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A woman's place is in theatre: women's perceptions and experiences of working in surgery from the ASGBI Women in Surgery working group.

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Manuscripts

Title: A woman's place is in theatre: women's perceptions and experiences of working in surgery from the ASGBI Women in Surgery working group.

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Abbreviations

ASGBI: Associations of Surgeons of Great Britain and Ireland

CCT: Certificates of Completion of Training

CV: Curriculum Vitae

LTFT: Less Than Full Time

STEM: Science, Technology, Engineering and Mathematics

WHO: World Health Organization

Keywords: surgery, gender equity, surgical career, STEM

Abstract Word count 300

Objective: Surgery remains an inherently male-dominated profession. The aim of this study was to survey women working within the discipline, to understand their current perceptions, to provide insight into their practical day-to-day lives, supporting an action-oriented change.

Design and Setting: The link to a confidential, on-line survey was distributed through the Association of Surgery of Great Britain and Ireland (ASGBI) social media platforms on Facebook and Twitter over a two-week period in October 2017.

Participants: Women working in the field of surgery and actively responding to the link shared through the ASGBI social media platforms. No patients were involved in the study.

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3 **Primary and Secondary Outcome measures:** Data were analysed through a mixed
4 methods approach. The quantitative data was analysed through descriptive
5 statistics and qualitative analysis was undertaken using a constant comparative
6 analysis of the participants' comments, to identify salient patterns (themes).
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13 **Results:** A total of 81 female participants replied (42% response rate from Facebook
14 members), with 88% (n=71) perceiving surgery as a male-dominated field. Over half
15 had experienced discrimination (59%,n=47), whilst 22% (n=18) perceived a 'glass
16 ceiling' in surgical training. Orthopaedics was reported as the most sexist surgical
17 specialty by 53% (n=43). Accounts of gendered language in the workplace were
18 reported by 59% (n=47), with 32% (n=25) of surveys participants having used it.
19 Overall, a lack of formal mentorship, inflexibility towards part-time careers, gender
20 stereotypes and poor work-life balance were the main perceived barriers for women
21 in surgical careers.
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35 **Conclusion:** These findings highlight the implicit nature of the perceived
36 discrimination that women report in their surgical careers. The ASGBI acknowledges
37 these perceptual issues and their relative implications as the first of many steps to
38 create an action-oriented change by allowing all staff, regardless of gender, to reflect
39 on their own behaviour, perceptions and the culture in which they work.
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47 **Trial registration:** not applicable
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50 **Article Summary:**
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3 The key aim of this study was to capture the perceived factors potentially deterring
4 women from pursuing a surgical career in a clinical and academic environment in
5 order to achieve gender equity within the profession.
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10 To illustrate these factors as a source of reflection for surgical staff of either gender,
11 for policy makers and for professional bodies such as the Association of Surgeons of
12 Great Britain and Ireland (ASGBI), could help to move beyond tokenism in the co-
13 construction of relevant, impactful and evidence-based action.
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18 The results of a voluntary, confidential, on-line survey through the ASGBI social
19 media platforms were analysed through a mixed methods approach of quantitative
20 statistics and qualitative thematic analysis.
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25 The socio-cultural aspects of the surgical profession were discussed and presented
26 along with the initial action-oriented changes.
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31 **Article Word count 3940**
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33 34 35 **Introduction** 36

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38 Despite annual intakes of medical school cohorts evidencing a 55% female
39 contingent, only 28% of these women eventually pursue a career in surgery via
40 higher surgical training in the UK (1). Beyond these baseline figures, a qualitative
41 analysis of the factors deterring women from pursuing surgery as a career in the
42 western countries is needed as an adjunct to the existing evidence base. In reality,
43 several extraneous variables rooted in socio-cultural backgrounds, such as toy-
44 makers sometimes blatantly but more often inadvertently, discourage girls from
45 studying science, technology, engineering and mathematics (STEM) (2), as do some
46 of their teachers (3). It is evident that some girls lack role models in these fields and
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3 grow up with the unfounded pre-supposition they would not do well in those,
4 considered male and technical professions(4). This ultimately influences their
5 intrinsic motivation and their resultant capacity to succeed in fields like surgery, due
6 to the perception that these careers require self-selected individuals who are driven,
7 competitive, and able to endure years of intense schooling and high expectations (5).
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11 Although there is acknowledgement of the longstanding historical contribution to
12 surgical practice from women (6, 7) the manner in which women feel perceived by
13 their male counterparts is under-evidenced and little reported. The key aim of this
14 study is to capture the perceived barriers in the experiences of women working
15 within the field of surgery and to use them as a source of reflection. This should
16 provide an important focus for surgical staff of either gender and for policy makers
17 who may need an insight into the practical day to day lives of women undertaking
18 roles in the surgical profession. Acknowledging these issues is the first of many
19 steps to addressing their implication to the surgical workforce, regardless of gender.
20 Alongside this is the need for critical introspection, a topic that has been much
21 debated in the research aiming to take action (8) and in which surgeons, due to the
22 functional role they undertake, should be more often involved (9).
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42 **Methods**

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44 The link to a voluntary, confidential, on-line survey was distributed through the
45 Association of Surgery of Great Britain and Ireland (ASGBI) Women In Surgery
46 social media platforms of Facebook (191 members) and shared via Twitter for a two
47 week period in October 2017. Weekly reminders were posted. The Facebook site
48 (10) is a closed group comprised of healthcare professionals working in the field of
49 surgery. Given the sensitivity of the topic, the closed access to the social media
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3 platforms, and the wish to ensure honest, open responses and anonymity, no
4 demographic information was collected. No patients were involved in the study.
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8 The questions were designed to understand whether barriers exist to deter women
9 from pursuing surgery as a career, and if so, what these barriers are and what
10 interventions would be suggested in order to reduce them. Respondents were
11 encouraged to provide their personal opinions throughout the free text boxes after
12 each question. As the aim of the research was to obtain as many responses as
13 possible, whilst understanding the participants' experiences of being a female
14 working in surgery, a mixed methods approach was used. The quantitative data was
15 analysed through descriptive statistics, and to provide context to this data and more
16 fully explore the participants' responses, a qualitative approach was taken using
17 constant comparative analysis of the participants' comments, to identify patterns
18 (themes) within the responses. This was guided by the principles of thematic
19 analysis (11), using a six step process of data familiarisation, generating initial
20 codes, searching for themes, reviewing themes, defining and naming themes and
21 producing the report.
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39 **Results**

40 A total of 81 participants completed the survey, an estimated response rate of 42%
41 based on the Facebook group membership. It was not possible to determine how the
42 Twitter platform influenced response rate. The 88% (n=71) felt that surgery remains
43 a male-dominated field, with 59% (n=47) reporting or witnessing discrimination
44 against females in the workplace. The hidden barriers for women reported by 34%
45 (n=28) were that the profession was not conducive to motherhood and family life,
46 with 16% (n=13) citing childcare issues. There was a perception that the surgical
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profession and culture was male-oriented, conceptualised as an 'old boys club' (16%, n=33) and possessing a masculine attitude and negative bias (13%, n=9). The framework for a career in surgery was reported as lacking flexibility and part-time careers (12%, n=10), with 10% (n=8) citing unsocial hours and working patterns (see Table I).

Table I Participant-perceived barriers to a career in surgery

No.	Barrier	Response
1	Not a profession conducive with motherhood, family and children	34% (n=28)
2	Childcare issues	16%(n=13)
3	'Old Boys' Club/network	16% (n=13)
4	Male attitudes/bias	13%(n=11)
5	Culture of surgery as a masculine field	12% (n=10)
6	Unconscious bias	12%(n=10)
7	Lack of flexible/part-time training	12%(n=10)
8	Unsocial hours/working patterns/rotas	10%(n=8)
9	Perceptions by Nurses and Patients that women are not able to be surgeons	7%(n=6)
10	Respondent skipped question	7%(n=6)
11	Maternity leave/career break	6%(n=5)
12	Women are excluded from 'male-only' social events	6% (n=5)
13	Women less confident in their abilities	5%(n=4)
14	Lack of female role models	5%(n=4)
15	Men have more variety in surgical career choices	5%(n=4)
16	No barriers	4%(n=3)
17	Male surgeons behaving inappropriately	4%(n=3)
18	Patients prefer male surgeons	4%(n=3)
19	Image of female surgeons as being on par with a nurse	2%(n=2)
20	Perceptions that women will want a less onerous career	2% (n=2)
21	Social barriers	2%(n=2)
22	Barriers are explicit, not hidden	2%(n=2)
23	Lack of flexibility	2%(n=2)
24	Women need to be seen as ruthless in order to succeed	2%(n=2)
25	Women need to pull their weight like a man	2%(n=2)
26	Hard for women to establish a private practice	n=1
27	Personal expectations	n=1
28	Historical/traditional expectations of women	n=1

The concept of a 'glass ceiling' for women within the surgical profession was raised, with 44% (n=36) feeling this did not exist. All 81 participants answered this question,

with 21% (n=17) feeling there was a tangible glass ceiling. The remaining 35% (n=28) chose not to comment.

Respondents were also asked if a glass ceiling existed at any particular levels during surgical training, with 9% (n=7) stating that this was evident at all levels; 6% (n=5) referred women underrepresentation at consultant role with different treatment compared to males.

Given the lack of women in surgical careers, participants were asked to comment on why women may be attracted to other clinical specialties. The most frequent responses (26%, n= 21) were quality of life/work-life balance and less unsocial hours (15%, n= 12) (see Table II).

Table II Benefits of working in non-surgical specialties for women

Quality of life/flexibility/work and life balance	26% (n=21)
More accepting of part-time/less than full time training (LTFT)	17% (n=14)
Less unsocial hours	15%(n=12)
More role models/mentoring	15% (n=12)
Accepting of childcare and family commitments	10% (n=8)
Less macho/male attitudes	7% (n=6)
Less on call	7% (n=6)
Less intimidating reputation/less competitive	6% (n=5)
Other	21% (n=17)
Not sure/don't know	16% (n=13)
Respondent skipped question	7% (n=6)

When asked what could be done to attract more women to the surgical professions, nearly half (42%, n=34) cited improved quality of life, and flexibility in part-time pathways with career and training options (see Table III).

Table III What could surgery do to attract more women to the profession?

Flexible training and career options (e.g. part-time, LTFT)	42% (n=34)
Project a less masculine image/address this	25% (n=20)
Improve the work/life balance	18% (n=15)
More female mentors/role models	18% (n=15)
More team/collaborative approaches	7% (n=6)
Financial support of trainees	6% (n=5)
Respondent skipped question	6% (n=5)
Others(<4 responses) Don't know Nothing Sessional work Less overbooking Less focus on service provision More positions in larger cities Remove perception of the need for PhDs	23% (n=19)

Although there is existing support for women in surgery, such as Less Than Full Time (LTFT) training and maternity leave, the dearth of women in surgical professions may demonstrate that there is a need for additional support mechanisms. Over 30% of respondents felt that LTFT training was perceived negatively, and this needed to be addressed. There was also a reported need to reduce stigma associated with women taking career breaks (22%, n=18) and to increase understanding of the impact of family on day-to-day activities (18%, n=15) in surgical practice (see Table IV).

Table IV What other support (aside from LTFT and maternity leave) is needed for women in surgery?

Change the negative perceptions of LTFT	32% (n=26)
Reduce the perceived stigma associated with women who take career breaks	22% (n=18)
Increase understanding of the perceived	18% (n=15)

impact of family on day to day work activities and support this	
Encourage men to take LTFT	15% (n=12)
Not sure	13%, (n=11)
Career break	13%, (n=11)
On site childcare	7%, (n=6)
More awareness and promotion of rules, regulations and support of gender equality and support for women	6% (n=5)
Nothing needed	6% (n=5)
Modular training	6% (n=5)
Other	26% (n=21)

To further explore the perceptions of a male-dominated surgical culture, participants were asked to list the specialties in which this dominated. More than half (53%, n=43) felt that Trauma and Orthopaedics was a sexist (12) specialty, followed by Cardiothoracic (16%, n= 13) and General Surgery (15%, n=12), with 15% reporting no surgical specialty as being more sexist than another (see Table V).

Table V Participant reported sexist surgical specialties

Surgical specialty	Reponses
Orthopaedics/Trauma	53% (n=43)
Cardiothoracic	16% (n=13)
General surgery	15% (n=12)
Not sure/don't know	15% (n=12)
Urology	5% (n=4)
None	4% (n=3)
Vascular	4% (n=3)
Neurosurgery	4% (n=3)
Hepatobiliary	N=1
Plastics	N=1
All	N=1
Leading question	N=1
Skipped question	11% (n=9)

Much of a culture is underpinned and shaped by the language used. Over half of respondents (58%, n=47) felt that gendered language exists within surgery. A quarter of the respondents confessed to having used gendered language themselves, but over half (52%, n=41) had not used it, with gendered language not affecting career choices for 87% (n=70%). The most common method of challenging gendered language was to speak out (21%, n=17), but 18% (n=15) had not encountered any incidences (see Table VI).

Table VI Challenging sexist language in the workplace

Action	Response
Speaking up/correcting/stating inappropriate language	21% (n=17)
Not experienced sexist language	18% (n=15)
Humour	9% (n=7)
Correcting/stating inappropriate language	9%(n=7)
Find it difficult	7% (n=6)
Non-confrontational approach/social media	2% (n=2)
Not able to interpret response	10%(n=8)
Ignore/refuse to respond	7%(n=6)

When asked what advice they would give to others when encountering gendered language, the most common recommendation was to confront or speak to the person (51%, n=41), with 17% (n=14) advising correction of the language used (see Table VII).

Table VII Advice to colleagues on dealing with sexist language in workplace environments

Advice	Response
Confront/speak to person involved	51% (n=41)
Correct the language used	17%(n=14)
Respondent did not answer	12% (n=10)

1	Deflect using humour	11% (n=9)
2	Do not accept/remain silent	10%(n=8)
3	Ignore	9% (n=7)
4	Be aware that people may not be aware they are using sexist language/don't make an issue out of it (unless 'over the line')/don't be overly sensitive	7% (n=6)
5	Seek support from others/support others	7% (n=6)
6	Don't know/no advice	4% (n=3)
7	File complaint	3% (n=2)
8	Demand apology	n=1
9	Treat as bullying	n=1

Thematic Analysis

There was an overarching theme of participants feeling constrained within the present surgical environment, which appears to be better equipped to support males, with sociocultural norms embedded in masculine discourses. The participants appeared to make efforts to fit into the environment, adapting a variety of stances to do this. The constraints were conceptualised as conflicting personal and career decisions, under-representation, a relative rigidity in surgical career structures, and the process of discrimination, both active and nuanced (self and others), that exists in current surgical practice. These themes are supported by in-vivo quotes from the data:

Conflict between personal and career decisions

'Trainees have families and other responsibilities to manage as well as surgical training'

'At registrar level, many women switch to GP training for family reasons'

'Maybe there is a glass ceiling, as the training scheme is long. When you want to have a family you are at senior level for jobs. It's harder to stay focused on career and your curriculum vitae (CV). This affects the quality of your CV at interview for consultancy. Somehow, it's easier for wives to follow their surgeon husbands rather than for husbands to follow surgeon wives'

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3 *'I am horrified by the stories of women in the first trimester of pregnancy with*
4 *morning sickness vomiting several times between procedures during a list,*
5 *and women in the third trimester doing nights, etc., especially when they want*
6 *to switch to a less physically intense session'*
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10 11 **Under-representation**

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14 *'Up until recently, there were no women in my sub-specialty'*
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16 *'Now that I am a consultant, I feel massively in the minority '*
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20 21 **Rigidity in surgical career structures**

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23 *'Reduce the hierarchal nature of surgical training; this would improve safety*
24 *and morale for all'*
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26 *'There needs to be a real understanding that having a small child really*
27 *hinders the ability to do things like extra work that needs to be completed out*
28 *of hours. If there was a way to come back into training but have a pause on in*
29 *counting towards your time up then there would be less financial and*
30 *timescale stress'*
31

32 *'Flexible training and to stop having such rigid pathways to CCT (Certificates*
33 *of Completion of Training), different paths are ok and valid. We also need true*
34 *competency based training – some people will complete faster than 5/6 years,*
35 *others might need longer. Be more open to time out.'*
36

37 *'There's an implicit assumption that surgeons will be able to have their*
38 *families trail around the country after them for jobs and fellowships.*
39 *Realistically this is less possible for women with professional partners and*
40 *small children. Women are presumed to deskill during maternity leave and*
41 *discouraged from working part-time.'*
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45 **Discrimination: self**

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47 *'Generally, women are less confident in their abilities, whereas men are more*
48 *confident...often holds females back'*
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50 *'Some women try and take advantage way over expected norms and use it to*
51 *bargain for favours which make things worse'*
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56 **Discrimination: others**

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3 *'People see a glass ceiling, actually you can get in, but you are treated*
4 *differently, so really a glass cliff'*

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6 *'You're an unlikely looking orthopod'*

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8 *'I find the surprise and confusion and refusal to believe I'm an orthopod e.g.*
9 *'you're too nice to be an orthopod' and 'that's not something to be proud of'*
10 *very frustrating'*

11
12 *'I recently presented a paper at a plenary session at a UK surgical meeting. I*
13 *was the only female presenter. I got equal marks as the top male candidate*
14 *(announced at the podium by the head of the society) but the prize was given*
15 *to the male and the prize was a tie'*

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18 *'I have done the World Health Organization checklist and then had the*
19 *comment 'we need to wait for the surgeon' despite having introduced myself*
20 *as the surgeon'*

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22 *'I got told by another surgeon that he left vascular surgery for plastics*
23 *because there were 'too many women surgeons and they caused too much*
24 *drama'.'*

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29 There were reported accounts of patients using gendered language with implicit
30 assumptions that female surgeons were not acceptable, or that being female was not
31 associated with being a surgeon:
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36 *'Patients don't think women can be doctors, let alone surgeons'*

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40 *'Significantly more patients call me nurse or lady doctor than any of my*
41 *colleagues'*

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44 *'Patients are often shocked that I will be doing their operation, and I have led*
45 *ward rounds where the patients have talked to my tall male F1 and not me'*

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47 *'Patients are extraordinarily sexist e.g. patients have walked into a consulting*
48 *room and said to me 'I thought I would be seeing a doctor at least' before I*
49 *had time to introduce myself. I am 34 and been a doctor for 10 years'*

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53 Perceived implicit discrimination was reported, but could not be proven:
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3 *'I had difficulty trying to get a consultant job. Although I was already working*
4 *as a locum consultant, I lost out many times to younger men who were all*
5 *registrars. Various reasons were cited, but I did begin to wonder if my face*
6 *didn't fit. Until a couple of years ago, there were no women in my particular*
7 *subspecialty'*

8
9 *'Improve the stigma that is sometimes attached to women who choose to take*
10 *time out of their careers for children. Many women I've spoken to say they*
11 *aren't viewed as competent as their full time colleagues'*

12
13 *'We lose out on consultant posts to younger males'*

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15 In the physical workplace, there was an account of discrimination:

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18 *'I am the only female Consultant General Surgeon in my Trust. I'm not*
19 *allowed in the consultant changing room. There is one consultant changing*
20 *room and it is for men only'*

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22 Accounts of discrimination were supported by other healthcare staff:

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24
25 *'Theatre staff have commented that male surgeons get more opportunities in*
26 *theatre than female'*

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28 There were also reports of female surgeons being discriminated against by other
29 non-surgical staff:

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31 *'The secretaries in my Trust do not do as much for the female consultants as*
32 *they are perceived as having taken a 'man's job'.'*

33 34 35 **Discussion**

36 This survey, conducted through the ASGBI social media platforms, illuminates the
37 lived realities of female surgeons in the UK today. Gender bias and discrimination
38 were reported by 59% of the participants irrespective of level of training and
39 experience, suggesting an ancient culture pervading our society since the 1800s, at
40 the time of the first female surgeon in the UK, Elizabeth Garrett (18, 19).

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48 The greatest perceived barrier to women wanting to pursue and persist with a career
49 in surgery was incongruity with motherhood and childcare commitments (50%).
50 Literature reports a significant level of attrition for women in surgical training (12),
51 traditionally seen as one of the most competitive and time-consuming specialties

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3 (13) with the perception that spending less time in surgical training would
4
5 compromise competency achievement (14). Furthermore, there is discrepancy on
6
7 parental leave policies across hospital trusts and specialties, despite widespread
8
9 recognition that better support for parents engenders marked benefits for the health
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11 and wellbeing of doctors, their children and ultimately healthcare provision (15). This
12
13 lack of support is potentially leading to burnout, since we know that this is ultimately
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15 driven by external factors such as excessive working hours, workload and conflicts
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17 with family commitments (16, 17). Thus, for some women, the only perceived option
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19 to preserve their own mental health is represented by withdrawing from surgical
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21 training.
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25 How do we create the change needed? Encouraging and tangible signs of an
26
27 already emergent cultural change, like day-care facilities and childcare options, are
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29 reflected in the wider societal acknowledgement of women in surgery. One example
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31 is the New Year's Honours List, where the Royal College of Surgeons of England
32
33 past president, and first female president, Clare Marx, received a damehood in
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35 acknowledgement of her contribution to surgical practice. In addition to this, Jackie
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37 Taylor has been chosen as president-elect of the Royal College of Physicians and
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39 Surgeons of Glasgow for the first time in its 418-year history, where, for the first time,
40
41 there is also a female surgical vice-president, Alison Lannigan. Whilst these women
42
43 are atypical and not necessarily representative of all women in surgery, they act as
44
45 positive role models for women in the context of career progression. We need
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47 strategic encouragement and education about the realities of leadership roles in
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49 STEM, along with instigation of evidence-based and effective schemes for gender
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51 equality in the workplace, such as the ATHENA SWAN for academic careers (18).
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3 Visibility of role models is key to increasing current female training rates and public
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5 advocacy campaigns through social media facilitate education and awareness of
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7 culturally sensitive matters. To this end, the ASGBI launched a Facebook group(10)
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9 to bring individuals together for networking and communications about women in
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11 surgery, parenting and work-life balance (10). As primary communication methods,
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13 social media are increasingly integrated into the daily routine of individuals personal
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15 activity and practice, with 68% of women and 62% of men using them (19). We aim
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17 to be what we see or what we deal with in our daily practice (20). The ASGBI
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19 #HowIBecameAWomanInSurgery” campaign was created on this basis to shine light
20
21 on the journey through the training pathways of female surgeons. Sharing their
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23 journeys aims to inspire and support other members, allowing them to see how
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25 frequently encountered barriers were overcome from different perspectives(21).
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27 Evidence of the benefits of mentoring to support women as they progress in their
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29 careers is plentiful (22) Interestingly, this survey revealed great awareness of the
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31 benefits of mentoring amongst female surgeons but a view in 15% that it currently
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33 remains an advantage to be gained primarily in non-surgical specialties.
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38 Finally, personality traits and behaviours adopted by surgeons are often perceived
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40 differently depending on a surgeon’s gender, which can have significant impact on
41
42 an individual’s confidence and self-reflection. Respondents to this survey noted
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44 being labelled as ruthless in order to succeed (2%), pressured to ‘pull their weight
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46 like a man’ (2%) and admitted a lack of confidence in their ability (5%). Women excel
47
48 in some areas more typically difficult for their male counterparts, including
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50 communication, collaboration, and patient centeredness (23). Recent analysis of
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52 over 100,000 surgical patients in Canada, found that those who were operated on by
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54 female surgeons were less likely to die one month after their procedure (24),
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3 mirroring a previous study according to which female internal medicine doctors had
4 slightly lower rates of death within 30 days of initial hospitalisation (25). Those data
5 need adequate dissemination amongst healthcare professionals and general
6 population, as in our survey the glass ceiling for women is also represented by
7 nurses and patients (7%).
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13 This study builds on the global commitment for greater female representation and
14 support in STEM. The greatest challenge currently faced, in the opinion of the
15 authors, is the realisation and elimination of unconscious bias existing in surgery.
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Gender equity is a leadership issue: when more women are in leadership positions, organisations offer employees more generous policies to support workplace gender (26, 27) and produce better business results (28).

Cultural change requires a nucleus of organisational catalysts who are insiders with outsiders' cultural beliefs (29). In today's workplace, these are colleagues at every level of power and leadership acting to call out insults and affronts, eliminate pay and promotion disparities, and advocate for policies that retain a diverse talent pool. Male surgeon colleagues who already mentor and support females are appreciated, but women, also need to step up and promote themselves (30). The glass ceiling for women in science is created by people, of either gender, and it can only be broken if all are aware of it and change their behaviour and attitude towards it.

Limitations

Despite a high response rate, the participants had responded to social media requests through ASGBI, therefore the findings are reflective of professionals active on social media and might not be representative of the entire female surgical workforce in the UK. Not all participants filled in the free text boxes and the themes

constructed from the written data are the researchers' interpretations of the written responses.

Recommendations

The survey posits a current theme of constraints for women working within surgical practice in the UK. The findings should be explored further in National and International Collaborative research for women working in surgery. Interviews and focus groups as methods of data collection would allow participants to speak about their experiences and perspectives in greater detail. A consensus conference, with the guidance and support of regulatory and educational bodies such as ASGBI, could fully explore the barriers faced and work together to produce targeted action plans to address the barriers described.

Authors' contributions:

Maria Irene Bellini designed the study, wrote the article, searched the literature and interpreted the data; Catherine Hayes and Yitka Graham performed the analysis, wrote the article and interpreted the data; Roxanna Zakeri wrote the article and interpreted the data; Rowan Parks and Vassilios Papalois conceptualized the study, wrote the article, interpreted the data and are the senior authors and executive of the ASGBI.

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BMJ Open

A woman's place is in theatre: women's perceptions and experiences of working in surgery from the Association of Surgeons of Great Britain and Ireland Women in Surgery working group.

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Primary Subject Heading:	Surgery
Secondary Subject Heading:	Health policy
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Manuscripts

Title: A woman's place is in theatre: women's perceptions and experiences of working in surgery from the Association of Surgeons of Great Britain and Ireland Women in Surgery working group.

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Abbreviations

ASGBI: Associations of Surgeons of Great Britain and Ireland

CCT: Certificates of Completion of Training

CV: Curriculum Vitae

LTFT: Less Than Full Time

STEM: Science, Technology, Engineering and Mathematics

WHO: World Health Organization

Keywords: surgery, gender equity, surgical career, STEM

Abstract Word count 300

Objective: Surgery remains an inherently male-dominated profession. The aim of this study was to survey women working within the discipline, to understand their current perceptions, providing insight into their practical day-to-day lives, supporting an action-oriented change.

Design and Setting: The link to a confidential, on-line survey was distributed through the Association of Surgery of Great Britain and Ireland (ASGBI) social media platforms on Facebook and Twitter over a two-week period in October 2017.

Participants: Women working in surgical specialties and actively responding to the link shared through the ASGBI social media platforms. No patients were involved in the study.

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3 **Primary and Secondary Outcome measures:** Data were analysed through a mixed
4 methods approach. The quantitative data was analysed through descriptive
5 statistics and qualitative analysis was undertaken using a constant comparative
6 analysis of the participants' comments, to identify salient patterns (themes).
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13 **Results:** A total of 81 female participants replied (42% response rate based on the
14 Facebook group members), with 88% (n=71) perceiving surgery as a male-
15 dominated field. Over half had experienced discrimination (59%, n=47), whilst 22%
16 (n=18) perceived a 'glass ceiling' in surgical training. Orthopaedics was reported as
17 the most sexist surgical specialty by 53% (n=43). Accounts of gendered language in
18 the workplace were reported by 59% (n=47), with 32% (n=25) of surveys participants
19 having used it. Overall, a lack of formal mentorship, inflexibility towards part-time
20 careers, gender stereotypes and poor work-life balance were the main perceived
21 barriers for women in surgical careers.
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35 **Conclusion:** These findings highlight the implicit nature of the perceived
36 discrimination that women report in their surgical careers. The ASGBI acknowledges
37 these perceptual issues and relative implications as the first of many steps to create
38 an action-oriented change by allowing all staff, regardless of gender, to reflect on
39 their own behaviour, perceptions and the culture in which they work.
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47 **Trial registration:** not applicable
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51 **Strengths and limitations of the study:**
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- This study adopted a multiple methods approach with the qualitative elements enriching the quantitative data on the topics addressed.
- The nature of the survey allowed critical introspection with a useful insight to create the action-oriented change.
- The representativeness and transferability of the data are hindered by the probability that women who had encountered discrimination were more likely to respond to this survey.
- As an online survey, it was not possible to probe to gain a deeper understanding of the comments.

Article Word count 4291

Introduction

Despite annual intakes of medical school cohorts evidencing a 55% female contingent, only 28% of these women eventually pursue a career in surgery via higher surgical training in the UK (1). Beyond these baseline figures, a qualitative analysis of the factors deterring women from pursuing surgery as a career in the western countries is needed to understand more in depth the nature of these hidden barriers (2).

In reality, several extraneous variables rooted in socio-cultural backgrounds, such as toy-makers sometimes blatantly but more often inadvertently, discourage girls from studying science, technology, engineering and mathematics (STEM) (3), as do some of their teachers (4, 5). It is evident that some girls lack role models in these fields and grow up with the unfounded pre-supposition they would not do well in those, considered male and technical professions (6). This ultimately influences their

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3 intrinsic motivation and their resultant capacity to succeed in fields like surgery, due
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5 to the perception that these careers require self-selected individuals who are driven,
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7 competitive, and able to endure years of intense schooling and high expectations (7).
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10 Although there is acknowledgement of the longstanding historical contribution to
11
12 surgical practice from women (8, 9) the manner in which women feel perceived by
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14 their male counterparts is under-evidenced and little reported. The key aim of this
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16 study is then to capture the perceived barriers in the experiences of women working
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18 within the field of surgery and to use them as a source of reflection for surgical staff
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20 of either gender, for policy makers and for professional bodies such as the
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22 Association of Surgeons of Great Britain and Ireland (ASGBI). Acknowledging these
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24 issues is the first of many steps to addressing their implication and to help moving
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26 beyond tokenism in the co-construction of relevant, impactful and evidence-based
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28 action(10).
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34 **Methods**

35 The link to a voluntary, confidential, on-line survey was distributed through the
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37 ASGBI Women in Surgery social media platforms of Facebook (191 members) and
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39 shared via Twitter for a two week period in October 2017. Weekly reminders were
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41 posted. The Facebook site (11) is a closed group comprised of healthcare
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43 professionals working in the field of surgery. It is mainly composed by women (90%),
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45 aged between 25-34 years (39%) and 35-44 years (30%). The main origin country is
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47 the UK (70%), with also contribution from India, Pakistan, USA, Europe and Africa.
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51 The questions were designed to understand whether barriers exist to deter women
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53 from pursuing surgery as a career, and if so, what these barriers are and what
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55 interventions would be suggested in order to reduce them. Respondents were
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3 encouraged to provide their personal opinions throughout the free text boxes after
4 each question. As the aim of the research was to obtain as many responses as
5 possible, whilst understanding the participants' experiences of being a female
6 working in surgery, a mixed methods approach was used. The quantitative data was
7 analysed through descriptive statistics, and to provide context to this data and more
8 fully explore the participants' responses, a qualitative approach was taken using
9 constant comparative analysis of the participants' comments, to identify patterns
10 (themes) within the responses. This was guided by the principles of thematic
11 analysis (12), using a six step process of data familiarisation, generating initial
12 codes, searching for themes, reviewing themes, defining and naming themes and
13 producing the report.
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26 27 *Patient and Public Involvement.*

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29 No patients were involved in the study. Given the sensitivity of the topic, the closed
30 access to the social media platforms, and the wish to ensure honest, open
31 responses and anonymity, no demographic information was collected.
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38 **Results**

39 A total of 81 participants completed the survey, an estimated response rate of 42%
40 based on the Facebook group membership. It was not possible to determine how the
41 Twitter platform influenced response rate.
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47 ***Quantitative Analysis***

48
49 The 88% (n=71) felt that surgery remains a male-dominated field, with 59% (n=47)
50 reporting or witnessing discrimination against females in the workplace. The hidden
51 barriers for women reported by 34% (n=28) were that the profession was not
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conducive to motherhood and family life, with 16% (n=13) citing childcare issues. There was a perception that the surgical profession and culture was male-oriented, conceptualised as an 'old boys club' (16%, n=33) and possessing a masculine attitude and negative bias (13%, n=9). The framework for a career in surgery was reported as lacking flexibility and part-time careers (12%, n=10), with 10% (n=8) citing unsocial hours and working patterns (see Table I).

Table I Participant-perceived barriers to a career in surgery

Barrier	Response
Not a profession conducive with motherhood, family and children	34% (n=28)
Childcare issues	16%(n=13)
'Old Boys' Club/network	16% (n=13)
Male attitudes/bias	13%(n=11)
Culture of surgery as a masculine field	12% (n=10)
Unconscious bias	12%(n=10)
Lack of flexible/part-time training	12%(n=10)
Unsocial hours/working patterns/rotas	10%(n=8)
Perceptions by Nurses and Patients that women are not able to be surgeons	7%(n=6)
Maternity leave/career break	6%(n=5)
Women are excluded from 'male-only' social events	6% (n=5)
Women less confident in their abilities	5%(n=4)
Lack of female role models	5%(n=4)
Men have more variety in surgical career choices	5%(n=4)
Male surgeons behaving inappropriately	4%(n=3)
Patients prefer male surgeons	4%(n=3)
Image of female surgeons as being on par with a nurse	2%(n=2)
Perceptions that women will want a less onerous career	2% (n=2)
Social barriers	2%(n=2)
Barriers are explicit, not hidden	2%(n=2)
Lack of flexibility	2%(n=2)
Women need to be seen as ruthless in order to succeed	2%(n=2)
Women need to pull their weight like a man	2%(n=2)
Hard for women to establish a private practice	n=1
Personal expectations	n=1
Historical/traditional expectations of women	n=1
No barriers	4% (n=3)
Respondent skipped question	7%(n=6)

The concept of a 'glass ceiling' for women within the surgical profession was raised, with 44% (n=36) feeling this did not exist. All 81 participants answered this question, with 21% (n=17) feeling there was a tangible glass ceiling. The remaining 35% (n=28) chose not to comment.

Respondents were also asked if a glass ceiling existed at any particular levels during surgical training, with 9% (n=7) stating that this was evident at all levels; 6% (n=5) referred women underrepresentation at consultant role with different treatment compared to males.

Given the lack of women in surgical careers, participants were asked to comment on why women may be attracted to other clinical specialties. The most frequent responses (26%, n= 21) were quality of life/work-life balance and less unsocial hours (15%, n= 12) (see Table II).

Table II Benefits of working in non-surgical specialties for women

Quality of life/flexibility/work and life balance	26% (n=21)
More accepting of part-time/less than full time training (LTFT)	17% (n=14)
Less unsocial hours	15%(n=12)
More role models/mentoring	15% (n=12)
Accepting of childcare and family commitments	10% (n=8)
Less macho/male attitudes	7% (n=6)
Less on call	7% (n=6)
Less intimidating reputation/less competitive	6% (n=5)
Other	21% (n=17)
Not sure/don't know	16% (n=13)
Respondent skipped question	7% (n=6)

When asked what could be done to attract more women to the surgical professions, nearly half (42%, n=34) cited improved quality of life, and flexibility in part-time pathways with career and training options (see Table III).

Table III What could surgery do to attract more women to the profession?

Flexible training and career options (e.g. part-time, LTFT)	42% (n=34)
Project a less masculine image/address this	25% (n=20)
Improve the work/life balance	18% (n=15)
More female mentors/role models	18% (n=15)
More team/collaborative approaches	7% (n=6)
Financial support of trainees	6% (n=5)
Remove the perception of the need for PhDs/to be an academic	3 % (n=3)
Sessional work	2% (n=2)
More positions in larger cities	2% (n=2)
Less overbooking	1% (n=2)
More surgical training for medical students	1% (n=1)
Educate surgeons in unconscious bias	1% (n=1)
Don't know/Not sure	5% (n=5)
Nothing	3% (n=3)
Respondent skipped question	6% (n=5)

Although there is existing support for women in surgery, such as Less Than Full Time (LTFT) training and maternity leave, the dearth of women in surgical professions may demonstrate that there is a need for additional support mechanisms. Over 30% of respondents felt that LTFT training was perceived negatively, and this needed to be addressed. There was also a reported need to reduce stigma associated with women taking career breaks (22%, n=18) and to increase understanding of the impact of family on day-to-day activities (18%, n=15) in surgical practice (see Table IV).

Table IV What other support (aside from LTFT and maternity leave) is needed for women in surgery?

Change the negative perceptions of LTFT	32% (n=26)
Reduce the perceived stigma associated with women who take career breaks	22% (n=18)
Increase understanding of the perceived impact of family on day to day	18%

work activities and support this	(n=15)
Encourage men to take LTFT	15% (n=12)
Not sure	13%, (n=11)
Career break	13%, (n=11)
On site childcare	7%, (n=6)
More awareness and promotion of rules, regulations and support of gender equality and support for women	6% (n=5)
Nothing needed	6% (n=5)
Modular training	6% (n=5)
Other	26% (n=21)

To further explore the perceptions of a male-dominated surgical culture, participants were asked to list the specialties in which this dominated. More than half (53%, n=43) felt that Trauma and Orthopaedics was a sexist specialty, followed by Cardiothoracic (16%, n= 13) and General Surgery (15%, n=12), with 15% reporting no surgical specialty as being more sexist than another (see Table V).

Table V Participant reported sexist surgical specialties

Surgical specialty	Reponses
Orthopaedics/Trauma	53% (n=43)
Cardiothoracic	16% (n=13)
General surgery	15% (n=12)
Not sure/don't know	15% (n=12)
Urology	5% (n=4)
None	4% (n=3)
Vascular	4% (n=3)
Neurosurgery	4% (n=3)
Hepatobiliary	n=1
Plastics	n=1
All	n=1
Leading question	n=1
Skipped question	11% (n=9)

Over half of respondents (58%, n=47) felt that gendered language exists within surgery. A quarter of the respondents confessed to having used gendered language themselves, but over half (52%, n=41) had not used it, with gendered language not affecting career choices for 87% (n=70%). The most common method of challenging gendered language was to speak out/correct and state inappropriate language (30%, n=24), but 18% (n=15) had not encountered any incidences (see Table VI).

Table VI Challenging sexist language in the workplace

Action	Response
Speaking up/correcting/stating inappropriate language	30% (n=24)
Not experienced sexist language	18% (n=15)
Humour	9% (n=7)
Find it difficult	7% (n=6)
Non-confrontational approach/social media	2% (n=2)
Not able to interpret response	10%(n=8)
Ignore/refuse to respond	7%(n=6)

When asked what advice they would give to others when encountering gendered language, the most common recommendation was to confront or speak to the person (51%, n=41), with 17% (n=14) advising correction of the language used (see Table VII).

Table VII Advice to colleagues on dealing with sexist language in workplace environments

Advice	Response
Confront/speak to person involved	51% (n=41)
Correct the language used	17%(n=14)
Respondent did not answer	12% (n=10)
Deflect using humour	11% (n=9)
Do not accept/remain silent	10%(n=8)
Ignore	9% (n=7)
Be aware that people may not be aware they are using sexist language/don't make an issue out of it (unless 'over the line')/don't be overly sensitive	7% (n=6)
Seek support from others/support others	7% (n=6)
Don't know/no advice	4% (n=3)
File complaint	3% (n=2)

Demand apology	n=1
Treat as bullying	n=1

Thematic Analysis

There was an overarching theme of participants feeling constrained within the present surgical environment, which appears to be better equipped to support males, with sociocultural norms embedded in masculine discourses. The participants appeared to make efforts to fit into the environment, adapting a variety of stances to do this. The constraints were conceptualised as conflicting personal and career decisions, under-representation, a relative rigidity in surgical career structures, and the process of discrimination, both active and nuanced (self and others), that exists in current surgical practice. These themes are supported by in-vivo quotes from the data:

Conflict between personal and career decisions

'Trainees have families and other responsibilities to manage as well as surgical training'

'At registrar level, many women switch to GP training for family reasons'

'Maybe there is a glass ceiling, as the training scheme is long. When you want to have a family you are at senior level for jobs. It is harder to stay focused on career and your curriculum vitae (CV). This affects the quality of your CV at interview for consultancy. Somehow, it's easier for wives to follow their surgeon husbands rather than for husbands to follow surgeon wives'

'I am horrified by the stories of women in the first trimester of pregnancy with morning sickness vomiting several times between procedures during a list, and women in the third trimester doing nights, etc., especially when they want to switch to a less physically intense session'

Under-representation

1
2
3 *'Up until recently, there were no women in my sub-specialty'*
4

5 *'Now that I am a consultant, I feel massively in the minority'*
6
7

8 9 **Rigidity in surgical career structures**

10
11
12 *'Reduce the hierarchal nature of surgical training; this would improve safety*
13 *and morale for all'*
14

15 *'There needs to be a real understanding that having a small child really*
16 *hinders the ability to do things like extra work that needs to be completed out*
17 *of hours. If there was a way to come back into training but have a pause on in*
18 *counting towards your time up then there would be less financial and*
19 *timescale stress'*
20

21 *'Flexible training and to stop having such rigid pathways to CCT (Certificates*
22 *of Completion of Training), different paths are ok and valid. We also need true*
23 *competency based training – some people will complete faster than 5/6 years,*
24 *others might need longer. Be more open to time out.'*
25

26 *'There's an implicit assumption that surgeons will be able to have their*
27 *families trail around the country after them for jobs and fellowships.*
28 *Realistically this is less possible for women with professional partners and*
29 *small children. Women are presumed to deskill during maternity leave and*
30 *discouraged from working part-time.'*
31

32 33 34 **Discrimination: self**

35
36 *'Generally, women are less confident in their abilities, whereas men are more*
37 *confident...often holds females back'*
38

39 *'Some women try and take advantage way over expected norms and use it to*
40 *bargain for favours which make things worse'*
41
42

43 44 45 **Discrimination: others**

46
47
48 *'People see a glass ceiling, actually you can get in, but you are treated*
49 *differently, so really a glass cliff'*
50

51 *'You're an unlikely looking orthopod'*
52

53 *'I find the surprise and confusion and refusal to believe I'm an orthopod e.g.*
54 *'you're too nice to be an orthopod' and 'that's not something to be proud of'*
55 *very frustrating'*
56
57

1
2
3 *'I recently presented a paper at a plenary session at a UK surgical meeting. I*
4 *was the only female presenter. I got equal marks as the top male candidate*
5 *(announced at the podium by the head of the society) but the prize was given*
6 *to the male and the prize was a tie'*
7

8 *'I have done the World Health Organization checklist and then had the*
9 *comment 'we need to wait for the surgeon' despite having introduced myself*
10 *as the surgeon'*
11

12 *'I got told by another surgeon that he left vascular surgery for plastics*
13 *because there were 'too many women surgeons and they caused too much*
14 *drama'.'*
15

16
17
18
19 There were reported accounts of patients using gendered language with implicit
20 assumptions that female surgeons were not acceptable, or that being female was not
21 associated with being a surgeon:
22
23

24
25
26 *'Patients don't think women can be doctors, let alone surgeons'*
27

28
29
30 *'Significantly more patients call me nurse or lady doctor than any of my*
31 *colleagues'*
32

33
34
35 *'Patients are often shocked that I will be doing their operation, and I have led*
36 *ward rounds where the patients have talked to my tall male F1 and not me'*
37

38 *'Patients are extraordinarily sexist e.g. patients have walked into a consulting*
39 *room and said to me 'I thought I would be seeing a doctor at least' before I*
40 *had time to introduce myself. I am 34 and been a doctor for 10 years'*
41

42
43 Perceived implicit discrimination was reported, but could not be proven:
44
45

46 *'I had difficulty trying to get a consultant job. Although I was already working*
47 *as a locum consultant, I lost out many times to younger men who were all*
48 *registrars. Various reasons were cited, but I did begin to wonder if my face*
49 *didn't fit. Until a couple of years ago, there were no women in my particular*
50 *subspecialty'*
51

52 *'Improve the stigma that is sometimes attached to women who choose to take*
53 *time out of their careers for children. Many women I've spoken to say they*
54 *aren't viewed as competent as their full time colleagues'*
55

56 *'We lose out on consultant posts to younger males'*
57
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1
2
3 In the physical workplace, there was an account of discrimination:
4

5 *'I am the only female Consultant General Surgeon in my Trust. I'm not*
6 *allowed in the consultant changing room. There is one consultant changing*
7 *room and it is for men only'*
8

9 Accounts of discrimination were supported by other healthcare staff:
10

11
12 *'Theatre staff have commented that male surgeons get more opportunities in*
13 *theatre than female'*
14

15 There were also reports of female surgeons being discriminated against by other
16 non-surgical staff:
17

18 *'The secretaries in my Trust do not do as much for the female consultants as*
19 *they are perceived as having taken a 'man's job'.'*
20
21

22 **Discussion**

23
24 This survey, conducted through the ASGBI social media platforms, illuminates the
25
26 lived realities of female surgeons in the UK today. Gender bias and discrimination
27
28 were reported by 59% of the participants irrespective of level of training and
29
30 experience, suggesting an ancient culture pervading our society since the 1800s, at
31
32 the time of the first female surgeon in the UK, Elizabeth Garrett (13, 14).
33
34

35
36 The greatest perceived barrier to women wanting to pursue and persist with a career
37
38 in surgery was incongruity with motherhood and childcare commitments (50%).
39
40 Literature reports a significant level of attrition for women in surgical training (15),
41
42 traditionally seen as one of the most competitive and time-consuming specialties
43
44 (16) with the perception that spending less time in surgical training would
45
46 compromise competency achievement (17). Furthermore, there is discrepancy on
47
48 parental leave policies across hospital trusts and specialties, despite widespread
49
50 recognition that better support for parents engenders marked benefits for the health
51
52 and wellbeing of doctors, their children and ultimately healthcare provision (18). The
53
54 general perception is that family-friendliness may be hard to reconcile with the
55
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3 working requirements of the surgical specialty, often involving patient treatment of
4 unknown length or at unsocial times of day or night (19). There is a challenge to
5 manage work in these areas and to improve family-friendliness without
6 compromising patient care. This lack of support is potentially leading to burnout,
7 since we know that this is ultimately driven by external factors such as excessive
8 working hours, workload and conflicts with family commitments (13, 14). Thus, for
9 some women, the only perceived option to preserve their own mental health is
10 represented by withdrawing from surgical training.

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21 How do we create the change needed? Encouraging and tangible signs of an
22 already emergent cultural change, like day-care facilities and childcare options, are
23 reflected in the wider societal acknowledgement of women in surgery. One example
24 is the New Year's Honours List, where the Royal College of Surgeons of England
25 past president, and first female president, Clare Marx, received a damehood in
26 acknowledgement of her contribution to surgical practice. In addition to this, Jackie
27 Taylor has been chosen as president-elect of the Royal College of Physicians and
28 Surgeons of Glasgow for the first time in its 418-year history, where, for the first time,
29 there is also a female surgical vice-president, Alison Lannigan. Whilst these women
30 are atypical and not necessarily representative of all women in surgery, they act as
31 positive role models for women in the context of career progression. We need
32 strategic encouragement and education about the realities of leadership roles in
33 STEM, along with instigation of evidence-based and effective schemes for gender
34 equality in the workplace, such as the ATHENA SWAN for academic careers (20).

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Visibility of role models is key to increasing current female training rates and public
advocacy campaigns through social media facilitate education and awareness of
culturally sensitive matters. To this end, the ASGBI launched a Facebook group(11)

1
2
3 to bring individuals together for networking and communications about women in
4 surgery, parenting and work-life balance (11). As primary communication methods,
5 social media are increasingly integrated into the daily routine of individuals personal
6 activity and practice, with 68% of women and 62% of men using them (21). We aim
7 to be what we see or what we deal with in our daily practice (22). The ASGBI
8 #HowIBecameAWomanInSurgery” campaign was created on this basis to shine light
9 on the journey through the training pathways of female surgeons. Since much of a
10 culture is underpinned and shaped by the language used (23), we advocate for a
11 cultural identification with women becoming surgeons. Sharing the journeys of
12 successful female surgeons aims to inspire and support other members, allowing
13 them to see how frequently encountered barriers were overcome from different
14 perspectives(24). Evidence of the benefits of mentoring to support women as they
15 progress in their careers is plentiful (25). Interestingly, this survey revealed great
16 awareness of the benefits of mentoring amongst female surgeons, but a view in 15%
17 that it currently remains an advantage to be gained primarily in non-surgical
18 specialties. The lack of female role models in surgical leadership and consultancy
19 positions contribute to the perpetration of the white male stereotypical gender role,
20 and those who do not fulfil these characteristics, may believe they cannot make in
21 this environment (22, 26). To address this structural problem, a more diverse senior
22 team could prevent discrimination against women in surgery favouring their hiring
23 and promotion.

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49 Finally, personality traits and behaviours adopted by surgeons are often perceived
50 differently depending on a surgeon’s gender, which can have significant impact on
51 an individual’s confidence and self-reflection. Respondents to this survey noted
52 being labelled as ruthless in order to succeed (2%), pressured to ‘pull their weight
53
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1
2
3 like a man' (2%) and admitted a lack of confidence in their ability (5%). Women excel
4
5 in some areas more typically difficult for their male counterparts, including
6
7 communication, collaboration, and patient centeredness (27). Recent analysis of
8
9 over 100,000 surgical patients in Canada, found that those who were operated on by
10
11 female surgeons were less likely to die one month after their procedure (28). More in
12
13 details, the selection of the surgical procedures followed these criteria: inclusion of
14
15 all surgical subspecialties with female surgeons and either frequently performed in
16
17 Ontario or having an increased likelihood of complications. The patients were
18
19 matched on a 1:1 basis, using a hard match comprising procedural fee code,
20
21 surgeon volume, surgeon age, hospital identifier, patient age, patient sex and patient
22
23 comorbidities. The findings mirrored those of an analogue study, according to which
24
25 female internal medicine doctors had slightly lower rates of death within 30 days of
26
27 initial hospitalisation (29). Those data need adequate dissemination amongst
28
29 healthcare professionals and general population, as in our survey the glass ceiling
30
31 for women is also represented by nurses and patients (7%).
32
33
34

35 This study builds on the global commitment for greater female representation and
36
37 support in STEM. The greatest challenge currently faced, in the opinion of the
38
39 authors, is the realisation and elimination of unconscious bias existing in surgery.
40
41 Gender equity is a leadership issue: when more women are in leadership positions,
42
43 organisations offer employees more generous policies to support workplace gender
44
45 (30, 31) and produce better business results (32).
46
47

48 Cultural change requires a nucleus of organisational catalysts who are insiders with
49
50 outsiders' cultural beliefs (33). In today's workplace, these are colleagues at every
51
52 level of power and leadership acting to call out insults and affronts, eliminate pay and
53
54 promotion disparities, and advocate for policies that retain a diverse talent pool. Male
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3 surgeon colleagues who already mentor and support females are appreciated, but
4
5 women, also need to step up and promote themselves (34). The glass ceiling for
6
7 women in science is created by people, of either gender, and it can only be broken if
8
9 all are aware of it and change their behaviour and attitude towards it.

11 **Limitations**

12
13
14 The representativeness and transferability of the results are hindered by the
15
16 response of the participants to a social media requests through ASGBI, therefore the
17
18 findings are reflective of professionals active on social media and might not be
19
20 representative of the entire female surgical workforce in the UK. Furthermore, those
21
22 who experienced gender inequalities might have been more likely to answer, with a
23
24 selection bias, or those who were replying may have had recall bias based on the
25
26 nature of the questions.
27
28

29
30 Not all participants filled in the free text boxes and the themes constructed from the
31
32 written data are the researchers' interpretations of the written responses. Since it
33
34 was an online survey, it was not possible to probe to gain a deeper understanding of
35
36 the comments
37
38

39 **Recommendations**

40
41
42 The survey posits a current theme of constraints for women working within surgical
43
44 practice in the UK. The findings should be explored further in National and
45
46 International Collaborative research for women working in surgery. Interviews and
47
48 focus groups as methods of data collection would allow participants to speak about
49
50 their experiences and perspectives in greater detail. A consensus conference, with
51
52 the guidance and support of regulatory and educational bodies such as ASGBI,
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could fully explore the barriers faced and work together to produce targeted action plans to address the barriers described.

Authors' contributions:

Maria Irene Bellini designed the study, wrote the article, searched the literature and interpreted the data; Catherine Hayes and Yitka Graham performed the analysis, wrote the article and interpreted the data; Roxanna Zakeri wrote the article and interpreted the data; Rowan Parks and Vassilios Papalois conceptualized the study, wrote the article, interpreted the data and are the senior authors and executive of the ASGBI.

Conflict of interest: none

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Data sharing statement

The data used to support the findings of this study are included within the article.

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BMJ Open

A woman's place is in theatre: women's perceptions and experiences of working in surgery from the Association of Surgeons of Great Britain and Ireland Women in Surgery working group.

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Manuscripts

Title: A woman's place is in theatre: women's perceptions and experiences of working in surgery from the Association of Surgeons of Great Britain and Ireland Women in Surgery working group.

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14 **Abbreviations**

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18 ASGBI: Associations of Surgeons of Great Britain and Ireland

19 CCT: Certificates of Completion of Training

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21 CV: Curriculum Vitae

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23 LTFT: Less Than Full Time

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25 STEM: Science, Technology, Engineering and Mathematics

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27 WHO: World Health Organization
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32 **Keywords:** surgery, gender equity, surgical career, STEM
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34 **Abstract Word count 300**

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37 **Objective:** Surgery remains an inherently male-dominated profession. The aim of this
38 study was to survey women working within the discipline, to understand their current
39 perceptions, providing insight into their practical day-to-day lives, supporting an action-
40 oriented change.
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48 **Design and Setting:** The link to a confidential, on-line survey was distributed through the
49 Association of Surgery of Great Britain and Ireland (ASGBI) social media platforms on
50 Facebook and Twitter over a two-week period in October 2017.
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3 **Participants:** Women working in surgical specialties and actively responding to the link
4 shared through the ASGBI social media platforms. No patients were involved in the study.
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10 **Primary and Secondary Outcome measures:** Data were analysed through a mixed
11 methods approach. The quantitative data was analysed through descriptive statistics and
12 qualitative analysis was undertaken using a constant comparative analysis of the
13 participants' comments, to identify salient patterns (themes).
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21 **Results:** A total of 81 female participants replied (42% response rate based on the
22 Facebook group members), with 88% (n=71) perceiving surgery as a male-dominated
23 field. Over half had experienced discrimination (59%, n=47), whilst 22% (n=18) perceived
24 a 'glass ceiling' in surgical training. Orthopaedics was reported as the most sexist surgical
25 specialty by 53% (n=43). Accounts of gendered language in the workplace were reported
26 by 59% (n=47), with 32% (n=25) of surveys participants having used it. Overall, a lack of
27 formal mentorship, inflexibility towards part-time careers, gender stereotypes and poor
28 work-life balance were the main perceived barriers for women in surgical careers.
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42 **Conclusion:** These findings highlight the implicit nature of the perceived discrimination
43 that women report in their surgical careers. The ASGBI acknowledges these perceptual
44 issues and relative implications as the first of many steps to create an action-oriented
45 change by allowing all staff, regardless of gender, to reflect on their own behaviour,
46 perceptions and the culture in which they work.
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54 **Trial registration:** not applicable
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Strengths and limitations of the study:

- This study adopted a multiple methods approach with the qualitative elements enriching the quantitative data on the topics addressed.
- The nature of the survey allowed critical introspection with a useful insight to create the action-oriented change.
- The representativeness and transferability of the data are hindered by the probability that women who had encountered discrimination were more likely to respond to this survey.
- As an online survey, it was not possible to probe to gain a deeper understanding of the comments.

Article Word count 4251

Introduction

Despite annual intakes of medical school cohorts evidencing a 55% female contingent, only 28% of these women eventually pursue a career in surgery via higher surgical training in the UK (1). Beyond these baseline figures, a qualitative analysis of the factors deterring women from pursuing surgery as a career in the western countries is needed to understand more in depth the nature of these hidden barriers (2).

In reality, several extraneous variables rooted in socio-cultural backgrounds, such as toy-makers sometimes blatantly but more often inadvertently, discourage girls from studying

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3 science, technology, engineering and mathematics (STEM) (3), as do some of their
4 teachers (4, 5). It is evident that some girls lack role models in these fields and grow up
5 with the unfounded pre-supposition they would not do well in those, considered male and
6 technical professions (6). This ultimately influences their intrinsic motivation and their
7 resultant capacity to succeed in fields like surgery, due to the perception that these
8 careers require self-selected individuals who are driven, competitive, and able to endure
9 years of intense schooling and high expectations (7).

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11 Although there is acknowledgement of the longstanding historical contribution to surgical
12 practice from women (8, 9) the manner in which women feel perceived by their male
13 counterparts is under-evidenced and little reported. The key aim of this study is then to
14 capture the perceived barriers in the experiences of women working within the field of
15 surgery and to use them as a source of reflection for surgical staff of either gender, for
16 policy makers and for professional bodies such as the Association of Surgeons of Great
17 Britain and Ireland (ASGBI). Acknowledging these issues is the first of many steps to
18 addressing their implication and to help moving beyond tokenism in the co-construction
19 of relevant, impactful and evidence-based action(10).

43 **Methods**

44 The link to a voluntary, confidential, on-line survey was distributed through the ASGBI
45 Women in Surgery social media platforms of Facebook (191 members) and shared via
46 Twitter for a two week period in October 2017. Weekly reminders were posted. The
47 Facebook site (11) is a closed group comprised of healthcare professionals working in
48 the field of surgery. It is mainly composed by women (90%), aged between 25-34 years

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3 (39%) and 35-44 years (30%). The main origin country is the UK (70%), with also
4 contribution from India, Pakistan, USA, Europe and Africa.
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9 The questions were designed to understand whether barriers exist to deter women from
10 pursuing surgery as a career, and if so, what these barriers are and what interventions
11 would be suggested in order to reduce them. Respondents were encouraged to provide
12 their personal opinions throughout the free text boxes after each question. As the aim of
13 the research was to obtain as many responses as possible, whilst understanding the
14 participants' experiences of being a female working in surgery, a mixed methods
15 approach was used. The quantitative data was analysed through descriptive statistics,
16 and to provide context to this data and more fully explore the participants' responses, a
17 qualitative approach was taken using constant comparative analysis of the participants'
18 comments, to identify patterns (themes) within the responses. This was guided by the
19 principles of thematic analysis (12), using a six step process of data familiarisation,
20 generating initial codes, searching for themes, reviewing themes, defining and naming
21 themes and producing the report.
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40 ASGBI Ethical Committee approved this study. Given the sensitivity of the topic, the
41 closed access to the social media platforms, and the wish to ensure honest, open
42 responses and anonymity, no demographic information was collected.
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51 *Patient and Public Involvement.*

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55 No patients were involved in the study.
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Results

A total of 81 participants completed the survey, an estimated response rate of 42% based on the Facebook group membership. It was not possible to determine how the Twitter platform influenced response rate.

Quantitative Analysis

The 88% (n=71) felt that surgery remains a male-dominated field, with 59% (n=47) reporting or witnessing discrimination against females in the workplace. The hidden barriers for women reported by 34% (n=28) were that the profession was not conducive to motherhood and family life, with 16% (n=13) citing childcare issues. There was a perception that the surgical profession and culture was male-oriented, conceptualised as an 'old boys club' (16%, n=33) and possessing a masculine attitude and negative bias (13%, n=9). The framework for a career in surgery was reported as lacking flexibility and part-time careers (12%, n=10), with 10% (n=8) citing unsocial hours and working patterns (see Table I).

Table I Participant-perceived barriers to a career in surgery

Barrier	Response
Not a profession conducive with motherhood, family and children	34% (n=28)
Childcare issues	16%(n=13)
'Old Boys' Club/network	16% (n=13)
Male attitudes/bias	13%(n=11)
Culture of surgery as a masculine field	12% (n=10)
Unconscious bias	12%(n=10)
Lack of flexible/part-time training	12%(n=10)
Unsocial hours/working patterns/rotas	10%(n=8)
Perceptions by Nurses and Patients that women are not able to be surgeons	7%(n=6)

Maternity leave/career break	6%(n=5)
Women are excluded from 'male-only' social events	6% (n=5)
Women less confident in their abilities	5%(n=4)
Lack of female role models	5%(n=4)
Men have more variety in surgical career choices	5%(n=4)
Male surgeons behaving inappropriately	4%(n=3)
Patients prefer male surgeons	4%(n=3)
Image of female surgeons as being on par with a nurse	2%(n=2)
Perceptions that women will want a less onerous career	2% (n=2)
Social barriers	2%(n=2)
Barriers are explicit, not hidden	2%(n=2)
Lack of flexibility	2%(n=2)
Women need to be seen as ruthless in order to succeed	2%(n=2)
Women need to pull their weight like a man	2%(n=2)
Hard for women to establish a private practice	n=1
Personal expectations	n=1
Historical/traditional expectations of women	n=1
No barriers	4% (n=3)
Respondent skipped question	7%(n=6)

The concept of a 'glass ceiling' for women within the surgical profession was raised, with 44% (n=36) feeling this did not exist. All 81 participants answered this question, with 21% (n=17) feeling there was a tangible glass ceiling. The remaining 35% (n=28) chose not to comment.

Respondents were also asked if a glass ceiling existed at any particular levels during surgical training, with 9% (n=7) stating that this was evident at all levels; 6% (n=5) referred women underrepresentation at consultant role with different treatment compared to males.

Given the lack of women in surgical careers, participants were asked to comment on why women may be attracted to other clinical specialties. The most frequent responses (26%, n= 21) were quality of life/work-life balance and less unsocial hours (15%, n= 12) (see Table II).

Table II Benefits of working in non-surgical specialties for women

Quality of life/flexibility/work and life balance	26% (n=21)
More accepting of part-time/less than full time training (LTFT)	17% (n=14)
Less unsocial hours	15%(n=12)
More role models/mentoring	15% (n=12)
Accepting of childcare and family commitments	10% (n=8)
Less macho/male attitudes	7% (n=6)
Less on call	7% (n=6)
Less intimidating reputation/less competitive	6% (n=5)
Other	21% (n=17)
Not sure/don't know	16% (n=13)
Respondent skipped question	7% (n=6)

When asked what could be done to attract more women to the surgical professions, nearly half (42%, n=34) cited improved quality of life, and flexibility in part-time pathways with career and training options (see Table III).

Table III What could surgery do to attract more women to the profession?

Flexible training and career options (e.g. part-time, LTFT)	42% (n=34)
Project a less masculine image/address this	25% (n=20)
Improve the work/life balance	18% (n=15)
More female mentors/role models	18% (n=15)
More team/collaborative approaches	7% (n=6)
Financial support of trainees	6% (n=5)
Remove the perception of the need for PhDs/to be an academic	3 % (n=3)
Sessional work	2% (n=2)
More positions in larger cities	2%(n=2)
Less overbooking	1%(n=2)
More surgical training for medical students	1%(n=1)
Educate surgeons in unconscious bias	1%(n=1)
Nothing	3%(n=3)
Don't know/Not sure	5%(n=5)
Respondent skipped question	6% (n=5)

Although there is existing support for women in surgery, such as Less Than Full Time (LTFT) training and maternity leave, the dearth of women in surgical professions may demonstrate that there is a need for additional support mechanisms. Over 30% of respondents felt that LTFT training was perceived negatively, and this needed to be addressed. There was also a reported need to reduce stigma associated with women taking career breaks (22%, n=18) and to increase understanding of the impact of family on day-to-day activities (18%, n=15) in surgical practice (see Table IV).

Table IV What other support (aside from LTFT and maternity leave) is needed for women in surgery?

Change the negative perceptions of LTFT	32% (n=26)
Reduce the perceived stigma associated with women who take career breaks	22% (n=18)
Increase understanding of the perceived impact of family on day to day work activities and support this	18% (n=15)
Encourage men to take LTFT	15% (n=12)
Career break	13%, (n=11)
On site childcare	7%, (n=6)
More awareness and promotion of rules, regulations and support of gender equality and support for women	6% (n=5)
Nothing needed	6% (n=5)
Modular training	6% (n=5)
Other	26% (n=21)
Not sure	13%, (n=11)

To further explore the perceptions of a male-dominated surgical culture, participants were asked to list the specialties in which this dominated. More than half (53%, n=43) felt that Trauma and Orthopaedics was a sexist specialty, followed by Cardiothoracic (16%, n=

13) and General Surgery (15%, n=12), with 15% reporting no surgical specialty as being more sexist than another (see Table V).

Table V Participant reported sexist surgical specialties

Surgical specialty	Reponses
Orthopaedics/Trauma	53% (n=43)
Cardiothoracic	16% (n=13)
General surgery	15% (n=12)
Urology	5% (n=4)
None	4% (n=3)
Vascular	4% (n=3)
Neurosurgery	4% (n=3)
Hepatobiliary	n=1
Plastics	n=1
All	n=1
Leading question	n=1
Skipped question	11% (n=9)
Not sure/don't know	15% (n=12)

Over half of respondents (58%, n=47) felt that gendered language exists within surgery. A quarter of the respondents confessed to having used gendered language themselves, but over half (52%, n=41) had not used it, with gendered language not affecting career choices for 87% (n=70%). The most common method of challenging gendered language was to speak out/correct and state inappropriate language (30%, n=24), but 18% (n=15) had not encountered any incidences (see Table VI).

Table VI Challenging sexist language in the workplace

Action	Response
Speaking up/correcting/stating inappropriate language	30% (n=24)
Not experienced sexist language	18% (n=15)
Humour	9% (n=7)

Find it difficult	7% (n=6)
Non-confrontational approach/social media	2% (n=2)
Not able to interpret response	10%(n=8)
Ignore/refuse to respond	7%(n=6)

When asked what advice they would give to others when encountering gendered language, the most common recommendation was to confront or speak to the person (51%, n=41), with 17% (n=14) advising correction of the language used (see Table VII).

Table VII Advice to colleagues on dealing with sexist language in workplace environments

Advice	Response
Confront/speak to person involved	51% (n=41)
Correct the language used	17%(n=14)
Respondent did not answer	12% (n=10)
Deflect using humour	11% (n=9)
Do not accept/remains silent	10%(n=8)
Ignore	9% (n=7)
Be aware that people may not be aware they are using sexist language/don't make an issue out of it (unless 'over the line')/don't be overly sensitive	7% (n=6)
Seek support from others/support others	7% (n=6)
File complaint	3% (n=2)
Demand apology	n=1
Treat as bullying	n=1
Don't know/no advice	4% (n=3)

Thematic Analysis

There was an overarching theme of participants feeling constrained within the present surgical environment, which appears to be better equipped to support males, with sociocultural norms embedded in masculine discourses. The participants appeared to make efforts to fit into the environment, adapting a variety of stances to do this. The constraints were conceptualised as conflicting personal and career decisions, under-

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3 representation, a relative rigidity in surgical career structures, and the process of
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5 discrimination, both active and nuanced (self and others), that exists in current surgical
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7 practice. These themes are supported by in-vivo quotes from the data:
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10 **Conflict between personal and career decisions**

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14 *'Trainees have families and other responsibilities to manage as well as*
15 *surgical training '*

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17 *'At registrar level, many women switch to GP training for family reasons'*

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20 *'Maybe there is a glass ceiling, as the training scheme is long. When you want to*
21 *have a family you are at senior level for jobs. It is harder to stay focused on career*
22 *and your curriculum vitae (CV). This affects the quality of your CV at interview for*
23 *consultancy. Somehow, it's easier for wives to follow their surgeon husbands*
24 *rather than for husbands to follow surgeon wives'*

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27
28 *'I am horrified by the stories of women in the first trimester of pregnancy with*
29 *morning sickness vomiting several times between procedures during a list, and*
30 *women in the third trimester doing nights, etc., especially when they want to switch*
31 *to a less physically intense session'*

32 33 34 35 36 **Under-representation**

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40 *'Up until recently, there were no women in my sub-specialty'*

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43 *'Now that I am a consultant, I feel massively in the minority '*

44 45 46 47 **Rigidity in surgical career structures**

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50 *'Reduce the hierarchal nature of surgical training; this would improve safety and*
51 *morale for all'*

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53 *'There needs to be a real understanding that having a small child really hinders the*
54 *ability to do things like extra work that needs to be completed out of hours. If there*
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3 was a way to come back into training but have a pause on in counting towards
4 your time up then there would be less financial and timescale stress'
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6 'Flexible training and to stop having such rigid pathways to CCT (Certificates of
7 Completion of Training), different paths are ok and valid. We also need true
8 competency based training – some people will complete faster than 5/6 years,
9 others might need longer. Be more open to time out.'

10
11 'There's an implicit assumption that surgeons will be able to have their families trail
12 around the country after them for jobs and fellowships. Realistically this is less
13 possible for women with professional partners and small children. Women are
14 presumed to deskill during maternity leave and discouraged from working part-
15 time.'
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19 **Discrimination: self**

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22 'Generally, women are less confident in their abilities, whereas men are more
23 confident...often holds females back'

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25 'Some women try and take advantage way over expected norms and use it to
26 bargain for favours which make things worse'
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31 **Discrimination: others**

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34 'People see a glass ceiling, actually you can get in, but you are treated differently,
35 so really a glass cliff'

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38 'You're an unlikely looking orthopod'

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40 'I find the surprise and confusion and refusal to believe I'm an orthopod e.g. 'you're
41 too nice to be an orthopod' and 'that's not something to be proud of' very frustrating'

42
43
44 'I recently presented a paper at a plenary session at a UK surgical meeting. I was
45 the only female presenter. I got equal marks as the top male candidate (announced
46 at the podium by the head of the society) but the prize was given to the male and
47 the prize was a tie'

48
49 'I have done the World Health Organization checklist and then had the comment
50 'we need to wait for the surgeon' despite having introduced myself as the surgeon'

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53 'I got told by another surgeon that he left vascular surgery for plastics because
54 there were 'too many women surgeons and they caused too much drama'.
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5 There were reported accounts of patients using gendered language with implicit
6 assumptions that female surgeons were not acceptable, or that being female was not
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8 associated with being a surgeon:
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13 *'Patients don't think women can be doctors, let alone surgeons'*

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17 *'Significantly more patients call me nurse or lady doctor than any of my*
18
19 *colleagues'*

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21
22 *'Patients are often shocked that I will be doing their operation, and I have led ward*
23 *rounds where the patients have talked to my tall male F1 and not me'*

24
25 *'Patients are extraordinarily sexist e.g. patients have walked into a consulting room*
26 *and said to me 'I thought I would be seeing a doctor at least' before I had time to*
27 *introduce myself. I am 34 and been a doctor for 10 years'*
28

29
30
31 Perceived implicit discrimination was reported, but could not be proven:
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33

34 *'I had difficulty trying to get a consultant job. Although I was already working as a*
35 *locum consultant, I lost out many times to younger men who were all registrars.*
36 *Various reasons were cited, but I did begin to wonder if my face didn't fit. Until a*
37 *couple of years ago, there were no women in my particular subspecialty'*
38

39 *'Improve the stigma that is sometimes attached to women who choose to take time*
40 *out of their careers for children. Many women I've spoken to say they aren't viewed*
41 *as competent as their full time colleagues'*
42

43 *'We lose out on consultant posts to younger males'*
44
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46 In the physical workplace, there was an account of discrimination:
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49 *'I am the only female Consultant General Surgeon in my Trust. I'm not allowed in*
50 *the consultant changing room. There is one consultant changing room and it is for*
51 *men only'*
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53 Accounts of discrimination were supported by other healthcare staff:
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3 *'Theatre staff have commented that male surgeons get more opportunities in*
4 *theatre than female'*
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6 There were also reports of female surgeons being discriminated against by other non-
7 surgical staff:
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9 *'The secretaries in my Trust do not do as much for the female consultants as they*
10 *are perceived as having taken a 'man's job'.'*
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14 **Discussion**

15 This survey, conducted through the ASGBI social media platforms, illuminates the lived
16 realities of female surgeons in the UK today. Gender bias and discrimination were
17 reported by 59% of the participants irrespective of level of training and experience,
18 suggesting an ancient culture pervading our society since the 1800s, at the time of the
19 first female surgeon in the UK, Elizabeth Garrett (13, 14).
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28 The greatest perceived barrier to women wanting to pursue and persist with a career in
29 surgery was incongruity with motherhood and childcare commitments (50%). Literature
30 reports a significant level of attrition for women in surgical training (15), traditionally seen
31 as one of the most competitive and time-consuming specialties (16) with the perception
32 that spending less time in surgical training would compromise competency achievement
33 (17). Furthermore, there is discrepancy on parental leave policies across hospital trusts
34 and specialties, despite widespread recognition that better support for parents engenders
35 marked benefits for the health and wellbeing of doctors, their children and ultimately
36 healthcare provision (18). The general perception is that family-friendliness may be hard
37 to reconcile with the working requirements of the surgical specialty, often involving patient
38 treatment of unknown length or at unsocial times of day or night (19). There is a challenge
39 to manage work in these areas and to improve family-friendliness without compromising
40 patient care. This lack of support is potentially leading to burnout, since we know that this
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3 is ultimately driven by external factors such as excessive working hours, workload and
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5 conflicts with family commitments (13, 14). Thus, for some women, the only perceived
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7 option to preserve their own mental health is represented by withdrawing from surgical
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9 training.
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13 How do we create the change needed? Encouraging and tangible signs of an already
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15 emergent cultural change, like day-care facilities and childcare options, are reflected in
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17 the wider societal acknowledgement of women in surgery. One example is the New Year's
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19 Honours List, where the Royal College of Surgeons of England past president, and first
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21 female president, Clare Marx, received a damehood in acknowledgement of her
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23 contribution to surgical practice. In addition to this, Jackie Taylor has been chosen as
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25 president-elect of the Royal College of Physicians and Surgeons of Glasgow for the first
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27 time in its 418-year history, where, for the first time, there is also a female surgical vice-
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29 president, Alison Lannigan. Whilst these women are atypical and not necessarily
30
31 representative of all women in surgery, they act as positive role models for women in the
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33 context of career progression. We need strategic encouragement and education about
34
35 the realities of leadership roles in STEM, along with instigation of evidence-based and
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37 effective schemes for gender equality in the workplace, such as the ATHENA SWAN for
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39 academic careers (20).
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46 Visibility of role models is key to increasing current female training rates and public
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48 advocacy campaigns through social media facilitate education and awareness of
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50 culturally sensitive matters. To this end, the ASGBI launched a Facebook group(11) to
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52 bring individuals together for networking and communications about women in surgery,
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54 parenting and work-life balance (11). As primary communication methods, social media
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3 are increasingly integrated into the daily routine of individuals personal activity and
4 practice, with 68% of women and 62% of men using them (21). We aim to be what we
5 see or what we deal with in our daily practice (22). The ASGBI
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10 #HowIBecameAWomanInSurgery” campaign was created on this basis to shine light on
11 the journey through the training pathways of female surgeons. Since much of a culture is
12 underpinned and shaped by the language used (23), we advocate for a cultural
13 identification with women becoming surgeons. Sharing the journeys of successful female
14 surgeons aims to inspire and support other members, allowing them to see how frequently
15 encountered barriers were overcome from different perspectives(24). Evidence of the
16 benefits of mentoring to support women as they progress in their careers is plentiful (25).
17 Interestingly, this survey revealed great awareness of the benefits of mentoring amongst
18 female surgeons, but a view in 15% that it currently remains an advantage to be gained
19 primarily in non-surgical specialties. The lack of female role models in surgical leadership
20 and consultancy positions contribute to the perpetration of the white male stereotypical
21 gender role, and those who do not fulfil these characteristics, may believe they cannot
22 make in this environment (22, 26). To address this structural problem, a more diverse
23 senior team could prevent discrimination against women in surgery favouring their hiring
24 and promotion.

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45 Finally, personality traits and behaviours adopted by surgeons are often perceived
46 differently depending on a surgeon’s gender, which can have significant impact on an
47 individual’s confidence and self-reflection. Respondents to this survey noted being
48 labelled as ruthless in order to succeed (2%), pressured to ‘pull their weight like a man’
49 (2%) and admitted a lack of confidence in their ability (5%). Women excel in some areas
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3 more typically difficult for their male counterparts, including communication, collaboration,
4 and patient centeredness (27). Recent analysis of over 100,000 surgical patients in
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6 Canada, found that those who were operated on by female surgeons were less likely to
7
8 die one month after their procedure (28), mirroring a previous study according to which
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10 female internal medicine doctors had slightly lower rates of death within 30 days of initial
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12 hospitalisation (29). The authors' possible explanation is that the barriers women face in
13
14 the surgical environment act as a higher bar to achieve a consultant or leadership role
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16 when compared to their male counterparts. Those data need adequate dissemination
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18 amongst healthcare professionals and general population, as in our survey the glass
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20 ceiling for women is also represented by nurses and patients (7%).
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26 This study builds on the global commitment for greater female representation and support
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28 in STEM. The greatest challenge currently faced, in the opinion of the authors, is the
29
30 realisation and elimination of unconscious bias existing in surgery. Gender equity is a
31
32 leadership issue: when more women are in leadership positions, organisations offer
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34 employees more generous policies to support workplace gender (30, 31) and produce
35
36 better business results (32).
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40 Cultural change requires a nucleus of organisational catalysts who are insiders with
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42 outsiders' cultural beliefs (33). In today's workplace, these are colleagues at every level
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44 of power and leadership acting to call out insults and affronts, eliminate pay and promotion
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46 disparities, and advocate for policies that retain a diverse talent pool. Male surgeon
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48 colleagues who already mentor and support females are appreciated, but women, also
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50 need to step up and promote themselves (34). The glass ceiling for women in science is
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3 created by people, of either gender, and it can only be broken if all are aware of it and
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5 change their behaviour and attitude towards it.
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7 **Limitations**

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10 The representativeness and transferability of the results are hindered by the response of
11
12 the participants to a social media requests through ASGBI, therefore the findings are
13
14 reflective of professionals active on social media and might not be representative of the
15
16 entire female surgical workforce in the UK. Furthermore, those who experienced gender
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18 inequalities might have been more likely to answer, or those who were replying may have
19
20 had recall bias based on the nature of the questions.
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25 Not all participants filled in the free text boxes and the themes constructed from the
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27 written data are the researchers' interpretations of the written responses. Since it was an
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29 online survey, it was not possible to probe to gain a deeper understanding of the
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31 comments
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34 **Recommendations**

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37 The survey posits a current theme of constraints for women working within surgical
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39 practice in the UK. The findings should be explored further in National and International
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41 Collaborative research for women working in surgery. Interviews and focus groups as
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43 methods of data collection would allow participants to speak about their experiences and
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45 perspectives in greater detail. A consensus conference, with the guidance and support of
46
47 regulatory and educational bodies such as ASGBI, could fully explore the barriers faced
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49 and work together to produce targeted action plans to address the barriers described.
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55 Authors' contributions:
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3 Maria Irene Bellini designed the study, wrote the article, searched the literature and
4 interpreted the data; Catherine Hayes and Yitka Graham performed the analysis, wrote
5 the article and interpreted the data; Roxanna Zakeri wrote the article and interpreted the
6 data; Rowan Parks and Vassilios Papalois conceptualized the study, wrote the article,
7 interpreted the data and are the senior authors and executive of the ASGBI.
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11

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13 Britain and Ireland (ASGBI)
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15

16 17 18 Data sharing statement 19

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21 The data used to support the findings of this study are included within the article.
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