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Women in surgery: a systematic review of 25 years

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ABSTRACT

The number of women entering medicine significantly increased over the last decades. Currently, over half of the medical students are women but less than half are applying to surgery and even less go on to surgical specialties. Even fewer women are seen in leadership roles throughout the profession of surgery and surgical residency. Our purpose of the literature review is to identify any themes, which would provide insight to the current phenomenon. We used the Preferred Reporting Items for Systemic Reviews and Meta-Analyses method for a systematic review of the literature over a 20-year period (1998–2018). Five broad themes were identified: education and recruitment, career development, impact of/on life around the globe and surgical subspecialties as areas of barriers for women entering or considering surgery. The systematic review suggests there are opportunities to improve and encourage women entering the profession of surgery as well as the quality of life for surgeons. Creating systems for mentorship across programmes, having policies to support work–life balance and recognising surgical training overlaps with childbearing years are key opportunities for improvement. Improving the current status in surgery will require direction from leadership.

INTRODUCTION

The number of women in the workforce increased over the last century from 10% to over 50%, contributing significantly to the economy.¹ Consistently, and steadily women enter and succeed at professions historically deemed for men.^{1,2} Despite the inherent barriers and biases women face, women excel in their chosen professions.^{1–3} Medicine has experienced tremendous growth in the number of women entering and excelling in the profession. In the USA, more than half of all medical residents are women.⁴ However, in sharp contrast is the number of women surgical residents.⁴ Less than half of all the residents in surgical residency and surgical specialties are women.^{4–8} It is unclear why general and specialty surgery do not see an increase in women like medicine. In addition, there is no clear reason why women enter surgery at lower rates than men. To date, there is growing number of published papers focusing on the experience of women in surgical practice but there is a gap in understanding the collective experience across the profession. Our aim is to explore the literature to identify current themes expressed by women in surgery to identify barriers or opportunities in encouraging women to enter the profession by healthcare leaders.

METHODOLOGY

This study systematically reviewed qualitative and quantitative studies relating to women in surgery.

We conducted a systematic literature search using different electronic databases including Medline, PubMed, ScienceDirect, Wiley Online Library, Google Scholar and Cumulated Index to Nursing and Allied Health Literature (CINHAL). These databases were searched using various combinations of the key terms which included Boolean phrases (and, or) “Women surgeons”, “Work-life balance and female surgeons”, “Career development for women surgeons, education and women surgeons, recruitment and women surgeons, women and surgical specialty”.

We used the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA).⁹ The initial search using the terms female or women in surgery resulted in 244 094 citations over 25 years (1993–2018). We then further refined the search using the Boolean phrases (and, or) identified and limiting to humans and English resulting in 100 046 articles.

We reviewed the first 100 articles in full after screening for titles with and without abstracts and removing duplicate titles. From the review of the first 100 articles, studies which met the following six criteria: (1) journals published in English in the last 20 years; (2) women in surgery; (3) women in surgical specialties; (4) women’s experience in surgery; (5) women’s professional growth in surgery and (6) women’s experience in surgery around the globe was included in the systematic review. Exclusion criteria included: (1) editorials; (2) opinion pieces; (3) studies not focused on women in surgery; (4) studies not published in English; (5) studies published before 1995; (6) case reports; (7) personal experiences and (8) articles regarding women having surgery. Based on the above criteria 48 articles were included for review (figure 1).

RESULTS

After examining these articles, we identified five broad themes: education and recruitment, career development, impact of/on life around the globe and surgical subspecialties.

Education and recruitment

The rate of women entering surgical residency lags behind the number of women in medical school.¹⁰ Medical and surgical scholars identify the discrepancy between the number of women in medicine and the number of women in surgery as a threat to quality of care.^{10–15} With over half of the applicants to medical school being women but less than half applying to surgery; bright candidates are missed.¹¹ A key challenge and opportunity is the poor exposure to surgery in undergrad or medical school. Women are not choosing surgery because they are unsure of how they fit in the profession and how professional practice will fit in their life goals.¹³ Further compounding



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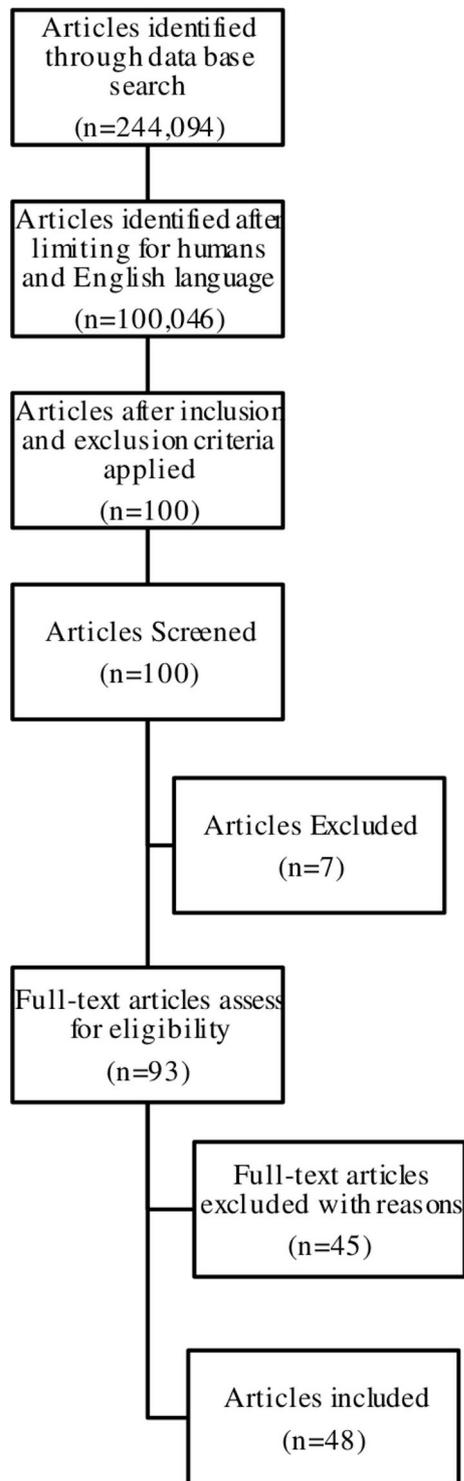


Figure 1 PRISMA Flow Chart.

the problem is the minimal representation by women surgeons or visibility of women surgeons.¹⁰

To facilitate women's decision to consider a surgical residency, structured surgical experiences during undergrad with 50% women surgeon faculty have a positive impact.¹⁰ Undergrads and medical students identified favourably with a career in surgery if they have a positive experience through exposure to women surgeon faculty and mentorship.¹¹⁻¹⁴ Overwhelmingly, the literature points to positive mentorship experience facilitated by women surgeons as a vessel to overcome the low number of

women applicant rates to surgery and gearing learning objectives to domains appreciated by women surgeons.^{13 15} Although surgical residents identified knowledge-based and skill-based learning goals in their final years of residency, the women surgical residents leaned towards attitudinal learning goals and knowledge base (table 1).

Career development

Women surgeons have increased in number and encouraged women colleagues to overcome barriers such as stereotyping.^{4-8 16-19} The harsh stereotyping of women surgeons has historically holed their career and imposed a glass ceiling.^{4-8 16-19} Talented surgeons felt held back and treated unfairly based on their sex.^{6 16 17} And this feeling among women surgeons is justified by the low number of women in tenured faculty, full professorship and programme directors positions across the country.^{4-8 16-19}

Despite the increasing number of women in medicine and surgery, there are low numbers of women in senior faculty and clinical roles across all of medicine.¹⁰ The theme of women surgeons not equally represented in higher-ranking positions is consistent in the articles over the last three decades.^{5 7 8 18} Lack of mentorship, feelings of exclusion, demands of childrearing, poor accommodations during childbearing years and tenure all contribute to the barriers.

Some of the strategies emphasise women surgeons mentor young women surgeons new to the profession and as early as residency or medical school.^{4 19} Mentoring identifies with creating a positive environment, demystifying surgical practice and chisels away at the boy's club mentality.^{4 19} Men surgeons are equally encouraged to mentor women surgeons and contribute to a thriving, collegial environment.¹⁸

The overlap of surgical training and childbearing years is not a barrier to career development but one that requires accommodation. Women scholars suggest extending the time to reach tenure or stopping the clock during maternity leave as suggestions to foster women surgeons seeking full professorship.^{6 16} Some suggest affirmative action to help shift the balance between men and women surgeon in academia.^{5-7 17} Scholars suggest supporting women surgeons' success in career development requires a commitment from organisations, professional societies and academia (table 2).

Impact of/on life

Increasingly authors are identifying the barriers felt by women surgeon practising in a model that assumes there is a full-time wife at home.²⁰⁻²⁵ A change in the model to accommodate the working mom, working-wife surgeon may open opportunities and improve career satisfaction.²⁰⁻²⁵ Women surgeons report career and home life satisfaction but worried that their careers lag behind their men colleagues and this was a source of dissatisfaction.

Women in surgical residencies did not report pregnancy or marriage as a barrier during training but the perception of being a burden.²²⁻²⁴ In general, marriage is increasingly common in surgical residency.²⁰⁻²⁵ A recent study identified 38.9% of 5345 surgical residents were married and 23.3% of those married were women and 15% of those married women had at least one child.²⁰⁻²⁵

Older retrospective survey studies repeatedly identified women surgeon who wished they had started their families earlier or had flexible schedules to sustain a personal life.^{20 21} Recent studies identify medical students valuing quality of life with work-life balance as a priority and as women choose surgical residency, starting a family is equally a priority²²⁻²⁵ (table 3).

Table 1 Education and recruitment

Author	Year	Participants	Type of study	Study objective	Findings
Ourian <i>et al</i> ¹⁰	2011	Undergraduate students considering a career in surgery	Survey	To examine the impact of outreach at the undergraduate level in the form of a course hosted by surgeons (50% women surgeons) influence on women's interest in medicine and surgery	Thirteen (100%) of the participants, 11 (85%) women found the outreach programme reaffirmed their decision to attend medical school and interest in surgery
Gifford <i>et al</i> ¹¹	2014	Surgical residents in 13 programmes	Survey	To determine how often surgical residents consider leaving the programme	Women residents are more likely to consider leaving (OR 1.2; 95%; p=0.003)
Vertrees <i>et al</i> ¹²	2014	Graduates from the Uniformed Services University of the Health Sciences	Survey	To determine if there are disparities among civilian and non-civilian women entering surgery and surgical subspecialties	Women in military medical programmes enter surgical training at the same rates as civilian programmes with an increase in rates (3.9% to 39% p=0.025)
Nebeker <i>et al</i> ¹³	2017	MSU Goal Consortium	Quantitative research	To identify gender differences in surgical residency	Greater impact is year of residency with first year residents leaning towards attitudinal learning objectives and later years choosing knowledge-based and skill-based learning objectives. Residents taught by women surgeons leaned towards knowledge based objectives over skill based.
Luc <i>et al</i> ¹⁴	2017	Medical and surgical residents	Quantitative survey	To identify the role of social media as a mentoring tool for women in surgery	Surgical residents identified using social media to build a network of mentors (p=0.031).
Fassiotto <i>et al</i> ¹⁵	2018	Graduate Medical Evaluation	Quantitative survey	To determine the difference if any in evaluation scores for women and men faculty	Women scored lower across the board for specialties with fewer women such as surgery (p<0.001)

Around the globe

Around the globe, authors identify the lack of women in all levels of surgery, despite increase number of women entering

medicine. The women who chose surgery as a profession report discrimination during pregnancy, lack of support and poorly structured residency.^{26–36} Women are choosing surgery at lower

Table 2 Career development

Author	Year	Participants	Type of study	Study objective	Findings
Jonasson ¹⁶	1993	American College of Surgeons (ACS)	Review	To establish the barriers for women surgeons career advancement	Multiple factors impede advancement which include: stereotypes, sexism and family demands.
Jonasson ⁶	2002	ACS Membership	Survey	To understand the representation of women in leadership roles in surgery	Percentage of women in societies in 2001: ACS 4.4% ASA 2.2 % Society of University Surgeons 3.3% Percentage of women among the board of directors of ABMS certifying boards 12 (6.3%)
Ahmadiyeh <i>et al</i> ¹⁷	2010	Surgeons	Qualitative	To identify elements of career satisfaction for women surgery	Women value a career which values the whole person beyond surgery
Zhuge <i>et al</i> ⁷	2011		Review	To review the glass-ceiling phenomenon in surgery and identify causes strategies	The glass-ceiling phenomenon is impacted by three themes: gender roles, sexism and lack of mentors.
Sexton <i>et al</i> ⁵	2012	Members of the American Association of Medical Colleges	Survey	To determine the distribution of men and women across professional rank and to estimate when 50% of professorship will be women	Rate of women surgeons progressing to full professorship is a slow slope of line of increase compared with rate of women entering medicine, and surgery (0.36 vs 0.75 vs 0.99)
Healy <i>et al</i> ¹⁸	2012		Review of literature	To understand the definition of role model, mentoring in surgery	Women (75%) identified role models and mentors as positive but challenging to identify a women surgeon mentor.
Weiss <i>et al</i> ⁸	2013	Residents in Surgical Residency in the U.S. Residents in medical schools Programme Chairs/Directors	Survey -cohort study	To determine the number of women in leadership positions as either a Chair, Programme Director (PD), Chief and Associate Director (AD)	Percentage of Women in the following positions: Chairs 8 (3%) PD 25 (10%) Chiefs 157 (10%) AD 35 (24%)
Cochran <i>et al</i> ¹⁹	2013	Surgical Residents and Faculty	Survey	To find out if women surgeons perceive different barriers than men counterparts in academia	Women surgeons feel and perceive excluded from the dominant culture in surgical departments
Seemann <i>et al</i> ⁴	2016	Women surgeons across Canadian Academic Centers	Survey	To explore women advancement and career satisfaction in surgery	Lack of gender equality, appropriate mentorship and accommodations for women

AAOS, American Academy of Orthopaedic Surgeons; ABMS, American Board of Medical Specialties; ASA, American Surgical Association.

Table 3 Impact of /on Life

Author	Year	Participants	Type of study	Study objective	Findings
Strahley and Longo ²⁰	2006	Women in surgical residency or board certified surgeons	Survey	To understand if family issues affect women in surgery	90 responses to the survey (60%) identified themes around stressful tension between career demands and family, difficulty during childbearing years, designed to have a 'wife' at home.
Troppmann <i>et al</i> ²¹	2009	American Board of Surgery	Survey	To assess challenges faced by women surgeons regarding personal family life compared with men counterparts.	178 Board certified women surgeons (20.3%) responded of this 82.5% would choose their profession again, 62.4% had children later in life, 26.9% spouses were primary caregivers, 67.8% felt maternity leave was important and childcare at work (67.8%)
Merchant <i>et al</i> ²²	2013	Surgical Residents and Program Directors across Canada	Survey	To explore the attitudes around pregnancy during surgical residency	160 residents (30%) and 8 Programme Directors (50%) identified inadequacies within programmes to support pregnancy during residency, time off and breast feeding
Brown <i>et al</i> ²³	2014	UC Davis General surgery graduates	Retrospective review	To investigate if child rearing increases attrition from residency	Nine women (10.5%) surgical residents had 10 pregnancies completed the programme and 87.5% went on to fellowship. There was no association with pregnancy and attrition.
Chen <i>et al</i> ²⁴	2013	National Study of Expectations and Attitudes of Residents in Surgery	Prospective longitudinal	To characterise the effects of marriage and childbirth on the experience of surgery residency	For women surgical residents marriage (p=0.005) and experiencing pregnancy and childbirth (p=0.008) were a source of negative emotions compared with men counterparts who reported feeling happier and supported.
Baptiste <i>et al</i> ²⁵	2017	Surgeons and all surgical trainees at one institution	Survey quantitative	To evaluate the gender differences in professional advancement, work-life balance, and satisfaction	Gender disparities may be overcome by improved recruitment and retention strategies. Women were more likely to be married to professionals and responsible for childrearing.

rates in Japan, Central America and Ireland.^{28–33} Women in medical schools reported surgery as not a good career choice related to quality of life, salary and lack of mentorship.^{28–33} In Switzerland, women surgeons report career satisfaction despite the barriers.²⁶ Canadian authors predict a wave of change across all of surgery as seen by the current statistics in plastic surgery with >40% of all plastics residents being women³⁶ (table 4).

Women in surgical specialties

The surgical subspecialties identify several paradoxes facing women. Even though inherent barriers remain within surgical subspecialties, women report career satisfaction despite the sacrifices related to their personal lives. One of the barriers identified across the surgical subspecialties is the lack of mentorship.^{37–48} To a lesser scale, women report the demands of family life as a barrier, which is easily overcome with support.^{37–48} As seen in cardiothoracic surgery with steady growth of women sitting for board certification while other areas such as urology orthopaedic and vascular surgery lag behind^{41 42} (table 5).

Different barriers correlate with the different subspecialties. Women practising in orthopaedic surgery and residency reported the long hours and inflexibility in hours as challenging.^{41 45–48} Urology and vascular subspecialties report the lack of mentorship and women faculty as deterrents to attracting women surgical residents.^{41 42} Urology residents reported facing sexism in clinical practice.⁴¹ With less than 10% of women urologist, the specialty reports financial discrepancy, lack of mentorship, career advancement and a path for academic advancement as barriers.⁴¹

DISCUSSION

Our aim in systematically reviewing the literature was to identify themes, which could provide insight into the low number of women entering surgery. Five broad themes of barriers or opportunities were identified: education and recruitment, career development, impact of/on life around the globe and surgical subspecialties.^{26–30 37–41} Women surgeons from around the

globe verbalise their concerns about: isolation, heavy burden managing a home and career despite feeling immensely satisfied with their career.^{41 45 46} The responsibilities inherit to women and nurturing children while working is a challenge faced by many professional women but easily overcome with support from within and outside the profession.^{6 16 49 50}

Another major theme woven throughout the articles is the lack of mentorship or role models. However, a comprehensive mentorship programme for any one surgical training programme is a challenge given the low number of practicing surgeons. A national approach to mentorship programmes may help fill the void in mentorship.^{50–52}

A redesign of the daily work, career advancement and scholarly demands could attract more women to surgery.^{51–54} Shifting the surgical profession to support a work-life balance may encourage women to enter the profession. It appears the greatest barrier is the current structure of surgical practice. Historically, the structure of surgical practice is developed by men for men.^{4–8} However, overwhelmingly both women and men wish for a flexible schedule to support a home life and quality of life.^{10–12} The surgical profession needs to consider the opinions of their young surgeons and residents to attract qualified applicants.^{21–25} With more than 57% of all medical residents being women but less than 50% applying to surgical residency, there is a real chance of missed candidates.

Coming full circle is the relationship between the demands of child rearing, nurturing a family and the rigid timeline for full professorships or opportunities to advance into programme director positions.^{4–8 17–19} Without a change or a restructuring in surgical career advancement, the profession will leave women behind. And perhaps more damning to the profession is the missed opportunities of brilliant women surgeons as leaders.^{4 5 8 18 19} However, utilisation of a national or global approach may help break the cycle of lack of mentorship and leadership opportunities.

The labour laws protecting maternity leave is too vague in relation to the needs of surgical residency. In many countries,

Table 4 Around the globe

Author	Year	Participants	Type of study	Study objective	Findings
Kaderli <i>et al</i> ²⁶	2011	Board certified women surgeons and surgical residents in Switzerland	Survey	To analyse women surgeons current personal and professional lives	189 (59.4%) surveys returned, 70% reported career satisfaction however identified discrimination towards pregnancy, rigid work hours, poor structured residency
McHugh <i>et al</i> ²⁷	2011	Basic Surgical Training Residents and Royal College of Surgeons in Ireland	Quantitative	To identify modifiable factors to encourage surgical training recruitment	Women residents were less likely to choose a surgical career ($p=0.049$). Surgical role model, intellectual challenge and academic opportunities influence choosing surgical subspecialty
Kwong	2012	Surgeons in Hong Kong	Quantitative survey	To evaluate the attitudes of women and men towards work, personal life and work-life balance	Of all the surgeons women surgeons (13%) reported not enough time community ($p=0.038$) and rest ($p=0.024$). Both men and women surgeons reported satisfaction at work and life. Men surgeons reported wanting to work part-time during child rearing year ($p=0.013$).
Borracci <i>et al</i> ²⁹	2013	Medical students at the Universidad of Buenos Aires and Surgeons	Observation case control analysis	To analyse the relationship between choosing or not choosing surgery	Women 74/100 students reported not choosing surgery because of limits in intellectual growth, jobs, not prestigious, poorly paid and it's a male specialty
Okoshi <i>et al</i> ²⁰	2014	Kyoto University Hospital and School of Medicine	Descriptive study	To study gender inequality in Japanese academic surgery	There are no women professors/associates in surgical medicine and one lecturer (2.3%).
Kerr <i>et al</i> ³¹	2015	Women Junior Doctors and Medical Students in the United Kingdom	Survey	To understand decision making process in choosing a surgical career	Ninety-six (96%) surveys returned and 12% of junior doctors and 30% medical students plan a surgical career with 56% citing work-life balance as the main reason for not choosing a surgical career. Thirty percent identified women surgeons dissuading a surgical career.
Yorozuya <i>et al</i> ³²	2015	Women surgeons in Japan	Quantitative	To clarify the role of mentors among Japanese women surgeons	Of the survey respondents (48.7%), 67% identified mentorship as crucial for staying in a clinical position, clinical advancement and moral support but not academic advancement or work-life balance.
Cruz <i>et al</i> ³³	2016	Graduates of the Department of Surgery University of Puerto Rico	Retrospective	To evaluate the gender distribution of General Surgery Residents between 1958 and 2014	Women represent 36% of surgical residents while 50% of all medical residents are women.
Steklacova <i>et al</i> ³⁴	2016	European National Neurosurgery Societies	Survey	To establish the rates of gender inequality across Europe within neurosurgery	There are 12 985 neurosurgeons across Europe and 12% are women with 26% in Denmark and 24% in Italy. Men neurosurgeons reported higher rates of marriage and children ($p=0.001$)
Dingemanni ³⁵	2017	Female Surgeons in Germany	Descriptive	To present the challenges, current climate, gender disparities facing women surgeons in Germany	With support for a balanced work-life and mentorship women have successful careers in surgery.
Retrouvey and Gdalevitch ³⁶	2018	Women Plastic Surgeons of Canada	Survey	To explore the role of Women Plastic Surgeons of Canada	In Canada, women currently represent 22.6% of practising plastic surgeons but 40.3% of all plastic surgery residents are women; thus, the need for mentorship, recognition of gender disparity is crucial and education of members regarding gender disparity

Table 5 Women in surgical specialty

Author	Year	Participants	Type of study	Study objectives	Findings
Caniano <i>et al</i> ⁴⁰	2004	Paediatric women surgeons	Survey	To maintain surgery and paediatric surgery as a premier career choice	Seventy-nine (83%) surveys returned identified insufficient protected time, clinical load, on-call, lack of mentorship and departmental support as barriers.
Benzil	2009	American Association of Neurological Surgeons	White Paper	To attract women to neurosurgery services	Mentors, role models and exposure can encourage women in medical school to consider the specialty
Hamilton <i>et al</i> ⁴²	2012	Women surgeons	Survey	To identify aspects of pregnancy and childbearing factors that impact residency and clinical practice	Women orthopaedic surgeons/residents who work more than 60 hours a week are at higher risk for preterm deliveries compared with the general population
Dageforde <i>et al</i> ⁴³	2012	Women medical residents	Survey	To find the elements which will encourage women to vascular surgery and leadership	Overall perceptions of women in surgery need to change
Grimsby and Wolter ⁴⁴	2013	Urology resident	Commentary	To explore the experience of urology residency for a woman	Less than 10% of all urologist are women urologist and there needs to be mentorship and exterminating sexual harrassment
Hill <i>et al</i> ⁴⁵	2013	Graduate Medical Students and American Academy of Orthopedic Surgical Residents	Survey	To understand what residents think of orthopaedic surgery and what hinders women from choosing the specialty	Women constitute 13.2% of all orthopaedic specialty and 15% of full-time faculty. Increased exposure to orthopaedic specialty and mentorship can encourage women to enter the specialty
Renfrow <i>et al</i> ⁴¹	2016	American Association of Neurological Surgeons	Retrospective survey	To characterise the enrollment, attrition, and post attrition	Women attrition rates in neurosurgery are similar to other specialties but greater than men. Twelve percent of the surgical residents from 2000 to 2009 were women.
Weiss and Teuscher ⁴⁶	2016	Council of Orthopedic Residency Directors within	Survey	To understand the influence of maternity policy and choosing a surgical specialty	45 programme directors responded (31% of those 80% have written maternity policies and 36% have formal and informal; 49% have paternity leave policy. There is a general lack of uniformity, which warrants transparency and discussion.
Garza <i>et al</i> ⁴⁷	2017	Plastic Surgery Program Directors	Survey	To investigate issues related to pregnancy	A return rate of 61.36% (54/88) identified 36.54% programmes have formal maternity policy and 20% have a policy for breast feeding. The rest of the directors identified multiple barriers to maternity leave policy, which include clinical training, coverage, workload burden, administrative support.
Chambers <i>et al</i> ⁵⁵	2018	Orthopaedic surgery	Quantitative survey	To quantify discrepancy across surgical specialties among residents and faculty	Orthopaedic surgery has the lowest rates of women in training (14%), less than 1% of women medical residents choose orthopaedics, 17.8% women orthopaedic surgeons are faculty, 8.7% professors of orthopaedics are women and 6.5% of the AAOS are women.

the labour laws protect women needing time off for pregnancy and childbirth; however, these labour laws fall short in a surgical practice or residency. Surgical residencies and surgical practices require structured policies around time-off, on-call coverage and modified return to work schedules. Tenure tracks and timelines need modification to create opportunities for prospective women surgeons taking time off to start a family or reducing commitments to nurture a young family. Changes in policy and practice would not only be supportive but could shift the culture away from the woman surgeon/resident as a burden.

There is no evidence in the literature that starting a family takes away from surgical training.²³ Quantitative studies identified women residents having a child during surgery residency has no negative impact on training or graduation.^{23 39–45} However, the negative impact of pregnancy on surgical training relates to the lack of policy to support lighter call hours, time off and accommodations for breast feeding.^{39–44} Changing policies around childrearing may be the start to encourage more women to enter the field of surgery and may be what women surgeons need to advance in their career.

Throughout the articles reviewed regardless of locations and specialty, there is a fear of missed opportunities. The

remedy echoed in each article is a push for increased visibility of women surgeons in higher academia and leadership in general. The dismal numbers of less than 10% of women surgeons in leadership positions across the board in academia and acute care is an area for tremendous growth.^{4 6–8 19 27} There needs to be a systematic and deliberate attempt to encourage women surgeons to advance into leadership positions.

There needs to be a deliberate shift within the profession of surgery so that both men and women entering the profession do not feel they have to choose between living a life and training to save a life.

With the increasing number of women entering medicine but stagnant number of women entering surgical practice, there is a clear signal for change. The current structure of surgical practice and residency is not desirable or conducive to a sustainable practice and quality of life for both women and men. The surgical profession continues to make people choose between living a fulfilled life and committing to saving lives, when there is an opportunity for the surgical profession to model how to live a life while saving lives.

Limitations/bias

Limitations for this systematic review include the inherent biases within the studies related to the database. Most studies used survey results from national surveys and several studies used similar if not the same database. Although article review occurred until identification of no new themes, there may be overlooked themes. Another limitation was the articles were restricted to the English language.

CONCLUSION

Our systematic review of the literature identifies that women have forged their way through surgery and surgical specialties. Fearless women have overcome the challenges of not having mentors, being limited in roles, juggling home and work life to be pioneers in their field. All the while, there is a constant hum that women feel choosing a life of surgery means sacrificing a life that has space for self-interests. Woven throughout the themes is the need to acknowledge surgical residency coincides with prime childbearing years and asking women and men to sacrifice starting a family for the practice of surgery is no longer acceptable. There is a great opportunity for the profession of surgery to increase the number of women entering surgery while simultaneously improving overall career satisfaction by developing policies to accommodate a work–life balance. It may take healthcare leaders to foster the change process which supports a balance in the profession of surgery.

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