

# Exploring gender roles in German interventional radiology – how progressive are we?

## Gleichstellung in der Interventionellen Radiologie in Deutschland – wie zukunftsorientiert sind wir?



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### Keywords

interventional radiology, gender equality, questionnaire, working conditions

received 6.2.2024

accepted after revision 10.8.2024

published online 2024

### Bibliography

Fortschr Röntgenstr

DOI 10.1055/a-2427-0303

ISSN 1438-9029


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Georg Thieme Verlag KG, Rüdigerstraße 14,  
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 Supplementary Material is available at <https://doi.org/10.1055/a-2427-0303>.

 Deutsche Version unter: <https://doi.org/10.1055/a-2427-0303>.

### ABSTRACT

**Purpose** This article presents the results of a nationwide survey addressing the status quo of gender equality and family friendliness within German interventional radiology (IR) with a focus on clinical entry and career development.

**Materials and Methods** All members of the German Society for Interventional Radiology and Minimally Invasive Therapy (DeGIR) were invited to participate in an online survey between November 2021 and February 2022. The survey consisted of 39 questions on demographic information, marital and parental status, experiences with entry and promotion in IR, family friendliness, and equality. A descriptive analysis of the responses was conducted.

**Results** 197 surveys from female (n = 76; 39%) and male (n = 121; 61%) interventional radiologists at various stages of training and career were analyzed. Fewer female attending physicians (58%) and chiefs of departments (23%) lived with children compared to male attending physicians (76%) and chiefs of departments (55%). Fewer men (4%) than women (41%) were primarily responsible for childcare. More female (55%) than male (6%) attending physicians worked part-time. Women rated entry into IR as more difficult than men. 55% of women felt disadvantaged by their gender (men: 6%); this was due to assumptions that women “perform less than men” (46%), “drop out due to family commitments” (35%) and that “men are promoted preferentially” (19%). 54% believed that it is more difficult for women to combine work and family. The

reasons for this are “family commitments” and “lack of flexible work schedules and childcare”. Parents with primary responsibility spent less than 50% of their working time on clinical interventions. Fathers from a younger generation were more likely to take parental leave than fathers of a previous generation (52% vs. 17%). Similar numbers of men (51%) and women (55%) planned to work part-time in the future.

**Conclusion** There are gender-specific differences in the German IR. To ensure sustainable recruitment of young talent, measures such as the normalization of flexible work schedules should be introduced to create equal conditions for women and men, as well as mothers and fathers, and thus take changing (family) structures adequately into account.

#### Key Points

- There are gender-specific differences in career entry/ career development in German interventional radiology.
- Working conditions must be adapted to ensure the next generation.
- Changing family structures must be adequately taken into account.

#### Citation Format

- Dewald CL, Blum SF, Becker LS et al. Exploring gender roles in German interventional radiology – how progressive are we?. *Fortschr Röntgenstr* 2024; DOI 10.1055/a-2427-0303

## ZUSAMMENFASSUNG

**Ziel** In diesem Artikel werden die Ergebnisse einer deutschlandweiten Umfrage vorgestellt, die sich mit dem Status Quo der Gleichstellung und Familienfreundlichkeit innerhalb der Interventionellen Radiologie (IR) mit Fokus auf den klinischen Berufseinstieg und die Karriereentwicklung beschäftigt.

**Material und Methoden** Alle Mitglieder der Deutschen Gesellschaft für Interventionelle Radiologie und minimal-invasive Therapie (DeGIR) wurden zwischen November 2021 und Februar 2022 zu einer Online-Umfrage eingeladen. Die Umfrage bestand aus 39 Fragen zu demografischen Angaben, Familienstand und Erfahrungen mit dem Einstieg und der

Förderung in der IR, Familienfreundlichkeit und Gleichstellung. Es erfolgte eine deskriptive Auswertung der Antworten.

**Ergebnisse** 197 Antwortbögen von weiblichen (n = 76; 39%) und männlichen (n = 121; 61%) Interventionsradiologen aus verschiedenen Ausbildungs- und Berufsphasen wurden analysiert. Mehr männliche Oberärzte (OÄ) (76%) und Chefärzte (CÄ) (55%) lebten mit Kindern im Vergleich zu weiblichen OÄ (58%) und CÄ (23%). Jedoch waren weniger Männer (4%) als Frauen (41%) primär verantwortlich für die Kinderbetreuung. Mehr weibliche (55%) als männliche (6%) OÄ waren in Teilzeit tätig. Frauen bewerteten den Einstieg in die IR schwieriger als Männer. 55% der Frauen fühlten sich aufgrund ihres Geschlechts benachteiligt (Männer: 6%); Grund sind die Annahmen, dass Frauen „weniger leisten als Männer“ (46%) und „aufgrund Familienverpflichtungen ausfallen“ (35%) sowie, dass „Männer bevorzugt gefördert werden“ (19%). 54% glaubten, dass es für Frauen schwieriger ist, Beruf und Familie zu vereinen. Gründe hierfür sind „Familienverpflichtungen“ sowie „mangelnde flexible Arbeitszeitmodelle und Kinderbetreuung“. Primärverantwortliche Eltern verbrachten weniger als 50% der Arbeitszeit mit klinischen Interventionen. Väter unter 45 Lebensjahren nahmen häufiger Elternzeit als Väter älter als 45 Jahre (52% vs. 17%). Ähnlich viele Männer (51%) und Frauen (55%) planten zukünftige Teilzeitarbeit.

**Schlussfolgerung** Es gibt geschlechtsspezifische Unterschiede in der deutschen IR. Um eine nachhaltige Nachwuchsförderung sicherzustellen, sollten Maßnahmen wie die Normalisierung flexibler Arbeitszeitmodelle eingeleitet werden, um gleiche Bedingungen für Frauen und Männer und auch Mütter und Väter zu schaffen, und so sich verändernde (Familien-)Strukturen angemessen zu berücksichtigen.

#### Kernaussagen

- Es gibt geschlechterspezifische Unterschiede im Berufseinstieg/der Karriereentwicklung in der deutschen Interventionsradiologie.
- Um Nachwuchs sicherzustellen, müssen sich die Bedingungen anpassen.
- Sich verändernde Familienstrukturen müssen angemessen berücksichtigt werden.

## Introduction

Interventional radiology (IR) has become an integral part of modern healthcare. Due to the continuous further development of innovative technologies and the increasing number of application areas, future growth in the field of IR can also be expected. To keep pace with these developments, promoting young talent and facilitating access to IR training and the ability to perform IR should have the highest priority. Special attention should be paid to the promotion of gender equality in IR, particularly since there are indications that diversity in healthcare systems can increase the quality of patient care as well as financial results [1]. In the winter semester 2022/2023, the percentage of women studying medicine in Germany was over 64% [2]. The percentage of women in radiology in 2022

was only 37% [3]. In IR which is considered a male-dominated work environment [4], the percentage of women is even lower. At present, only 17% of the members of the German Society for Interventional Radiology and Minimally Invasive Therapy (DeGIR) are women.

The demand for interventional radiologists is increasing [5]. Therefore, planning for future staffing utilizing all resources is imperative. It is not sufficient to simply raise awareness among students and young physicians regarding IR as a clinical subject if the basic conditions are not adapted to the needs of the talent pool. In a survey by the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) regarding gender equality in IR, participants cited radiation exposure risks, work-family balance, and

effects of pregnancy and parental leave on training and practice as their main concerns [4].

These concerns not only affect young female talent but also make IR unattractive to family-oriented men. Therefore, IR must meet the demands of women as well as men.

Understanding the extent to which career entry and career development differ between the genders and where there are deficits with respect to the development of young talent and family friendliness can help to overcome staffing shortages in a long-term manner. To this end, the authors developed a survey to determine the status quo of clinical work in IR in Germany.

## Materials and Methods

Approval (10640\_BO\_K\_2022) of the ethics committee of Hannover Medical School was obtained.

Between 11/2021 and 02/2022 all members of the DeGIR (n = 1636) were invited to participate in an anonymous and voluntary online survey regarding the situation among interventional radiologists in Germany. The questionnaire was developed by the DeGIR steering group “young talent and women in interventional radiology”.

Depending on the profile of the participants, the survey included up to 74 questions. The current evaluation includes the portion of the survey addressing clinical work in IR with up to 39 questions (Appendix A). The responses include demographic data and statements regarding family friendliness, working time models, gender equality in IR, career entry, promotion, and satisfaction. Questions regarding academic career and research activities in IR have already been evaluated in a separate study [6].

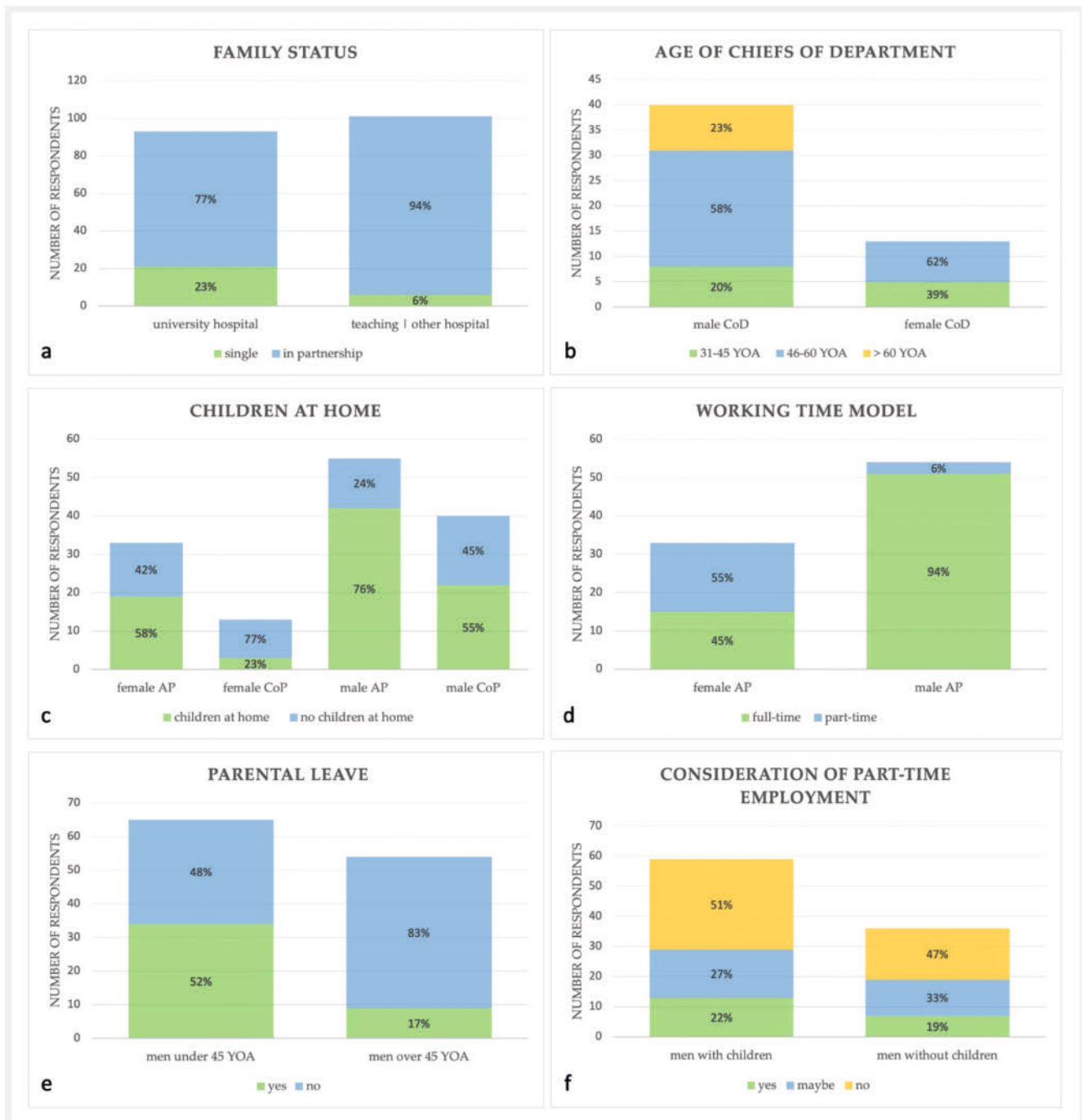
Statistical analyses and subgroup analyses were performed with IBM SPSS Statistics (v25.0, IBM Corp., United States). Descriptive statistics with corresponding percentages were used. If applicable, the mean and standard deviations are provided. Questions with multiple possible answers were categorized according to frequency. In the case of free text questions, responses were divided into categories.

## Results

In total, 267 questionnaires were filled out (return rate 16.4%) with 200 of them being fully completed. To ensure anonymity, survey participants specifying their gender as other (n = 3) were

► **Table 1** Overview of the demographic data of all respondents (all) and according to female and male gender.

	All (n = 197)	Female (n = 76)	Male (n = 121)
<b>Age (years)</b>			
▪ <30	14   7%	9   12%	5   4%
▪ 31–45	105   53%	44   58%	61   50%
▪ 46–60	61   31%	22   29%	39   32%
▪ >60	17   9%	1   1%	16   13%
<b>Family status</b>			
▪ Single	27   14%	15   20%	12   10%
▪ In partnership	170   86%	61   80%	109   90%
<b>Income</b>			
▪ Main earner	134   68%	41   54%	93   77%
▪ Secondary earner	10   5%	8   10%	2   2%
▪ Balanced	53   27%	27   36%	26   21%
<b>Hospital type</b>			
▪ University hospital	93   47%	38   50%	55   45%
▪ Teaching hospital	88   45%	32   42%	56   46%
▪ Other hospital	12   6%	5   7%	7   6%
▪ Private practice and other	4   2%	1   1%	3   3%
<b>Level of training</b>			
▪ Resident	35   18%	19   25%	16   13%
▪ Specialist	14   7%	8   11%	6   5%
▪ Senior specialist	6   3%	3   4%	3   3%
▪ Attending physician	88   45%	33   43%	55   46%
▪ Chief of department	53   27%	13   17%	40   33%



► **Fig. 1** Graphical presentation of the subgroup analyses with regard to demographic data, family friendliness and working time models: **a** Marital status by hospital type. **b** Age distribution of chiefs of department. **c** Proportion of attending physicians and chiefs of department with children at home. **d** Working time model of the attending physicians. **e** Proportion of male respondents who have taken parental leave, broken down by age. **f** Proportion of men with and without children who plan to work part-time in the future. AP: Attending physician, CoD: Chief of Department, YOA: Years of age.

excluded from the statistical analysis. 197 datasets were included in the analysis.

The responses to the different topic areas are provided in the tables broken down by gender. Subgroup analyses are shown in the corresponding figures.

### Demographic data (► Table 1)

39% of survey participants were women ( $n = 76$ ) and 61% were men ( $n = 121$ ). The majority of the people in both gender groups were under the age of 45. Most survey participants worked at a university hospital (47%) or an academic teaching hospital (45%).

► **Table 2** Overview of the results regarding family friendliness.

	All (n = 197)	Female (n = 76)	Male (n = 121)
<b>Children at home</b>			
▪ Yes	105   53%	31   41%	74   61%
▪ No	92   47%	45   59%	47   39%
<b>Family-friendly work environment</b>			
Yes	117   70%	43   64%	74   73%
No	51   30%	24   36%	27   27%
	<b>All (n = 105)</b>	<b>Female (n = 40)</b>	<b>Male (n = 65)</b>
<b>In what way is the work environment family-friendly*</b>			
▪ Flexible working time models are possible	51   49%	15   38%	36   55%
▪ Support from colleagues	37   35%	21   53%	16   25%
▪ Flexible childcare	17   16%	4   10%	13   20%
	<b>All (n = 47)</b>	<b>Female (n = 25)</b>	<b>Male (n = 22)</b>
<b>In what way is the work environment not family-friendly*</b>			
▪ High workload and inflexible working hours	33   70%	15   68%	18   72%
▪ Rejection of flexible working time models	5   11%	4   18%	1   4%
▪ Insufficient childcare	9   19%	3   14%	6   24%
	<b>All (n = 105)</b>	<b>Female (n = 31)</b>	<b>Male (n = 74)</b>
<b>Primary caregiver</b>			
▪ Yes	16   15%	13   42%	3   4%
▪ No	49   47%	3   10%	46   62%
▪ Equal	40   38%	15   48%	25   34%
<b>Single parent</b>			
▪ Yes	5   5%	3   10%	2   3%
▪ No	100   95%	28   90%	72   97%
<b>Childcare during working hours</b>			
▪ Yes	72   69%	26   84%	46   62%
▪ No	33   31%	5   16%	28   38%

The total sum may exceed 100% due to rounding of decimal places

\*Free-text question

Slightly more female than male participants lived alone (20% vs. 10%). While only 6% of participants working at teaching hospitals and other hospitals lived alone, 23% of those surveyed working at university hospitals were not in a partnership (► **Fig. 1a**).

The majority of participants (45%) were attending physicians, 28% were residents, specialists, or senior specialists, and 27% were chiefs of departments. Compared to male chiefs of departments, female chiefs of departments were younger on average (► **Fig. 1b**).

### Family friendliness (► **Table 2**)

53% of those surveyed lived in households with children, with the percentage of women (41%) being lower than the percentage of men (61%) (► **Table 2**). A gender-specific difference was seen particularly in the groups of attending physicians and chiefs of depart-

ments: A lower percentage of female attending physicians (58%) and especially female chiefs of departments (23%) had children in their household compared to their male colleagues (attending physician: 76% and chief of department: 55%) (► **Fig. 1c**).

There was also a difference in relation to childcare: Only 4% of men stated that they are the primary caregiver compared to 41% of women. Nonetheless, a majority of those surveyed stated that they work in a family-friendly environment with sufficient childcare options. The most commonly named reasons for considering the work environment family-friendly were the availability of flexible working time models (men: 55%, women: 38%) and support from colleagues (men: 25%, women: 53%). The main reason for considering the work environment non-family-friendly was the combination of high workload and lack of flexible work schedules (70% of all responses).

► **Table 3** Overview of the results regarding working time models.

	All (n = 197)	Female (n = 76)	Male (n = 121)
<b>Current work schedule</b>			
▪ Full-time	168   86%	56   74%	112   94%
▪ Part-time	27   14%	20   26%	7   6%
<b>Consideration of part-time employment</b>			
▪ Yes	42   26%	22   35%	20   21%
▪ No	76   48%	29   45%	47   50%
▪ Maybe	41   26%	13   20%	28   30%
<b>Maternity/parental leave taken so far?</b>			
▪ Yes	70   36%	27   36%	47   36%
▪ No	125   64%	49   64%	28   64%
	<b>All (n = 66)</b>	<b>Female (n = 26)</b>	<b>Male (n = 40)</b>
<b>What has changed as a result of maternity/parental leave?*</b>			
▪ Improvement in quality of life	14   21%	3   12%	11   28%
▪ Deterioration in professional reputation	19   29%	14   54%	5   13%
▪ No change	33   50%	9   35%	24   60%
	<b>All (n = 148)</b>	<b>Female (n = 58)</b>	<b>Male (n = 90)</b>
<b>What are the concerns about part-time work?*</b>			
▪ Impairment of training	53   36%	22   38%	31   34%
▪ Impairment of career prospects	29   20%	19   33%	10   11%
▪ Loss of earnings	18   12%	4   7%	14   16%
▪ No concerns	48   32%	13   22%	35   39%
*Free-text question			

### Working time models (► Table 3)

The majority of those surveyed worked full-time (86%) (► Table 3). 94% of male attending physicians worked full-time and only 6% worked part-time, while 45% of female attending physicians worked full-time and 55% worked part-time (► Fig. 1d).

The same percentage of male and female survey participants have taken parental leave (36%). A trend was seen among male participants: Significantly more men under the age of 45 have taken parental leave compared to men over the age of 45 (52% vs. 17%) (► Fig. 1e). The majority of men (60%) did not feel that their parental leave had an impact on their career. In contrast, the majority of female survey participants stated that parental leave had a negative effect on their career (54%).

Both men with children and men without children planned to work part-time in the future (22% and 19%, respectively) (► Fig. 1f). The surveyed men had fewer concerns about working part-time compared to the women. The women tended to be more concerned about a negative impact on their training (38%) and career prospects (33%). In contrast, the men were more concerned about the loss of income (16%; women: 7%).

### Gender equality in IR (► Table 4)

55% of surveyed women stated that they feel that they are at a disadvantage as a result of their gender (► Table 4). Women who felt that they were at a disadvantage gave the following assumptions as possible reasons: “Women perform less than men” (46%), “women drop out due to their family commitments” (35%), and “[men] are promoted preferentially” (19%). The percentage of those surveyed who felt that they are at a disadvantage decreased as the level of education increased. Thus, 69% of residents/specialists/senior specialists, 50% of attending physicians, and 39% of chiefs of departments stated that they feel that they are at a disadvantage. Female respondents without children were more apt to feel that they are at a disadvantage than those with children (► Fig. 2).

6% of male respondents stated that they feel that they are at a disadvantage due to the “preferential promotion of [women]”. In total, 54% of all respondents stated that it is more difficult for women to balance work and family (female respondents: 63%, male respondents: 48%). In particular, women under the age of 45 (71%) and women with children (72%) shared this opinion. Surprisingly, fewer female chiefs of departments than male chiefs of departments shared this opinion (39% vs. 50%) (► Fig. 3).

As the main reason for the difficulty balancing work and family, the respondents stated that most childcare is still provided by

► **Table 4** Overview of the questions on equality.

	All (n = 197)	Female (n = 76)	Male (n = 121)
<b>Have you felt ... in your career as a result of your gender?</b>			
▪ Favored	13   7%	1   2%	11   11%
▪ Disadvantaged	43   26%	37   55%	6   6%
▪ No influence	113   67%	29   43%	84   83%
	<b>All (n = 42)</b>	<b>Female (n = 37)</b>	<b>Male (n = 6)</b>
<b>Why have you felt <u>disadvantaged</u> in your career as a result of your gender?*</b>			
<b>Based on the assumption that</b>			
▪ "women do not perform as well as men"	24   57%	17   46%	0   0%
▪ "women will/could drop out due to family planning"	12   29%	13   35%	0   0%
▪ "the opposite (not one's own) sex is preferentially promoted"	6   14%	7   19%	6   100%
	<b>All (n = 11)</b>	<b>Female (n = 1)</b>	<b>Male (n = 10)</b>
<b>Why have you felt <u>favored</u> in your career as a result of your gender?*</b>			
▪ Preferred promotion	5   46%	1   100%	4   40%
▪ More physical strength	1   9%	0   0%	1   10%
▪ No family obligations	5   46%	0   0%	5   50%
	<b>All (n = 167)</b>	<b>Female (n = 67)</b>	<b>Male (n = 100)</b>
<b>Balancing career and family is more difficult for women</b>			
▪ Agree	90   54%	42   63%	48   48%
▪ Tend to agree	29   17%	11   16%	18   18%
▪ Partially agree	21   13%	5   8%	16   16%
▪ Tend to disagree	9   5%	4   6%	5   5%
▪ Do not agree	9   5%	2   3%	7   7%
▪ Cannot comment	9   5%	3   5%	6   6%
	<b>All (n = 126)</b>	<b>Female (n = 53)</b>	<b>Male (n = 73)</b>
<b>Why is it more difficult for women to balance career and family?*</b>			
▪ Care work is mainly done by women	91   72%	40   76%	51   70%
▪ Discrimination by superiors	14   11%	7   13%	7   10%
▪ Structural problem (working time model, childcare)	21   17%	6   11%	15   21%
*free-text question			

women. The second most common reason was structural problems due to a lack of childcare options or flexible working time models followed by discrimination by superiors.

### Career entry into IR and promotion (► Table 5)

Male respondents evaluated entry into clinical work in IR on a scale of 1–10 (easy to difficult) with an average score of 3.6 (standard deviation  $\sigma$  2.4), while female respondents evaluated entry as more difficult with a score of 5 ( $\sigma$  2.7).

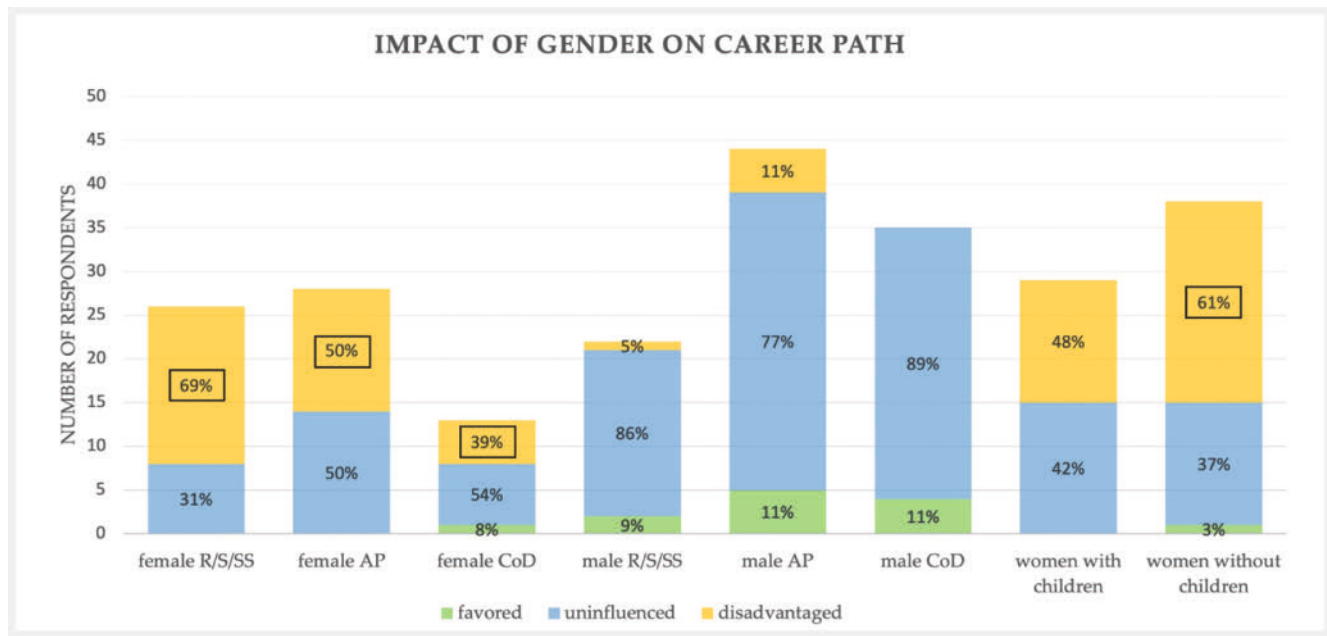
Female residents/specialists/senior specialists found career entry more difficult than the male comparison group (5.7 ( $\sigma$  1.7) vs. 3.7 ( $\sigma$  1.7)). Women over the age of 45 found career entry more difficult (7 ( $\sigma$  4.4)) compared to those under the age of 45 (4.7 ( $\sigma$  2.4)). The opposite trend was seen among male respondents with those under

the age of 45 rating career entry as more difficult (4.3 ( $\sigma$  2.4)) than those over the age of 45 (2.8 ( $\sigma$  2.1)) (► Fig. 4).

According to 53% of female respondents, "less than 25%" of working time is spent performing clinical interventions. The most common answer among male respondents is 25–50% (36%). Almost all male and female respondents with primary responsibility for childcare stated that they spend less than 50% of their working time performing clinical interventions (► Fig. 5).

### Satisfaction with career (► Table 6)

The majority of respondents stated that they are satisfied with their career to date or tend to be satisfied (► Fig. 6). However, only 13% of female residents/specialists/senior specialists stated that they are satisfied, while a significantly higher percentage



► **Fig. 2** Responses from different training levels and parental status to the question: “Have you felt favored, disadvantaged or uninfluenced by your gender in your career?” The proportion of female respondents who consider themselves disadvantaged decreases as the level of education increases (square outline). Slightly more female respondents without children feel disadvantaged (square outline) than respondents with children. AP: Attending physician, CoD: Chief of department, SS: Senior specialist, S: Specialist, R: Resident.

(55%) of male residents/specialists/senior specialists stated that they are satisfied.

“Achieving a leadership position” was the most common career goal for both genders.

The greatest need for optimization was seen in the areas of “compatibility with working time models” and “working hours” by both female and male respondents.

## Conclusion

Our results indicate that women and men in German IR are faced with different conditions with respect to career entry and career development. The current (working) conditions in IR are at best only moderately tailored to the needs particularly of the young female interventional radiologists who participated in the survey. This applies not only to the interests of women. Due to changing family structures, men are also affected by working conditions.

## Discussion

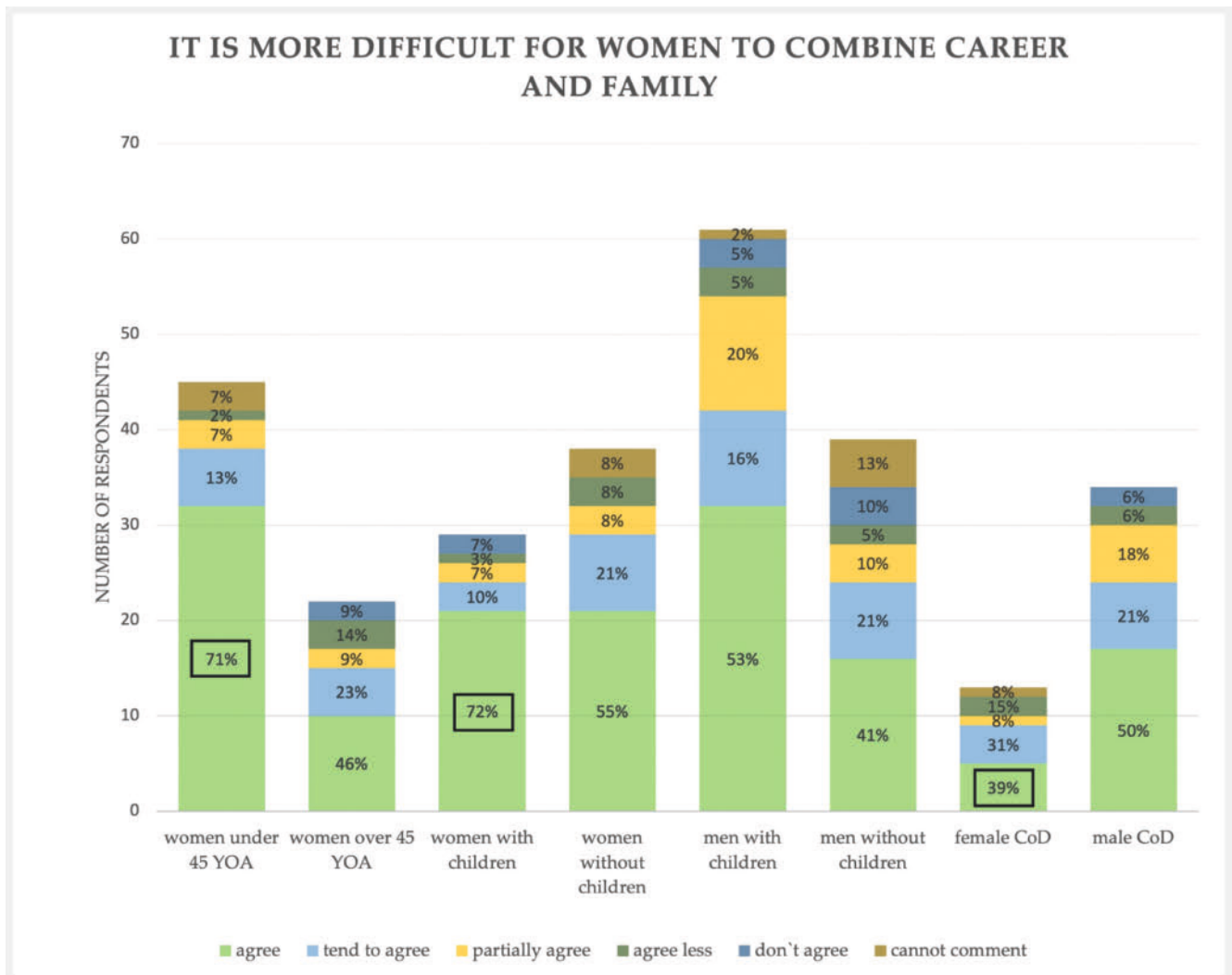
Women have always been underrepresented in radiology and in IR in particular [7, 8]. Since it is only a question of time until the number of female physicians exceeds the number of male physicians, it is essential for the lasting development of our discipline to recognize the necessity to improve the promotion of young talent and to ensure equal opportunity regarding career entry and career development. In our survey, we determined the current status of gender equality and family friendliness in clinical work in IR in Germany.

In German IR, positive trends in gender equality have already been seen, particularly at the management level where a higher presence of younger women among chiefs of departments can be observed. These women are less likely to have children than their male colleagues. This phenomenon can also be seen at the attending physician level even though this theoretically coincides with the time when people typically start a family. It should be discussed whether family planning is actively delayed due to the lack of certainty of being included in IR during a pregnancy or the ability to re-enter IR after a pregnancy/parental leave.

In the early career stages, it usually takes women longer to complete their training than men since they take longer maternity leave and parental leave while men often only briefly go on parental leave [9, 10, 11]. As a result of this and the fact that more women than men continue to be responsible for providing primary childcare beyond the period of parental leave and more commonly work part-time, the majority of surveyed mothers felt that parental leave had a negative impact on their professional reputation.

Due to these discrepancies among other things, most respondents felt that it is more difficult for women to balance work and family. The survey performed by CIRSE in 2017 yielded similar results [4]. The international comparison indicated that respondents from countries with better gender equality like Denmark or structured training programs like the USA are less likely to have problems with work-family compatibility. A structured training program could help to reduce the chances of (conscious or unconscious) discrimination. If, for example, certain interventions need to be learned by a specific point in training, access must be provided and adjusted to the particular working time model of the trainees. Surprisingly, the female chiefs of departments who





► **Fig. 3** Graphical representation of the reaction of different subgroups to the statement: "It is more difficult for women to combine career and family". The subgroups that agree with the statement particularly often (women under 45 and women with children) or rarely (female chiefs of department) are outlined in a square. CoD: Chief of Department; YOA: Years of age.

participated in our survey found it less challenging to balance work and family. Whether this is due to the fact that the surveyed female chiefs of departments have found a way to ensure better balance for themselves and their female physicians in their work environment or that they have fewer responsibilities related to children cannot be derived from the data.

More than half of all female respondents have felt disadvantaged due to their gender during the course of their career. This percentage exceeds that of the CIRSE data, where almost half of surveyed residents stated that they felt that they were at a disadvantage or had been discriminated against [4]. The number of survey participants who felt that they were at a disadvantage due to their gender decreased with an increasing level of education and a corresponding increase in age.

A similar trend was seen in the analysis of career satisfaction to date: Young female interventionalists (residents/specialists/senior specialists) are significantly less satisfied. Moreover, they find entry into IR to be more challenging than their male colleagues. This

coincides with the results of a Germany-wide survey performed in 2020 regarding the work and training conditions of residents and young radiologists in IR. The survey showed that female survey participants tended to be less satisfied with their training [12].

This could be associated with differences in learning behavior. Reder et al. examined gender-specific differences regarding self-assessment and perceived stress level when performing a simulated endovascular catheter maneuver. The female participants needed more time and asked for help earlier than the male participants. However, they could objectively evaluate their performance significantly better [13]. It is also conceivable that entry into IR for young female interventional radiologists is more difficult because the stigmatization regarding their age and the associated possibility of a pregnancy is greater than generally assumed. The possibility or the risk of a pregnancy was also identified by Sieren et al. as a potential obstacle in IR training of female residents [12]. This could explain why more childless female respondents felt at a disadvantage due to their gender than female respondents with children.

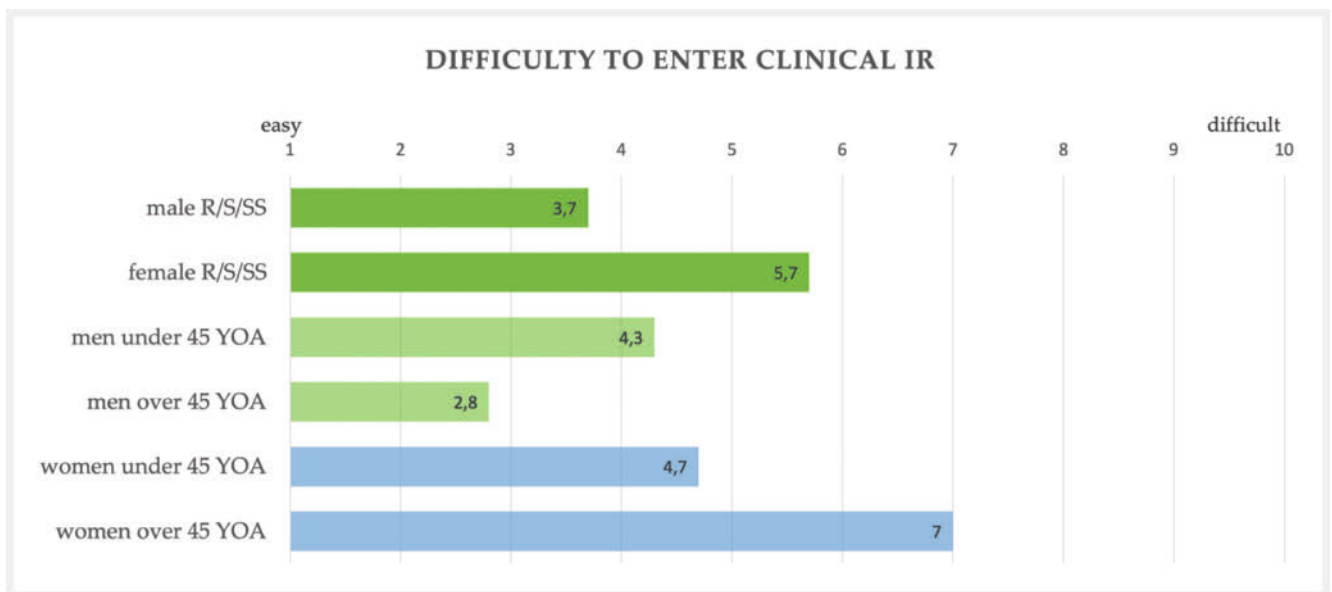
► **Table 5** Overview of answers to questions regarding entry and promotion in IR.

	All (n = 181)	Female (n = 72)	Male (n = 109)
<b>Was working in IR the goal from the start?</b>			
▪ Yes	97   54%	39   54%	58   53%
▪ No	84   46%	33   46%	51   47%
<b>Level of difficulty of entry into clinical work in IR? (1–10; easy-difficult)</b>			
▪ Median (standard deviation)	4 (2.6)	5 (2.7)	3.6 (2.4)
	<b>All (n = 30)</b>	<b>Female (n = 15)</b>	<b>Male (n = 15)</b>
<b>What were the difficulties?*</b>			
▪ Lack of training	10   33%	3   20%	7   47%
▪ Competition from colleagues	10   33%	5   33%	5   33%
▪ Structural problems	6   20%	3   20%	3   20%
▪ Discrimination against women	4   13%	4   27%	0   0%
	<b>All (n = 197)</b>	<b>Female (n = 76)</b>	<b>Male (n = 121)</b>
<b>What % of your total working time do you actively spend on procedures?</b>			
▪ <25 %	77   40%	40   53%	37   31%
▪ 25–50 %	66   34%	23   30%	43   36%
▪ 51–75 %	30   15%	8   11%	22   19%
▪ >75 %	22   11%	5   7%	17   14%
<b>What has influenced your clinical promotion so far? (Ranked from most common to least common answers)</b>			
▪ None of the above	Rank 1	Rank 1	Rank 1
▪ Working time model	Rank 2	Rank 2	Rank 2
▪ Family model	Rank 3	Rank 4	Rank 3
▪ Gender	Rank 4	Rank 3	Rank 5
▪ Age	Rank 5	Rank 5	Rank 4
▪ Family origin	Rank 6	Rank 6	Rank 6
<b>Which characteristic has helped to promote your career? (Ranked from most common to least common answers)</b>			
▪ Commitment/voluntary engagement	Rank 1	Rank 1	Rank 1
▪ Ability to work in a team	Rank 2	Rank 3	Rank 2
▪ Determination	Rank 3	Rank 2	Rank 3
▪ Assertiveness	Rank 4	Rank 4	Rank 4
▪ Restraint	Rank 5	Rank 5	Rank 5
▪ Self-presentation	Rank 6	Rank 6	Rank 6
▪ None of the above	Rank 7	Rank 7	Rank 7
<b>Which characteristic has not helped to promote your career? (Ranked from most common to least common answers)</b>			
▪ None of the above	Rank 1	Rank 2	Rank 1
▪ Restraint	Rank 2	Rank 1	Rank 2
▪ Self-presentation	Rank 3	Rank 3	Rank 3
▪ Assertiveness	Rank 4	Rank 4	Rank 4
▪ Ability to work in a team	Rank 5	Rank 4	Rank 6
▪ Determination	Rank 6	Rank 5	Rank 5
▪ Commitment/voluntary engagement	Rank 7	Rank 6	Rank 7

► **Table 5** (Continuation)

	All (n=181)	Female (n=72)	Male (n=109)
<b>Which attribute has brought you the most progress so far? (Ranked from most common to least common answers)</b>			
▪ Performance	Rank 1	Rank 1	Rank 1
▪ Expertise	Rank 2	Rank 2	Rank 2
▪ Assertiveness	Rank 3	Rank 3	Rank 4
▪ Contacts	Rank 4	Rank 4	Rank 3
▪ Self-presentation	Rank 5	Rank 7	Rank 5
▪ Positioning in higher positions	Rank 6	Rank 5	Rank 7
▪ Appearance	Rank 6	Rank 7	Rank 6
▪ None of the above	Rank 7	Rank 6	Rank 7
▪ Positioning in general positions	Rank 8	Rank 8	Rank 7
▪ Family origin	Rank 9	Rank 9	Rank 7

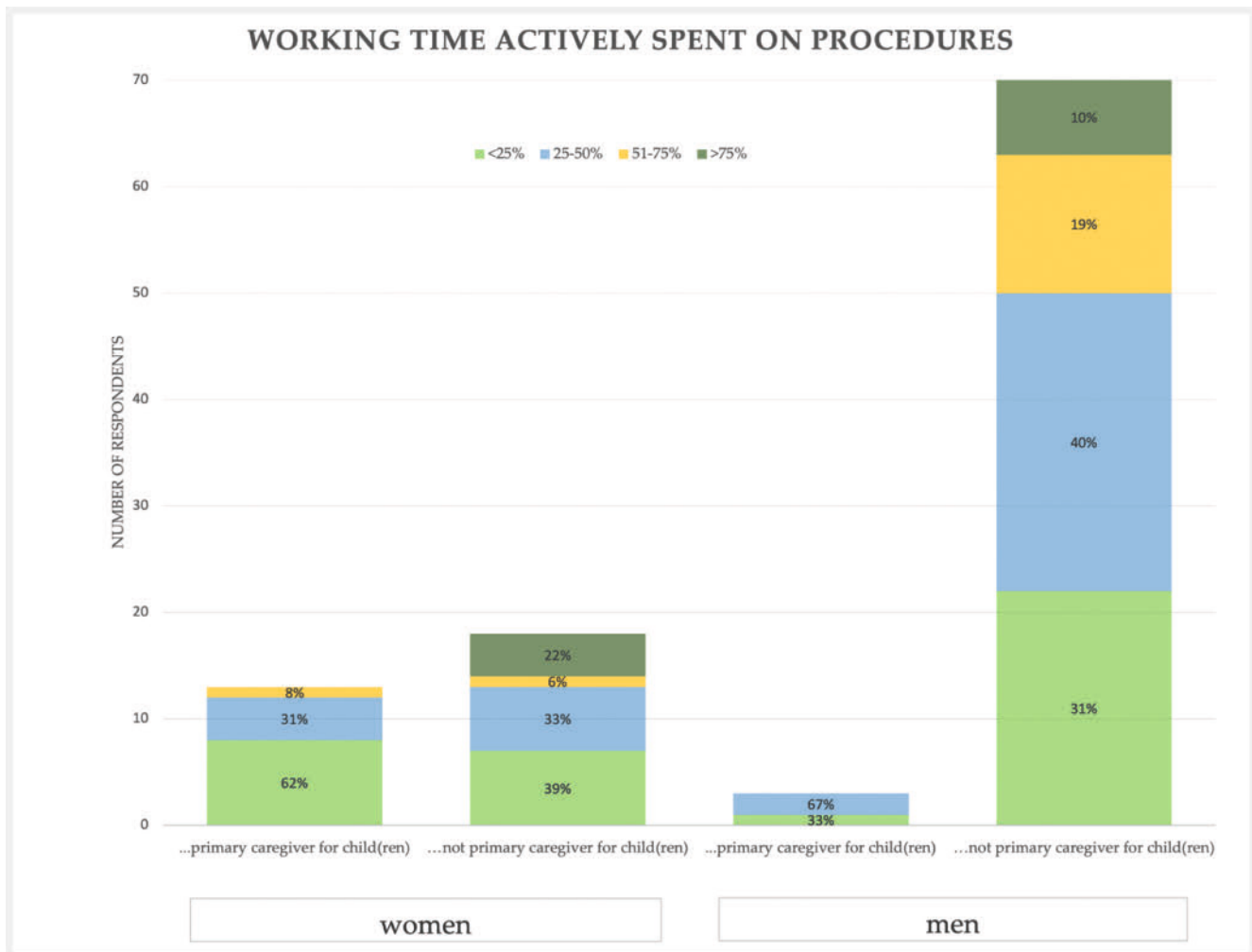
\*free-text question



► **Fig. 4** Response behavior of male and female respondents under and over 45 years of age to the question of how easy or difficult it was to start clinical work in interventional radiology. The mean value is shown. IR: Interventional radiology, R: Resident, SS: Senior specialist, S: Specialist, YOA: Years of age.

To date, more women than men continue to be responsible for primary childcare and work part-time. However, when searching for solutions, it is necessary to avoid stereotyping male and female gender roles. A large meta-analysis of sociological studies showed that, contrary to popular belief, the conflicts between work and family among men and women are more similar than different [14]. In some cases, men also worry about being stigmatized if they take parental leave or openly talk about their struggles to balance career and family. To the extent that this can be interpreted from the gathered data, there is a generational shift

among male interventional radiologists. While still placing the same level of importance on their clinical career, the younger generation also wants better compatibility between family and career. This is evidenced, for example, by the positive trend regarding requests for parental leave and plans to work part-time among younger (<45 years old) respondents. It is also striking that younger (<45 years old) men find it more difficult to enter IR than the older generation.



► **Fig. 5** The percentage of working time spent on clinical interventions by respondents with or without primary responsibility for childcare (“primary caregiver”). YOA: Years of age.

Therefore, there must be a paradigm shift in German IR not only to ensure gender equality for young female talent but also to take the needs of the young and subsequent generations of men into account and to ensure that IR continues to be attractive.

Our results show that flexible working time models support the ability to balance work and private life. However, flexible working conditions will be difficult to implement in IR due to on-call duties and irregular working times. It is the responsibility of management and professional societies to actively look for solutions. For example, it should be possible to allow part-time staff and primary caregivers to perform more clinical interventions than the percentage specified by those who participated in our survey (<25%). In addition, the teaching conditions should be adapted to the needs of those in training, e.g., by identifying gender-specific differences in learning behavior. A further approach, in contrast to established practice, would be to introduce residents to IR early in their training in order to be able to identify and retain talent.

An adjustment of the basic conditions also involves comprehensive education regarding radiation exposure in pregnancy.

The DeGIR steering group “young talent and women in interventional radiology” is currently working on a position paper regarding interventions during pregnancy. The steering group recommends not actively excluding pregnant women from IR but rather making clinical work as well as options for scientific work available to them. Only in this way can the stigmatization of pregnancy and “absences due to pregnancy” – which should never be confused with inability to work – be counteracted.

Systematic rethinking and adjustment of the basic conditions are essential to meet the needs of the next IR generation and to promote gender equality. A lack of long-term measures could have a lasting effect on German IR.

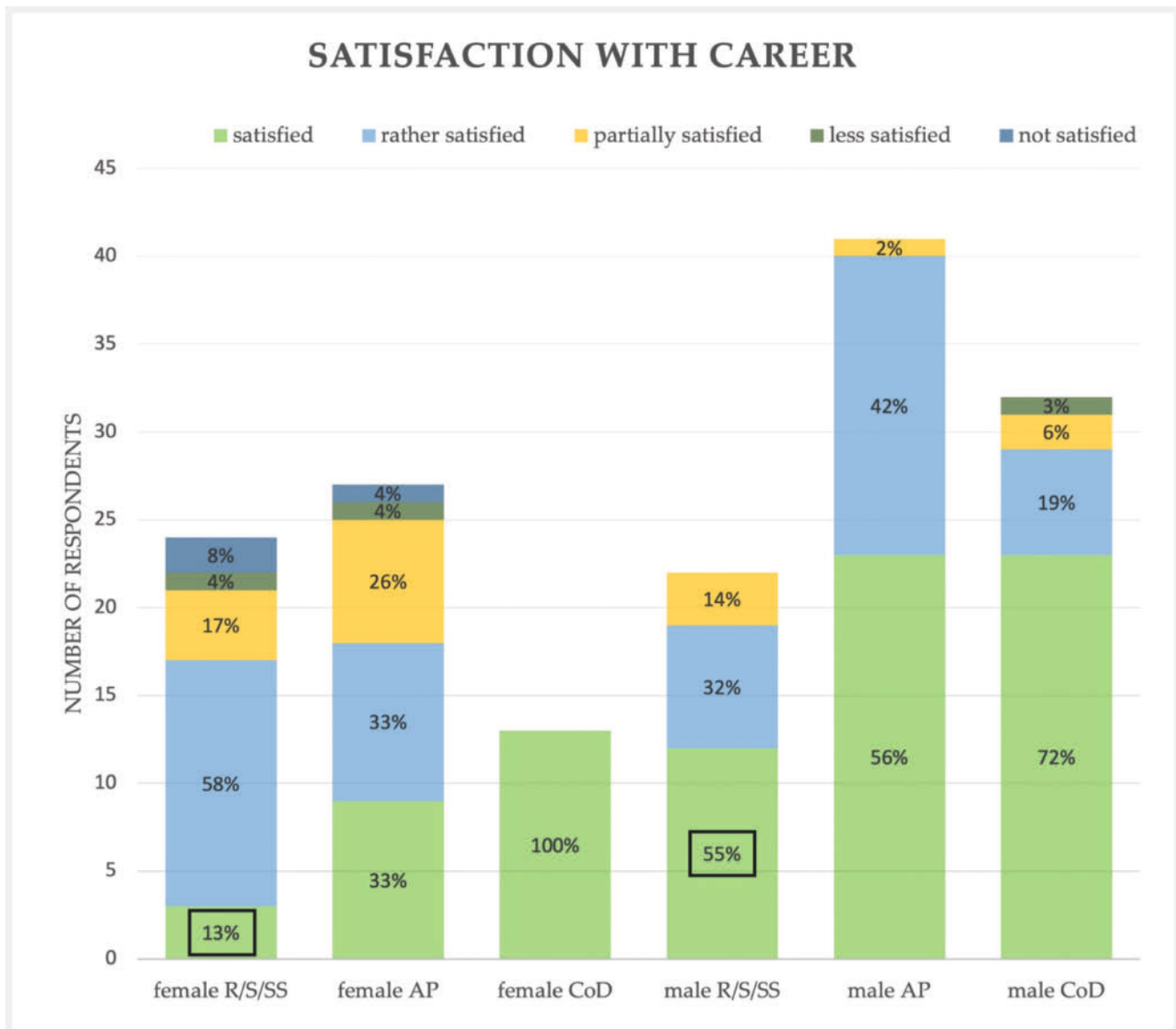
The results should be interpreted under consideration of the following limitations: Analysis of a voluntary survey can be subject to a possible bias. Some parts of the questionnaire relate to personal experience and perceptions that cannot be validated in a standardized manner and are thus subject to a certain amount of subjectivity. The survey was only sent to members of the DeGIR. The representativeness of the study population cannot be validated since important demographic data (e.g. location) and other

► **Table 6** Overview of responses regarding career satisfaction.

	All (n = 159)	Female (n = 64)	Male (n = 95)
<b>Importance of the clinical (IR) career</b>			
▪ Important	78   49%	31   48%	47   50%
▪ Rather important	34   21%	11   17%	23   24%
▪ Partially important	31   20%	12   19%	19   20%
▪ Less important	8   5%	4   6%	4   4%
▪ Not important	8   5%	6   9%	2   2%
<b>Satisfaction with career to date</b>			
▪ Satisfied	83   52%	25   39%	58   61%
▪ Rather satisfied	53   33%	23   36%	30   32%
▪ Partially satisfied	17   11%	11   17%	6   6%
▪ Less satisfied	3   2%	2   3%	1   1%
▪ Not satisfied	3   2%	3   5%	0   0%
▪ Cannot comment	0   0%	0   0%	0   0%
	<b>All (n = 146)</b>	<b>Female (n = 57)</b>	<b>Male (n = 89)</b>
<b>Future career goals*</b>			
▪ Achieve leadership position	65   45%	23   40%	42   47%
▪ Expand clinical competencies	37   25%	18   32%	19   21%
▪ Improve work-life balance	14   10%	5   8%	9   10%
▪ Goals already achieved	30   21%	11   19%	19   21%
	<b>All</b>	<b>Female</b>	<b>Male</b>
<b>What factors did you think about before starting clinical work in IR? (Ranked from most common to least common answers)</b>			
▪ Radiation protection	Rank 1	Rank 1	Rank 1
▪ Working hours (night shifts)	Rank 2	Rank 2	Rank 2
▪ Physical labor	Rank 3	Rank 3	Rank 2
▪ Compatibility with working time models	Rank 4	Rank 4	Rank 3
▪ Risk of infection	Rank 5	Rank 5	Rank 4
▪ Other issues	Rank 6	Rank 6	Rank 5
<b>In which areas do you see a need for optimization? (Ranked from most common to least common answers)</b>			
▪ Compatibility with working time models	Rank 1	Rank 1	Rank 1
▪ Working hours (night shifts)	Rank 2	Rank 2	Rank 2
▪ Radiation protection	Rank 3	Rank 3	Rank 3
▪ Physical labor	Rank 4	Rank 4	Rank 4
▪ Other factors	Rank 5	Rank 5	Rank 6
▪ Risk of infection	Rank 6	Rank 6	Rank 5
*free-text question			

features could not be recorded in order to ensure anonymity. Due to the detailed examination of subgroups, only limited responses were included in the individual analyses. A corresponding bias should be taken into consideration. The high response rate of

female interventional radiologists is important for answering our hypotheses but does not reflect the actual gender distribution in German IR.



► **Fig. 6** Stacked bar chart of “satisfaction with career” for subgroups with different levels of training. For overview reasons, the female and male residents/specialists/senior specialists which are satisfied with their career are outlined with a square. AP: Attending physician, CoD: Chief of department, SS: Senior specialist, S: Specialist, R: Resident.

## Clinical relevance

- Interventional radiology will continue to grow. Therefore, young talent must be promoted and access to IR must be made easier.
- Understanding of gender-specific differences regarding career entry and development can help to overcome staffing shortages in the long term.
- A paradigm shift in German IR is needed to include the entire next generation of interventional radiologists and to maintain the attractiveness of IR.

## Conflict of Interest

The authors declare that they have no conflict of interest.

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