The second dimension was *intervention level* (individual, organisational, or cultural), which was informed by other multi-level approaches to change implementation.(22, 23) See Table 1 for examples of interventions categorised using the framework. Following an iterative 'select and review' process, 50 items considered qualitatively representative of the concourse formed the final Q set (see Figure 1).

Participant sample

We anticipated that respondents' opinions would be influenced by experience in their current academic department, by gender and by pay grade and therefore sampled academic staff members purposively to ensure diversity of viewpoint. Key members of the school's Athena SWAN teams were asked to identify members of staff in their Institutes across gender, pay grade and potential diversity of viewpoint. In addition, members of the School Executive were invited to take part. Only two of those invited declined to participate. Fifty-five members of staff participated (31 women, 24 men) see **Error! Reference source not found.**. Ages ranged between 27 and 63 years (mean 45 years).

Ethical approval

This research received ethical approval from the Ethics Committee at the host institution (SoMREC/13/062). Informed written consent was gained from all participants.

Procedure

Data collection took place between April and June 2014. Each participant completed their Q sort individually, in a one-to-one or a small group setting. Data collection was carried out by a researcher not employed within the School of Medicine. The interventions were presented to participants on a set of numbered cards, shuffled prior to administration. Verbal instructions about how to complete the Q-sorting were given:

> *"Please read each card in turn. For each intervention, please consider how important you think it is for promoting gender equality in the School of Medicine"*

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In a series of steps, participants ranked the interventions according to their priority (most important (1) to least important (9)) on to a grid of the form of a quasi-normal distribution. Participants were asked to provide written statements about the reasons for their choices at both extremes of the grid and this information was used to inform interpretation.

Analysis

Principal Components Analysis

Principal Components Analysis (PCA) with Varimax rotation was used to identify relationships between individual Q sorts. The Q sort data were managed and analysed using dedicated software package PQMethod Version 2.1.(24) Each principal component (from now on referred to as a factor) represents a highly inter-correlated cluster of Q sorts; that is a set of items sorted in a statistically similar way that reflects a distinct point of view on action to reduce gender inequality in the participant's workplace. During the Varimax rotation, established strategies were employed to identify the maximum number of interpretable and distinct viewpoints to take forward for interpretation.(25) A weighted averaging formula was applied to exemplar Q sorts to create a composite 'idealised' Q sort to represent each factor (see Figure 1). Exemplar Q sorts are those which load significantly at $p < 0.01$ on one factor only and therefore best exemplify the viewpoint represented by the factor.

The interpretation of the unique configuration of statements for each factor requires a considered synthesis of the quantitative and qualitative data collected during the process. The information produced by PQMethod is used to inform the first level of interpretation: highest and lowest scores assigned to particular statements are considered first, as are statements statistically distinguishing for that factor at $p < 0.01$. Subsequently, a deeper level of interpretation takes place, whereby the whole Q sort is considered holistically along with qualitative information provided by the participants. The output of the interpretation phase is a narrative account, or 'best possible theoretical explanation' of the factor.(25) Initial Q factor analysis was conducted by the lead author, followed by iterations of different factor solutions, each discussed with co-authors to maintain transparency of the interpretation process and keep interpretation close to the data.

Latent class analysis

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Latent class analysis (LCA), a statistical modelling tool widely used for market segmentation, was used to identify whether any discernible pattern in statement placement was associated with participant characteristics, for example, gender or academic role. This was implemented by use of the poLCA library within R statistical software; mathematical details are provided elsewhere.(26)

Results

A six-factor solution produced the best fit for the data in terms of providing the maximum number of distinct interpretable viewpoints. Each factor had at least three exemplar Q sorts loading highly and significantly at $p < 0.01$ on that factor only; considered sufficient for further interpretation.(20) These six factors together represented 51% of the total explained variance. The following factor interpretations are illustrated using anonymised written comments made by participants in relation to the placing of specific items. After each comment the participant number and the number of the Q item referenced in the comment are given.

FACTOR 1: Prioritise interventions to support research careers of women with childcare commitments

The Q sorts of nine participants exemplified Factor 1 (six women, three men). Ages ranged from 30 to 54 years. Seven worked at assistant professor level or lower, three worked part time, six had caring responsibilities. All but one had line management responsibilities, only one had clinical responsibilities.

In this viewpoint, family responsibilities have the most significant impact on a woman's career development. High priority interventions are therefore ones that address this.

> *"Family responsibilities fall disproportionately on women. Reducing the inevitable stress of dealing with family life and the conflicting requirements of work/family can only mean less stressed, more organised and thoughtful employees" (*p19:7)

Interventions of high priority include a mix of best practice and positive action: clearer endorsement of flexible working patterns for all parents, action to reduce the gendered pay gap, and financial and administrative initiatives to support research after maternity leave or a career break. Positive action to increase numbers of women in senior decision-making roles is seen as a priority to improve representation of the issues which affect other women.

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Lowest priority interventions are those aimed at culture change via raising the profile of women, for example, the promotion of female role models via an Athena SWAN website. Interventions aimed purely at the individual level only (women-only social media networks) are viewed to have little material impact on the working environment and are essentially "window" activities (p54:35), distracting resources away from more important activities:

> *"Staff with family commitments are already under time pressure to be successful. ….. I would not prioritise my time at work to look at websites/emails/social media"* (p32:15)

FACTOR 2: Prioritise positive action to get more women into leadership

The Q sorts of three participants exemplified Factor 2 (two men, one woman). Ages ranged from 40 to 61 years. All worked full-time, one had caring responsibilities. Two were full Professors and one was an Assistant Professor. All line-managed staff and two had clinical responsibilities.

This view prioritises high level interventions to increase the number of senior women in positions of influence and leadership. Setting targets, for example in terms of the number of women at Chair level "*are essential otherwise there is no way to measure impact*" (p9:49). High priority interventions are those which encourage women to achieve excellence as currently defined ("*we shouldn't lower the standards for women*" p3:17) but focus on accelerating change. Supporting those women who want to achieve seniority is a priority, for example appointing advisors to women aiming for promotion. There is a need to understand why eligible women are less likely than men to apply for promotion at senior level.

> *"We must know why women drop out of academia……. this knowledge can be used to inform policy to enhance/improve promotion of women to Chairs" (p9:41)*

Interventions aimed specifically at supporting women with young children are considered to represent a stereotypical view of gender inequality. As they will not activate high level change they were ranked as lowest priority. For similar reasons, activities aimed at women on an individual level, such as personal development training and women-only events are low priority.

FACTOR 3: Prioritise the career development of all women, not just those aiming for the top

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The Q sorts of six participants exemplified Factor 3 (four men, two women). Ages ranged from 40 to 61 years. Three had caring responsibilities. One participant did not provide further personal details but of the remaining five, all worked full-time, four worked at Associate Professor or full Professor grade, three had line management responsibilities and five had clinical responsibilities.

In this view, and in contrast to Factor 2, the equality agenda places too much emphasis on supporting women aiming for leadership. Interventions should be a combination of positive action to support women's careers and good practice to develop all staff. It is essential to change organisational systems and practices that maintain gender inequality; otherwise all other interventions aimed at the individual level will be inconsequential. High priority interventions are those that benefit all women, for example formal mentoring arrangements, access to flexible working, reviewing current promotional criteria that value 'male' over 'female' working styles and traditional linear career trajectories. A priority is financial investment such as funding to support research after maternity leave. In contrast to Factors 1 and 2, it is considered important to raise the profile of women as part of changing organisational culture, for example by funding a high-profile website.

> *'Exceptional women have always reached the top* [but] *we need positive role models to show women academics that senior posts are for women like them.* (p76:40)

Lowest priority interventions are measures just for women aiming for leadership, for example senior women's networks. Setting targets, for example in terms of the number of women at Chair level, was also low priority partly because targets are seen as tokenistic but also potentially disadvantageous to the institution in light of initiatives like Athens SWAN –

"What would happen if the target was not reached?" (p37:49).

FACTOR 4: Prioritise leadership responsibility for driving change

The Q sorts of seven participants exemplified Factor 4 (six women, one man). Ages ranged from 45 to 60 years. All worked full-time, four had caring responsibilities. Four were Associate Professors and three were full Professors. All had line management responsibilities and four had clinical responsibilities.

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According to this view, significant steps such as eliminating the gender pay gap will only happen if those in leadership roles take responsibility for driving change. High priority interventions are therefore those that represent positive action at an organisational level.

> "*High level, central* [University] *support would send a meaningful signal - I like the idea of* [gender equality] *'champions'*" (p4:43).

As in Factor 2, increasing the promotion of women to Chair is a priority and must be accelerated. In contrast to Factor 2 and in line with Factor 3, current standards of excellence are seen as gendered and act to maintain inequality because they disadvantage working styles more frequently found in women than men.

> *"Plenty of research suggests women are more likely to work collaboratively and include citizenship and teaching.* [Make] *sure these are rewarded in promotions criteria"* (p69:14)

Lowest priority interventions are those to support men with families and those which impact a minority of women, such as facilities for storing breast milk at work.

FACTOR 5: Prioritise interventions that recognise merit irrespective of gender

The Q sorts of five participants exemplified Factor 5 (four men, one woman). Ages ranged from 27 to 62 years. All exemplars worked full-time and one had caring responsibilities; four were Associate Professor or Professor grade, four had clinical responsibilities and two had line management responsibilities.

According to this viewpoint merit should be judged irrespective of gender: positive action discriminates against men and is patronising to women.

> *"Any incentive that is based on gender alone unjustly discriminates against men. This could lead to talented and hardworking male academics being unfairly bypassed for promotion in favour of women"* (p47:25)

Promotion, selection for leadership training, or invitation to join a committee should be entirely down to merit. The best way to support the career development of women is to prioritise interventions that benefit all staff, for example gender blinding when shortlisting for interviews and training managers in equality and

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diversity issues. Staff should feel free to identify who they want – and if they want - to seek mentoring from rather than having formal schemes for women. Senior staff talking to colleagues about how they balance work and home life may help women identify whether or not they want to seek promotion.

Lowest priority interventions are those associated with setting "artificial" equality targets; these are positive discrimination and may not result in improved outcomes for women. Resources should not be put into initiatives aiming to benefit women only and top down directives are not the best ways to enact culture change.

> *"Setting targets is unlikely to promote equality. Many* [women] *may feel they have only been chosen because of the target and not because they deserve to be there". (p15:46)*

FACTOR 6: Prioritise good practice in line management and career development

The Q sorts of five participants (three men, two women) exemplified Factor 6. Ages ranged from 47 to 53 years. All worked full-time, one had caring responsibilities. Four were Associate Professor or Professor pay grade. Three had line management responsibilities and four had clinical responsibilities.

In this view achieving gender equality can be best achieved by improving existing practice such as ensuring compliance with annual staff reviews rather than new initiatives. This approach benefits all staff not just women. For example, managers need guidance on how to help people maintain a research trajectory following a career break.

> *"This will benefit women and men. Poor management and leadership is a leading cause of dissatisfaction. Women are often reluctant to bring up or challenge problems caused by this, or to insist their manager help with their career development." (25:4)*

It is a priority to have someone at a senior level in each department responsible for implementing existing good practice. Low priority interventions include those which change current practice, e.g. gender blinding at interviews or having core meeting times to support those who work part-time or flexibly.

> *"I don't think this would have much impact. More staff would find a regular slot much easier"* (p35:18)

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PCA did not find any participant characteristics obviously aligned with any particular viewpoint although Factor 1 included all the participants who worked part-time and those participants were all women. LCA analysis was therefore employed to identify any significant latent relationships between gender and the placing of specific statements.

Latent class analysis (LCA) by gender

Only the most discriminating Q items were retained in the LCA model to avoid overfitting. The statements discriminating most by gender were items 36, 45, 46 and 49 (see Table 3); there were no interpretable results using other participant characteristics. For each participant values were assigned to each of these items using their placement on the Q sorting grid: low, medium or high priority.

A satisfactory fit of the multi-group model was achieved using two classes regressed upon gender. The probability of a participant being in Class 1 opposed to Class 2 was provided by a logistic regression. The odds ratio for female gender being in Class 2 was 3.56 with a 95% confidence interval (0.94, 13.46) indicating that female participants were more likely to place the discriminating items in the pattern seen for Class 2 than for Class 1, and vice versa for men. The class frequencies are given in Table 3. Overall, women were more likely than men to give high priority to interventions related to setting 'hard' equality targets. Women were less likely to give high priority to the development of an 'Athena SWAN' website when compared to men.

Discussion

This study had two objectives: [i] identify different staff viewpoints on the prioritisation of a range of gender equality interventions in the workplace and [ii] identify barriers and facilitators to implementing these interventions. A key finding of our research was the strong divergence in views as to whether good practice or positive action was the most appropriate strategy for achieving gender equality. While all viewpoints prioritised some positive action interventions (interventions to support women) as well as good practice initiatives (interventions to support all staff), the balance of these approaches and the strength of the favoured positive action initiatives varied greatly. No viewpoint identified via the Q factor analysis was

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clearly associated with any participant characteristic although latent class analysis suggested that men may be less likely than women to be in favour of setting 'hard' positive action targets.

Factor 5 represents the strongest rejection of positive action, seeing it as a form of social engineering that will undermine the meritocratic principles of academic institutions. In this view, positive action is considered a means to advance less academically excellent women over academically excellent men. Women deserve fair treatment but not favoured access to career development initiatives. Factor 6 also favoured good practice with a focus on improving existing management practice to ensure women and men are treated equally. The favouring of good practice interventions supports the idea that universities are meritocracies. Yet research suggests that both women and men who are affiliated with an organisation espousing meritocratic values, such as 'excellence', are likely to manifest bias towards men in appointment or promotion panels.(27) It has been argued elsewhere that 'excellence', as the new keyword in Higher Education (28), is not a gender-neutral marker of merit.(29, 30) In this study, Factor 4 agreed that assessment of excellence was gendered; for example promotions criteria were seen to be biased toward individual 'masculine' leadership styles over collaborative 'feminine' styles.

The commonest reason given for women not progressing into senior posts is the negative impact on career progression caused by the bearing and raising of children - the so-called 'motherhood penalty'.(31) Factor 1 endorsed this as the main obstacle to career progression, and prioritised support for flexible working and other initiatives to meet the needs of staff with young children. In contrast, Factor 4 viewed the focus on women with children as a distraction from the main issue of a gender power imbalance. Initiatives to support women with young families are less controversial in the workplace than quotas or equality targets; most universities support flexible working and other 'family friendly' initiatives. It has been argued, however, that a focus on these policies can in fact strengthen the expectation that women undertake a disproportionate amount of caring work in families.(32) Family friendly policies do not help challenge attitudes, which women may also internalise, that mothers are less competent academics or medics, are less committed to their careers and are less suited to leadership positions than men.(33)

Implications for gender equality work in medical schools

As our School's Athena SWAN work has developed, the initiatives have been evaluated using our framework to ensure that as many different priorities as possible are addressed. For example, to address

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Factor 1 concerns about the impact of childbearing on career the School has implemented a popular bursary scheme to support the academic trajectory of those taking a period of maternity or adoption leave. We have also set targets to increase the number of female Clinical Professors and reduce the gender pay gap in our academic staff to address priorities of those in Factors 2 and 4. The development of the gender equality intervention framework has helped us avoid too narrow a focus on interventions aimed at 'fixing' individuals.(22) A positive but intangible benefit of conducting the research is that it was an intervention in itself, raising the profile of gender equality and the possibility for change within the School.

A limitation of using the framework is that it is descriptive and does not take into account the existing culture of an organisation and the fact that some interventions are more easily implemented than others. Some interventions also have a strong immediate appeal despite there being limited evidence of their effectiveness. Our Athena SWAN plan, like many others, includes unconscious bias training and mentoring schemes although neither of these interventions featured strongly in our findings. Finally, while the data was collected by a researcher not employed within the School of Medicine, the Q analysis and interpretation were carried out in collaboration with co-authors who are academics employed within the School. The interpretation of the findings were therefore likely to have been informed by cultural context of the School within which four of the co-authors were situated. Other possible interpretations could be made by those external to this context.

Conclusions

We believe the findings of the study and the approach taken have significant utility for those involved in gender equality work in other medical schools within and outside of the UK, even though we recognise that Q methodology does not identify the prevalence of particular views nor deal with the reality that certain viewpoints (or the viewpoints of certain individuals) may hold more influence than others. Nevertheless, the illumination of areas of agreement and discord via Q methodology makes a useful contribution to decision-making in areas where contentious action may be needed.(34) Finally, a note of caution; tying the Athena SWAN Silver status to research funding has not yet demonstrated a significant overall impact on the careers of women in UK medical schools.(14) A continued evaluation of the outcomes of these and similar initiatives is essential if their value and status are to be upheld.

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There are no unpublished data sets available for this study.

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Figure 1: Factor 1 reconstructed as an idealised Q-sort

			46. Set 50% target for women leading high profile Some or Institute events, e.g. giving guest or inaugural lectures.			
		48. Train all staff with management or recruitment roles in equality and diversity and unconscious gender bias.	44. Provide appropriate facilities for expressing and storing milk so that women who return from maternity leave do not feel that they have to stop breast feeding	43. Lobby the University for high level Athena SWAN Leadership e.g. a Pro-Vice Chancellor and Gender Equality Champions.		
	49. Set a target of increasing the proportion of women professors and associate professors by 10% over the next two REF cycles (8 years)	37. Appoint Chair Advisors who will support the promotion of women, e.g. advice on how to build a profile that meets the requirements for the promotion panel.	41. Conduct exit interviews with women staff at grade 7 and above to find out why they are leaving the SoM.	30. Introduce 'Men of Achievement' Awards as well as 'Women of Achievement Awards'.	40. Invite senior staff to speak about what they enjoy about their jobs and how they make it work. Perception of work/life balance at the top of academia can be off putting for women.	
1. Provide guidance for line managers about how to actively support anyone taking a career break so that their career is not disadvantaged upon their return	47. Introduce gender blinding in short-listing candidates and enforce rating against criteria prior to interview to reduce unconscious bias. This should benefit everybody not just women.	31. Improve gender balance across gender-stereotyped roles e.g. more men in mentoring and small group teaching, women leading research and giving large lecture theatre style teaching.	33. Encourage individual Institutes to apply for Gold Athena SWAN status; this will motivate staff at 'grass roots' level and help maintain the Some Silver Status once attained.	26. Introduce a (funded) Grade 10 Athena Swan role with responsibility for delivering the Bronze/Silver plan.	39. Monitor all job advertisements for family-friendly wording, mentioning policies and Athena SWAN objectives	36. Provide funding to create and maintain a dynamic, high profile, Athena SWAN webpage for the Some similar to the ones at institutions with Silver/Gold awards.
10. Develop a support plan for the career needs of men with small children. They only get very short paternity	29. Conduct and publish an annual equal pay review and publish salaries, years in grade, and pay gap by	25. Fund a 'Women in Medicine' development programme to accelerate the promotion of women to	27. Establish systems at University level to capture data on gender balance. This can be used to inform	23. Provide funds to female staff to access external Athena SWAN type initiatives e.g. provide	38. Appoint an independent working group to examine Chair appointment practice in the SoM. Research has	34. Hold an annual Athena SWAN day with an invited speaker on the theme of women in STEM. This will

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	leave and have to juggle competing demands of fatherhood and full time work.	gender across grades across the SoM.	senior roles in academic medicine.	target setting priority areas for interventions within and across Faculties/ Schools.	bursaries for attendance at established development events for women in STEM at other Universities	shown that apparently gender-neutral practices actually contribute to inequalities.	provide focus and increase visibility of successful women from other institutions.	
42. Set a target of ensuring that at each grade, female and male academic salaries are equal within 10 years. Surveys in the UK repeatedly show that female academic's salaries are on average 15% less than male salaries.	12. Support those who want to work long hours or flexibly, by ensuring that staff have access to University facilities and buildings at evenings and weekends.	19. Set up a mentoring programme for women and men who are considering promotion to Chair to help achieve gender equality in leadership without disadvantaging men.	24. Support contributions to child-care or other carer costs for attending conferences via staff development funding.	16. Set a target for a 50/50 male-female quota for the University Leaders Development Programme. Directors should nominate one male and one female academic per intake.	20. Make each Institute responsible for developing its own flexible, optional mentoring policy for women that must be introduced as part of induction/probation and regularly reviewed.	21. Encourage an informal mentoring system. Academics are well able to seek advice from whomever they think is best.	28. Set up a social network of senior women to improve communication and information exchange between female academic leaders and encourage discussion of women-specific work issues.	50. Ensure all School and Institute websites have images that represent women carrying out a range of roles including teaching and research at senior levels.
9. Actively promote part-time/flexible working/career breaks to men so that this becomes more normalised and less gender specific.	22. Allocate money to minimise the impact of extended leave on research, e.g. provide ££s to support research on return from maternity leave	11. Implement a workload model to include ALL activities including mentoring and staff development as these are disproportionately carried out by women.	18. Vary days of the week/times of day on which seminars and expert talks are held to facilitate attendance by those who work part-time or flexible hours.	14. Assess and change promotional criteria that accord less value to a more collaborative model of research success. This bias can disadvantage women as they more often work in this way.	17. Encourage and expect women to meet research and teaching standards of excellence as currently defined.	4. Make managers more responsible for staff development by making it part of *their* staff review. Currently, leadership performance is focused only on the person's own academic success.	15. Create a SoM mailing list aimed at female academics, to disseminate information about events, awards/fellowships, useful websites, training courses etc.	35. Increase awareness of Athena SWAN to students, e.g. in teaching rooms, screen savers on computer clusters, library and career fair materials.
7. Design and implement a role review procedure for female academics during periods of family commitment or part-time work so their academic output does not suffer e.g. reduce admin roles	45. Set a target for having 50% women on senior decision making bodies (e.g. senior management committees) so that women are fairly represented. Over 50% of staff at SoM are women.	8. Evaluate Athena SWAN initiatives to check for evidence of improved outcomes for women, e.g. job satisfaction, reduced staff turnover, research outputs, representation on Boards.	6. Identify and recommend female staff to join grant review and journal editorial boards. Women are under-represented on these yet they provide networking opportunities and career benefits.	13. Conduct an analysis of SoM staff returned to REF 2014 and publish the results. National data suggests women academics are underrepresented.	2. Encourage more female students to take intercalated degrees: it's often the first step on the ladder for medics with academic ambitions and women are under-represented.	3. Promote fellowships available just to women, e.g. via staff email lists, so women know the SoM wants them to apply	5. Increase promotion of the Women's Development Programmes, which helps women think about career and personal development	32. Include a statement about SoM commitment to Athena SWAN in the staff review/probation materials and reminder emails to emphasise the need to consider gender equality issues.
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

Most important **Least important**

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Contribution by authors

LB, AH and VW conceived and designed the study. PB and LB made substantial contributions to the acquisition of the data. LB, AH, VW, and PB made substantial contributions to the analysis and interpretation of the Q methodology data. RW designed and conducted the latent class analysis. LB and RW conducted the latent class analysis interpretation. LB drafted the manuscript and integrated critical feedback and important content from all of the other authors. All of the authors read and approved the final version of the manuscript.

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Good practice or positive action? Using Q methodology to identify competing views on improving gender equality in academic medicine

SRQR checklist adherence

	Topic	Description	Page(s) in article
1.	Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
2.	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2
	INTRODUCTION		
3.	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
4.	Purpose or research question	Purpose of the study and specific objectives or questions	5
	METHODS		
5.	Qualitative approach and research paradigm	Qualitative approach (e.g., ethnography, grounded theory, case study,phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale[b]	5
6.	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	5, 17
7.	Context	Setting/site and salient contextual factors; rationale[b]	5
8.	Sampling strategy	How and why research participants, documents, or events wereselected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale[b]	6
9.	Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	7
10.	Data collection methods	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and	6,7

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		modification of procedures in response to evolving study findings; rationale[b]	
11.	Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires). Number and relevant characteristics of participants, or events included devices (e.g., audio recorders) used for data collection; if/how the in the study; level of participation (could be reported in results)	7
12.	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	6/7
13.	Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	7, 9
14.	Data analysis	Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale [b]	8
15.	Techniques to enhance trustworthiness	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale[b]	8
	RESULTS		
16.	Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	9-15
17.	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-14
	DISCUSSION		
18.	Integration with prior work, implications, transferability and contribution to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/ generalizability; identification of unique contribution(s) to scholarship in a discipline or field	15-18
19.	Limitations	Trustworthiness and limitations of findings	3, 17
	OTHER		
20.	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	21
21.	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	21

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Good practice or positive action? Using Q methodology to identify competing views on improving gender equality in academic medicine

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Good practice or positive action? Using Q methodology to identify competing views on improving gender equality in academic medicine

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ABSTRACT

Objectives: The number of women entering medicine has increased significantly yet women are still under-represented at senior levels in academic medicine. To support the gender equality action plan at one School of Medicine, this study sought to [i] identify the range of viewpoints held by staff on how to address gender inequality and [ii] identify attitudinal barriers to change.

Design: Q methodology. 50 potential interventions representing good practice or positive action, and addressing cultural, organisational and individual barriers to gender equality were ranked by participants according to their perception of priority.

Setting: The School of Medicine at the University of Leeds, UK

Participants: 55 staff members were purposively sampled to represent gender and academic pay grade.

Results: Principal components analysis identified six competing viewpoints on how to address gender inequality. Four viewpoints favoured positive action interventions: 1) Support careers of women with childcare commitments, 2) Support progression of women into leadership roles rather than focus on women with children, 3) Support careers of all women rather than just those aiming for leadership, and 4) Drive change via high level financial and strategic initiatives. Two viewpoints favoured good practice with no specific focus on women by 5) Recognising merit irrespective of gender, and 6) Improving existing career development practice. No viewpoint was strongly associated with gender, pay grade, or role, however latent class analysis identified that female staff were more likely than men to prioritise the setting of equality targets. Attitudinal barriers to the setting of targets and other positive action initiatives were identified and it was clear that not all staff supported positive action approaches.

Conclusions: The findings and the approach have utility for those involved in gender equality work in other medical and academic institutions. However, the impact of such initiatives needs to be evaluated in the longer term.

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Strengths and limitations of this study

- The first ever study to apply Q methodology to the area of gender inequality in Medical Schools.
- Q methodology is an ideal approach to evidencing the range of views on gender inequality in the academic workplace, which are already known to be multiple and contested.
- The inclusion of latent class analysis provided some further insight into where key differences about gender equality initiatives lie.
- The research was limited to one (large) medical school and additional viewpoints may exist in other institutions.
- As a qualitative approach Q methodology describes the nature and landscape of viewpoints rather than their prevalence in the population.

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Improving gender equality in academic medicine: A Q methodology study of staff viewpoints on 'good practice' versus positive action

INTRODUCTION

Women remain underrepresented at senior levels in virtually all levels of academic medicine.(1, 2) For example, fewer than 20% of Clinical Academic Professors in the UK are female, compared with 41% of Clinical Lecturers,(3) evidence of what has been called the 'leaky pipeline'.(4) Women also tend to progress through pay grades more slowly than men and are paid less than men overall.(5) There are significant female attrition rates in particular specialisms such as academic surgery.(6) It is likely that many women's career choices in medicine and medical research reflect constraints attributable to an accumulation of gendered disadvantage, both perceived and actual.(7, 8)

Few women in academic medicine report overt gender discrimination but more women than men perceive inequities in promotion, salary, access to resources, and fellowship opportunities.(7) Women are less likely to report a sense of belonging in medical academia and are less confident about their career advancement than men.(9) Although some argue that female academic clinicians make an active choice to prioritise family over career, women report being as eager as men to assume leadership positions.(9, 10)

This waste of female academic talent is widely acknowledged as a concern.(11, 12) The Athena SWAN initiative was launched in the UK in 2005 to advance the careers of women in STEMM (Science, Technology, Engineering, Maths and Medicine) higher education and research. This initiative has gained momentum in UK medical schools since achievement of Silver chartered status ("a significant record of activity and achievement by the institution in promoting gender equality"(13)), became a prerequisite for government funding for Biomedical Research Centres.(14)

This study was undertaken in 2014 as part of an Athena SWAN strategy in one UK medical school. The aim of the study was to provide evidence to inform the development and implementation of an

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action plan to address gender equality challenges in the school. This study had two objectives; [i] identify the range of viewpoints held by academics on how to address gender inequality and [ii] identify attitudinal barriers to implementing these interventions.

METHODS

Materials and Methods

Q methodology aims to detect the range of subjective viewpoints on a topic within a given population by requiring participants to consider and respond to a set of predefined statements on the topic under investigation. It is a sensitive method for exploring tension between socially acceptable views and personal beliefs and values making it an ideal approach to explore views on gender equality initiatives and positive action in the workplace, initiatives which are known to be debated and contested.(15) The method combines qualitative approaches to sampling and pattern interpretation with quantitative research techniques and analyses.(16)

Q methodology starts from the assumption that for each social topic there is a 'flow of communicability' called the concourse.(17) The concourse consists of the things that are written or said about a topic that can be "socially contested, argued about and debated…. matters of values and beliefs".(18) The method requires participants to consider and respond to a set of pre-defined statements sampled from the concourse (called the Q set) using a ranking technique called Q sorting. The method is concerned with the relationships between individuals' views as expressed in their Q sorts and so uses factor analytic techniques to identify how viewpoints cluster together.(19) The techniques invert the usual factor analytic approach by using participants as the variables central to the factoring process rather than the items in the Q set. The pattern of statement placement for each factor is interpreted qualitatively and a narrative is created that represents a distinct point of view on the topic under study.

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Developing the Q set

For this study the concourse was defined as interventions which had already been tried or suggested as ways to address gender inequality in academic medicine and related STEM disciplines. Candidate interventions were identified from a review of the academic and grey literature on gender equality interventions in the workplace, which was not confined to the UK. From this review 154 candidate interventions were initially identified. These interventions were thematically analysed by type of intervention, for example 'mentoring' and 'flexible working' and organised these using a framework that categorised interventions along two dimensions that had emerged from a detailed reading of the concourse materials. The first dimension was *intervention target* (good practice or positive action): the target of good practice interventions was all staff members (equal treatment) whereas the target of positive action interventions was specifically women.(20) The second dimension was *intervention level* (individual, organisational, or cultural), which was informed by other multi-level approaches to change implementation.(21, 22) See Table 1 examples of interventions categorised using the framework. During a series of research meetings the original 154 interventions were refined and reduced down to the final 50 (see Figure 1). For example, where three different interventions about training in unconscious bias had been identified, one item was selected to represent this type of intervention.

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Table 1: The gender equality interventions framework: categorisation of example interventions

Intervention	Intervention target	Intervention level
Train all staff with management or recruitment roles in equality and diversity awareness and unconscious bias.	Good Practice	Cultural
Provide guidance for line managers about how to actively support staff taking a career break so that their career is not disadvantaged upon their return	Good Practice	Organisational
Support contributions to child-care or other carer costs for attending conferences via staff development funding.	Good Practice	Individual
Ensure all school websites have images that represent women carrying out a range of roles including teaching and research at senior levels.	Positive Action	Cultural
Design and implement a role review procedure for female academics during periods of family commitment or part-time work so their academic output does not suffer	Positive Action	Organisational
Identify and recommend female staff to join grant review and journal editorial boards. Women are under-represented on these yet they provide networking opportunities and career benefits.	Positive Action	Individual

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Participant sample

We anticipated that respondents' opinions would be influenced by experience in their current academic department, by gender and by pay grade and therefore sampled academic staff members strategically across these variables. Key members of the school's Athena SWAN teams were asked

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to identify members of staff in their Institutes across gender, pay grade and potential diversity of viewpoint. In addition, members of the School Executive were invited to take part to enable representation of views at senior decision making levels. Only two staff of those invited declined to participate; both were male. Fifty-five members of staff participated (31 women, 24 men) see Table 2. Ages ranged between 27 and 63 years (mean 45 years). The sample met the two main sufficiency criteria of Q methodology; firstly that the sample provides sufficient diversity of viewpoint across the variables of interest and secondly, that are enough participants to enable a robust factor structure, usually between 40 and 60 individuals.(16)

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Table 2. Summary of participant characteristics by gender (N=55)

Characteristic	Total	Female	Male
Age*			
Under 40	13 (24%)	8 (62%)	5 (38%)
40–49	22 (40%)	13 (59%)	9 (41%)
50 plus	18 (33%)	9 (50%)	9 (50%)
Ethnicity			
White or British white	51(93%)	29 (57%)	22 (43%)
Other	4(7%)	2 (50%)	2 (50%)
Caring responsibilities*			
No	26 (47%)	14 (54%)	12 (46%)
Yes	28 (51%)	16 (57%)	12 (43%)
Pay grade*			
Research Assistant/Fellow	11 (20%)	6 (55%)	5 (54%)
Senior Research Fellow/Assistant Professor	10 (18%)	6 (60%)	4 (40%)
Associate Professor	15 (27%)	9 (60%)	6 (40%)
Professor	18 (33%)	9 (50%)	9 (50%)
Full or part-time*			
Full time	51 (93%)	27 (53%)	24 (47%)
Part time	3 (5%)	3 (100%)	0 (0%)
Employed by school *			
Less than 10 years	24 (44%)	13 (54%)	11 (46%)
10 or more years	26 (47%)	15 (58%)	11 (42%)
Line management responsibilities*			
No	11 (20%)	5 (45%)	6 (55%)
Yes	43 (78%)	25 (58%)	18 (42%)

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Clinical responsibilities*			
No	42 (76%)	26 (62%)	16 (38%)
Yes	12 (22%)	4 (33%)	8 (67%)

*Where total does not equal 100% this indicates missing data

Ethical approval

This research received ethical approval from the Ethics Committee at the host institution (SoMREC/13/062). Informed written consent was gained from all participants.

Procedure

Data collection took place between April and June 2014. Each participant completed their Q sort individually, in a one-to-one or a small group setting. Data collection was carried out by a researcher not employed within the School of Medicine. The interventions were presented to participants on a set of numbered cards, shuffled prior to administration. Verbal instructions about how to complete the Q-sorting were given:

> *"Please read each card in turn. For each intervention, please consider how important you think it is for promoting gender equality in the School of Medicine"*

In a series of steps, participants ranked the interventions according to their priority (most important (1) to least important (9)) on to a grid of the form of a quasi-normal distribution. Participants were asked to provide written statements about the reasons for their choices at both extremes of the grid and this information was used to inform interpretation.

Analysis

Principal Components Analysis

Principal Components Analysis (PCA) with Varimax rotation was used to identify relationships between individual Q sorts. The Q sort data were managed and analysed using dedicated software package PQMethod Version 2.1.(23) Each principal component (from now on referred to as a

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factor) represents a highly inter-correlated cluster of Q sorts; that is a set of items sorted in a statistically similar way that reflects a distinct point of view on action to reduce gender inequality in the participant's workplace. During the Varimax rotation, established strategies were employed to identify the maximum number of interpretable and distinct viewpoints to take forward for interpretation.(16) A scree test was applied to factors with an eigenvalue greater than one (Kaiser-Guttman criterion) with at least two significantly loading Q sorts. The eigenvalues of these factors were plotted on a simple line graph: factors falling around the point the line changes slope and before the point where the line levels off were considered for rotation.

After the optimum number of factors had been selected, a weighted averaging formula was applied to exemplar Q sorts to create a composite 'idealised' Q sort to represent each factor (see Figure 1). Exemplar Q sorts are those which load significantly at $p < 0.01$ on one factor only and therefore best exemplify the viewpoint represented by the factor.

The interpretation of the unique configuration of statements for each factor requires a considered synthesis of the quantitative and qualitative data collected during the process. The information produced by PQMethod is used to inform the first level of interpretation: highest and lowest scores assigned to particular statements are considered first, as are statements statistically distinguishing for that factor at $p < 0.01$. Subsequently, a deeper level of interpretation takes place, whereby the whole Q sort is considered holistically along with qualitative information provided by the participants. The output of the interpretation phase is a narrative account, or 'best possible theoretical explanation' of the factor.(16) Initial Q factor analysis was conducted by the lead author, followed by iterations of different factor solutions, each discussed with co-authors to maintain transparency of the interpretation process and keep interpretation close to the data.

Latent class analysis

Latent class analysis (LCA), a statistical modelling tool widely used for market segmentation, was used to identify whether any discernible pattern in statement placement was associated with

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participant characteristics, particularly gender or academic role. This was implemented by use of the poLCA library within R statistical software; mathematical details are provided elsewhere.(24)

Results

The first aim of the study was to identify the range of viewpoints held by academic and research staff on how to address gender inequality. A six-factor solution produced the best fit for the data in terms of providing the maximum number of distinct interpretable viewpoints. Each factor had at least three exemplar Q sorts loading highly and significantly at $p < 0.01$ on that factor only; considered sufficient for further interpretation.(19) These six factors together represented 51% of the total explained variance. The following factor interpretations are illustrated using anonymised written comments made by participants in relation to the placing of specific items. After each comment the participant number and the number of the Q item referenced in the comment are given.

FACTOR 1: Prioritise interventions to support research careers of women with childcare commitments

The Q sorts of nine participants exemplified Factor 1 (six women, three men). Ages ranged from 30 to 54 years. Seven worked at assistant professor level or lower, three worked part time, six had caring responsibilities. All but one had line management responsibilities, only one had clinical responsibilities.

In this viewpoint, family responsibilities have the most significant impact on a woman's career development. High priority interventions are therefore ones that address this.

> *"Family responsibilities fall disproportionately on women. Reducing the inevitable stress of dealing with family life and the conflicting requirements of work/family can only mean less stressed, more organised and thoughtful employees" (*p19:7)

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Interventions of high priority include a mix of best practice and positive action: clearer endorsement of flexible working patterns for all parents, action to reduce the gendered pay gap, and financial and administrative initiatives to support research after maternity leave or a career break. Positive action to increase numbers of women in senior decision-making roles is seen as a priority to improve representation of the issues which affect other women.

Lowest priority interventions are those aimed at culture change via raising the profile of women, for example, the promotion of female role models via an Athena SWAN website. Interventions aimed purely at the individual level only (women-only social media networks) are viewed to have little material impact on the working environment and are essentially "window" activities (p54:35), distracting resources away from more important activities:

> *"Staff with family commitments are already under time pressure to be successful. ….. I would not prioritise my time at work to look at websites/emails/social media"* (p32:15)

FACTOR 2: Prioritise positive action to get more women into leadership

The Q sorts of three participants exemplified Factor 2 (two men, one woman). Ages ranged from 40 to 61 years. All worked full-time, one had caring responsibilities. Two were full Professors and one was an Assistant Professor. All line-managed staff and two had clinical responsibilities.

This view prioritises high level interventions to increase the number of senior women in positions of influence and leadership. Setting targets, for example in terms of the number of women at Chair level "*are essential otherwise there is no way to measure impact*" (p9:49). High priority interventions are those which encourage women to achieve excellence as currently defined ("*we shouldn't lower the standards for women*" p3:17) but focus on accelerating change. Supporting those women who want to achieve seniority is a priority, for example appointing advisors to women aiming for promotion. There is a need to understand why eligible women are less likely than men to apply for promotion at senior level.

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"We must know why women drop out of academia……. this knowledge can be used to inform policy to enhance/improve promotion of women to Chairs" (p9:41)

Interventions aimed specifically at supporting women with young children are considered to represent a stereotypical view of gender inequality. As they will not activate high level change they were ranked as lowest priority. For similar reasons, activities aimed at women on an individual level, such as personal development training and women-only events are low priority.

FACTOR 3: Prioritise the career development of all women, not just those aiming for the top

The Q sorts of six participants exemplified Factor 3 (four men, two women). Ages ranged from 40 to 61 years. Three had caring responsibilities. One participant did not provide further personal details but of the remaining five, all worked full-time, four worked at Associate Professor or full Professor grade, three had line management responsibilities and five had clinical responsibilities.

In this view, and in contrast to Factor 2, the equality agenda places too much emphasis on supporting women aiming for leadership. Interventions should be a combination of positive action to support women's careers and good practice to develop all staff. It is essential to change organisational systems and practices that maintain gender inequality; otherwise all other interventions aimed at the individual level will be inconsequential. High priority interventions are those that benefit all women, for example formal mentoring arrangements, access to flexible working, reviewing current promotional criteria that value 'male' over 'female' working styles and traditional linear career trajectories. A priority is financial investment such as funding to support research after maternity leave. In contrast to Factors 1 and 2, it is considered important to raise the profile of women as part of changing organisational culture, for example by funding a high-profile website.

'Exceptional women have always reached the top [but] *we need positive role models to show women academics that senior posts are for women like them.* (p76:40)

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Lowest priority interventions are measures just for women aiming for leadership, for example senior women's networks. Setting targets, for example in terms of the number of women at Chair level, was also low priority partly because targets are seen as tokenistic but also potentially disadvantageous to the institution in light of initiatives like Athens SWAN – *"What would happen if the target was not reached?"* (p37:49).

FACTOR 4: Prioritise leadership responsibility for driving change

The Q sorts of seven participants exemplified Factor 4 (six women, one man). Ages ranged from 45 to 60 years. All worked full-time, four had caring responsibilities. Four were Associate Professors and three were full Professors. All had line management responsibilities and four had clinical responsibilities.

According to this view, significant steps such as eliminating the gender pay gap will only happen if those in leadership roles take responsibility for driving change. High priority interventions are therefore those that represent positive action at an organisational level.

> "*High level, central* [University] *support would send a meaningful signal - I like the idea of* [gender equality] *'champions'*" (p4:43).

As in Factor 2, increasing the promotion of women to Chair is a priority and must be accelerated. In contrast to Factor 2 and in line with Factor 3, current standards of excellence are seen as gendered and act to maintain inequality because they disadvantage working styles more frequently found in women than men.

> *"Plenty of research suggests women are more likely to work collaboratively and include citizenship and teaching.* [Make] *sure these are rewarded in promotions criteria"* (p69:14)

Lowest priority interventions are those to support men with families and those which impact a minority of women, such as facilities for storing breast milk at work.

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FACTOR 5: Prioritise interventions that recognise merit irrespective of gender

The Q sorts of five participants exemplified Factor 5 (four men, one woman). Ages ranged from 27 to 62 years. All exemplars worked full-time and one had caring responsibilities; four were Associate Professor or Professor grade, four had clinical responsibilities and two had line management responsibilities.

According to this viewpoint merit should be judged irrespective of gender: positive action discriminates against men and is patronising to women.

> *"Any incentive that is based on gender alone unjustly discriminates against men. This could lead to talented and hardworking male academics being unfairly bypassed for promotion in favour of women"* (p47:25)

Promotion, selection for leadership training, or invitation to join a committee should be entirely down to merit. The best way to support the career development of women is to prioritise interventions that benefit all staff, for example gender blinding when shortlisting for interviews and training managers in equality and diversity issues. Staff should feel free to identify who they want – and if they want - to seek mentoring from rather than having formal schemes for women. Senior staff talking to colleagues about how they balance work and home life may help women identify whether or not they want to seek promotion.

Lowest priority interventions are those associated with setting "artificial" equality targets; these are positive discrimination and may not result in improved outcomes for women. Resources should not be put into initiatives aiming to benefit women only and top down directives are not the best ways to enact culture change.

> *"Setting targets is unlikely to promote equality. Many* [women] *may feel they have only been chosen because of the target and not because they deserve to be there". (p15:46)*

FACTOR 6: Prioritise good practice in line management and career development

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The Q sorts of five participants (three men, two women) exemplified Factor 6. Ages ranged from 47 to 53 years. All worked full-time, one had caring responsibilities. Four were Associate Professor or Professor pay grade. Three had line management responsibilities and four had clinical responsibilities.

In this view achieving gender equality can be best achieved by improving existing practice such as ensuring compliance with annual staff reviews rather than new initiatives. This approach benefits all staff not just women. For example, managers need guidance on how to help people maintain a research trajectory following a career break.

> *"This will benefit women and men. Poor management and leadership is a leading cause of dissatisfaction. Women are often reluctant to bring up or challenge problems caused by this, or to insist their manager help with their career development." (25:4)*

It is a priority to have someone at a senior level in each department responsible for implementing existing good practice. Low priority interventions include those which change current practice, e.g. gender blinding at interviews or having core meeting times to support those who work part-time or flexibly.

> *"I don't think this would have much impact. More staff would find a regular slot much easier"* (p35:18)

PCA did not find any participant characteristics obviously aligned with particular viewpoints although Factor 1 included all the participants who worked part-time and those participants were all women.

Latent class analysis (LCA) by gender

The second objective of the study was to identify attitudinal barriers to implementing these interventions. LCA analysis was employed to identify any significant latent relationships between participant characteristics and the placing of specific statements to help identify attitude differences by group. To avoid overfitting only the most discriminating Q items were retained in the LCA model.

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The statements discriminating most by gender were items 36, 45, 46 and 49 (see Table 3); there were no interpretable results using other participant characteristics. For each participant values were assigned to each of these items using their placement on the Q sorting grid: low, medium or high priority.

A satisfactory fit of the multi-group model was achieved using two classes regressed upon gender. The probability of a participant being in Class 1 opposed to Class 2 was provided by a logistic regression. The odds ratio for female gender being in Class 2 was 3.56 with a 95% confidence interval (0.94, 13.46) indicating that female participants were more likely to place the discriminating items in the pattern seen for Class 2 than for Class 1, and vice versa for men. The class frequencies are given in Table 3. Overall, women were more likely than men to give high priority to interventions related to setting 'hard' equality targets. Women were less likely to give high priority to the development of an 'Athena SWAN' website when compared to men.

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Table 3: Latent Class Analysis: table of class frequencies

		Class 1 (higher probability of being male)	Class 2 (higher probability of being female)
Probabilistic assignment		0.57	0.43
Overall modal assignment		0.55	0.45
Q item			
36. Create a high profile, Athena SWAN webpage	Low	0.44	0.39
	Medium	0.15	0.44
	High	0.40	0.17
45.Target of 50% women on decision making boards	Low	0.72	0.06
	Medium	0.20	0.42
	High	0.08	0.51
46.Target of 50% women leading high profile events	Low	0.57	0.11
	Medium	0.37	0.39
	High	0.06	0.50
49.Target of 10% increase in women professors	Low	0.74	0.00
	Medium	0.26	0.44
	High	0.00	0.56

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Discussion

This study had two objectives: [i] identify different staff viewpoints on the prioritisation of a range of gender equality interventions in the workplace and [ii] identify barriers and facilitators to implementing these interventions. Six significantly different viewpoints were identified demonstrating the complexity of the debate on addressing gender equality in the workplace. A key finding of our

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research was the strong divergence in views as to whether good practice or positive action was the most appropriate strategy for achieving gender equality. While all viewpoints prioritised some positive action interventions (interventions to support women) as well as good practice initiatives (interventions to support all staff), the balance of these approaches and the strength of the favoured positive action initiatives varied greatly. No viewpoint identified via the Q factor analysis was clearly associated with any participant characteristic although latent class analysis suggested that men may be less likely than women to be in favour of setting 'hard' positive action targets.

Factor 5 represents the strongest rejection of positive action, seeing it as a form of social engineering that will undermine the meritocratic principles of academic institutions. In this view, positive action is considered a means to advance less academically excellent women over academically excellent men. Women deserve fair treatment but not favoured access to career development initiatives. Resentment about perceived positive discrimination embedded within Athena SWAN has been recorded elsewhere.(25) Factor 6 also favoured good practice with a focus on improving existing management practice to ensure women and men are treated equally. The favouring of good practice interventions supports the idea that universities are meritocracies. Yet experimental research suggests that managers who see themselves as affiliated with an organisation that espouses meritocratic values are actually more likely to manifest a favourable bias towards men in terms of monetary rewards than those who do not see their organisation as explicitly holding these values.(26) It has been argued elsewhere that 'excellence', as the new keyword in Higher Education (27), is not a gender-neutral marker of merit.(28, 29) In this study, Factor 4 agreed that assessment of excellence was gendered; for example promotions criteria were seen to be biased toward individual 'masculine' leadership styles over collaborative 'feminine' styles.

The commonest reason given for women not progressing into senior posts is the negative impact on career progression caused by the bearing and raising of children - the so-called 'motherhood penalty'.(30) Factor 1 endorsed this as the main obstacle to career progression, and prioritised support for flexible working and other initiatives to meet the needs of staff with young children. In contrast, Factor 4 viewed the focus on women with children as a distraction from the main issue of a

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gender power imbalance. Initiatives to support women with young families are less controversial in the workplace than quotas or equality targets; most universities support flexible working and other 'family friendly' initiatives. It has been argued, however, that a focus on these policies can in fact strengthen the expectation that women undertake a disproportionate amount of caring work in families.(31) Family friendly policies do not help challenge attitudes, which women may also internalise, that mothers are less competent academics or medics, are less committed to their careers and are less suited to leadership positions than men.(32)

Implications for gender equality work in medical schools

As our School's Athena SWAN work has developed, the initiatives have been evaluated using our framework to ensure that as many different priorities as possible are addressed. For example, to address Factor 1 concerns about the impact of childbearing on career the School has implemented a popular bursary scheme to support the academic trajectory of those taking a period of maternity or adoption leave. The development of the gender equality intervention framework has however, helped us avoid too narrow a focus on interventions aimed at 'fixing' individuals.(21) A positive but intangible benefit of conducting the research is that it was an intervention in itself, raising the profile of gender equality and the possibility for change within the School. We have also set targets to increase the number of female Clinical Professors and reduce the gender pay gap in our academic staff to address priorities of those in Factors 2 and 4. The finding that men, who still comprise the majority in terms of holding high level decision making power in medical schools, are less supportive of positive action programmes, may indicate an attitudinal barrier to achieving these targets that needs to be addressed..

A limitation of using the framework is that it is descriptive and does not take into account the existing culture of an organisation and the fact that some interventions are more easily implemented than others. Some interventions also have a strong immediate appeal despite there being limited evidence of their effectiveness. Our Athena SWAN plan, like many others, includes unconscious bias training and mentoring schemes although neither of these interventions featured strongly in our

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findings. Finally, while the data was collected by a researcher not employed within the School of Medicine, the Q analysis and interpretation were carried out in collaboration with co-authors who are academics employed within the School. The interpretation of the findings were therefore likely to have been informed by cultural context of the School within which four of the co-authors were situated. Other possible interpretations could be made by those external to this context.

Conclusions

We believe the findings of the study and the approach taken have significant utility for those involved in gender equality work in other medical schools within and outside of the UK, even though we recognise that Q methodology does not identify the prevalence of particular views nor deal with the reality that certain viewpoints (or the viewpoints of certain individuals) may hold more influence than others. Nevertheless, the illumination of areas of agreement and discord via Q methodology makes a useful contribution to decision-making in areas where contentious action may be needed to overcome attitudinal barriers to positive action.(33) Finally, a note of caution; tying the Athena SWAN Silver status to research funding has not yet demonstrated a significant overall impact on the careers of women in UK medical schools.(14) A continued evaluation of the outcomes of these and similar initiatives is essential if their value and status are to be upheld.(25)

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Contribution by authors

LB, AH and VW conceived and designed the study. PB and LB made substantial contributions to the acquisition of the data. LB, AH, VW, and PB made substantial contributions to the analysis and interpretation of the Q methodology data. RW designed and conducted the latent class analysis. LB and RW conducted the latent class analysis interpretation. LB drafted the manuscript and integrated critical feedback and important content from all of the other authors. All of the authors read and approved the final version of the manuscript.

Declaration of competing interests

Grant funding for research but no other competing interest

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; LB, AH, VW and RW have received NIHR funding in the previous 3 years. Accreditation by the Athena Swan programme is a prerequisite for certain NIHR funding, although not that received by LB, AH, VW or RW. There are no other relationships or activities that could appear to have influenced the submitted work

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There are no unpublished data sets available for this study.

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Figure 1: Factor 1 reconstructed as an idealised Q-sort

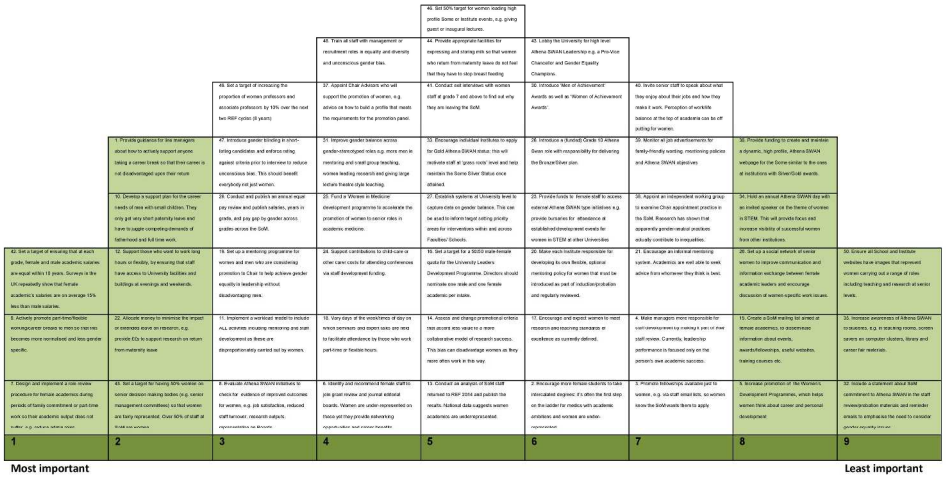

Figure 1: Factor 1 reconstructed as an idealised Q-sort

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Good practice or positive action? Using Q methodology to identify competing views on improving gender equality in academic medicine

SRQR checklist adherence

	Topic	Description	Page(s) in article
1.	Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
2.	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2
	INTRODUCTION		
3.	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
4.	Purpose or research question	Purpose of the study and specific objectives or questions	5
	METHODS		
5.	Qualitative approach and research paradigm	Qualitative approach (e.g., ethnography, grounded theory, case study,phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale[b]	5
6.	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	10 & 22
7.	Context	Setting/site and salient contextual factors; rationale[b]	2 & 4
8.	Sampling strategy	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale[b]	7 - 8
9.	Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	10
10.	Data collection methods	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and	5- 6 & 10

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		modification of procedures in response to evolving study findings; rationale[b]	
11.	Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires). Number and relevant characteristics of participants, or events included devices (e.g., audio recorders) used for data collection; if/how the in the study; level of participation (could be reported in results)	7 - 10
12.	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	8 - 10
13.	Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	10 - 12
14.	Data analysis	Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale [b]	5 & 11
15.	Techniques to enhance trustworthiness	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale[b]	11
	RESULTS		
16.	Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	12-19
17.	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	12-17
	DISCUSSION		
18.	Integration with prior work, implications, transferability and contribution to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/ generalizability; identification of unique contribution(s) to scholarship in a discipline or field	19-22
19.	Limitations	Trustworthiness and limitations of findings	21-22
	OTHER		
20.	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	28
21.	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	28

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