

Hidden Discrimination in Academia.

Mentoring as an Empowerment Strategy for Female Researchers in Medicine.

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Abstract: This article examines the (equal) opportunities for female researchers in the Faculty of Medicine at a German university, the hidden obstacles in pursuing individual careers in academia, the factors preventing females from reaching leading positions as well as mentoring as an instrument favoring the predictability, security and stability of the academic career. The authors performed several quantitative studies on the working conditions as well as a survey on mentoring effects for female researchers working at the Medical Faculty. The main target group includes female researchers at the postdoctoral phase of academic qualification.

Keywords: gender balance, precarious employment conditions, individual careers in academia, mentoring, knowledge transfer, networking.

1. Introduction: Are there signs of gender discrimination in academia?

Increasingly precarious working conditions are considered to be a common phenomenon among academics of both genders³ at universities in Germany. Nevertheless Gender equality plans demonstrate the underrepresentation of women at higher stages of their academic careers. Especially, it refers to the field of medicine, where the proportion of women resembles a pyramid – the higher the academic qualification level is the fewer females are represented. While the majority of medicine students (64,5%) as well as doctorate researchers (66,7%) is female, only few female researchers manage to reach the top of the pyramid. The percentage of female professors is 21,2 % for the W2 positions and only 17,0 % for the highest W3 positions⁴.

In order to prevent the structural discrimination of female researchers and increase the proportion of women at universities, the position of women representatives, renamed later on into the position of equal opportunities commissioners was introduced all over Germany at

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³ In this article we analyse the variable “gender” by comparing the conditions for male and female researchers. Because of unavailability of data, the third gender is currently not the subject of our analysis.

⁴ Internal statistics of Heinrich-Heine-University Dusseldorf, 2016.

the beginning of the 1990s [2]. One of the tools to promote equal opportunities in academia is considered to be a formal mentoring program for female researchers.

The reasons of the underrepresentation of women in higher positions in academia can vary in every individual case, but we can suppose a certain latent discrimination of the female gender in the educational system of Germany. In this article we analyze the working conditions of female researchers at the Medical Faculty. Our special interest lies on the target group of employees between two qualification stages – after the PhD degree and before the habilitation. We investigate, which personal and professional key skill female researchers gain through mentoring and conclude, how helpful the female-oriented program are in order to if not to reach gender balance than at least to raise awareness of existing gender imbalance within the scientific community.

2. Methods

2.1. Quantitative study on the working conditions

We performed a quantitative study on the working conditions for academical employees at a medical faculty in Germany by analysing the employment contracts over a period of four years (2012 – 2015).

Table 1. Overview of the data collected

	Analysis of employment contracts 2012-2015 (PhD, MD only)	Reconciliation of family and career 2013-2015
Type of contract (first vs. continued employment)	+	
Gender (m/f)	+	+
Academic title		+
Contract duration (Cod) in months	+	
Weekly working time (wwt) in %	+	+
Tariff classification	+	+
Age	+	+
Maternity protection y/n		+
Parental leave without working y/n		+

A multivariate analysis of variance (MANOVA) was performed with the test statistic Wilks' lambda and the factors gender and contract type. As dependent variables we indicated *duration of the working contract* (cod) and *weekly working time* (wwt). Due to the exploratory

question Bonferroni correction of level of significance was omitted. All in all we analyzed 2774 working contracts of the employees of the medical faculty concluded in the years 2012 – 2015. We divided the contracts into two groups based on the variable *contract duration*. Postdoc employees with the duration of their working contract shorter than 70 months belonged to group A, respectively group B included all postdoc employees having a contract duration longer than 70 months.

MANOVA for fixed-term contracts

For group A a MANOVA was conducted with the test statistic Wilks' lambda and the factors gender and type of contract (initial contract vs. extension). Dependent variables were *contract duration* and *weekly working time*. The sample consisted of all fixed-term contracts between 2012 and 2015 (2650 persons, of whom 1530 were women and 1120 were men).

Table 2. Database

Type of contract	Female	Male	Total
Fixed term 95,5 %	1530 58 %	1120 42 %	2650
Permanent 4,5 %	47 38 %	77 62 %	124

MANOVA for permanent contracts

For group B a MANOVA was conducted with the test statistic Wilks' lambda and the factors gender and type of contract (initial contract vs. extension). Dependent variables were *age* and *weekly working time*. The sample comprises 124 employees (47 women and 77 men).

Analysis of the reconciliation of family and career

We performed a gender analysis for all academical employees of the medical faculty examining the weekly working time and the fact and duration of parental leave of those employees who became a new parent during the period of investigation.

The analysis of the duration of parental leave was performed with ALSTAN based on Excel. This tool gives an analysis of the demographic composition of an institution. There is no specific evaluation of individual datasets.

For the academic and clinical career we analyzed different groups. The groups are defined as follows: doctorate researchers, postdocs and researchers with a postdoctoral lecture qualification of the medical faculty (excluding physicians). For the medical career group we included only physicians. They are divided into assistant physicians, medical specialists and

senior physicians. A look at the claim and duration of parental leave within these groups might reveal a possible correlation of the work-life-balance. In order to make an objective comparison between men and women, we considered only parental leave excluding the leave within mandatory maternal protection period. For the analysis of the reconciliation of family and career, we collected 265 datasets about parental leave regarding gender, age, duration of parental leave and academic status from 178 persons.

2.2. Quantitative and qualitative empirical data on mentoring

The findings on the mentoring part for this article are based on an online survey conducted 2016 among the former mentees of a female-oriented mentoring program SelmaMeyerMentoring at a German university who participated in the program from 2006 to 2016 (response rate 64%). As program is open for the female young career researchers of all faculties, we sorted out the data for the participants (mentees) from the Medical Faculty and the Faculty of Mathematics and Natural Sciences (n=121), who worked in the field of medicine.

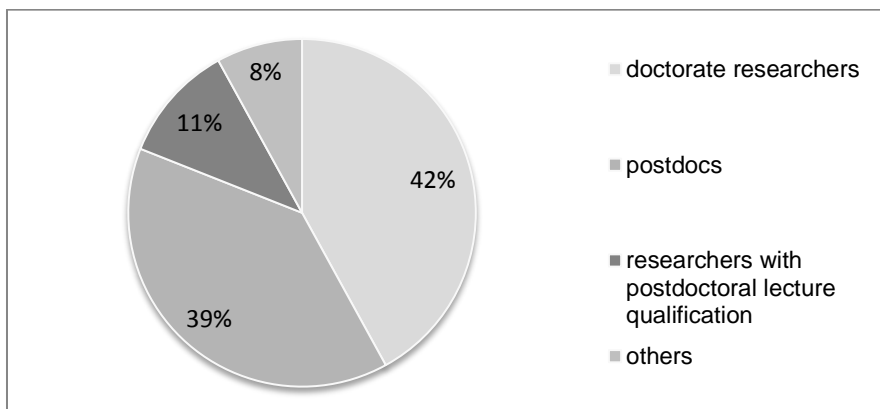


Fig. 1. Data set of mentees at Medical Faculty and Faculty of Mathematics and Natural Sciences, (N=121).

At the same time, 31 semi-structured qualitative interviews with experts were carried out. The mentees and experts were asked to express their individual goals and personal as well as institutional benefits through the participation in the mentoring program.

3. Findings

3.1. Differences in the working conditions between male and female employees

There were main effect for the factors gender ($F(2/2645)=12.647$; $p<.001$, $\eta^2=.009$) and contract type ($F(2/2645)=74.195$; $p<.001$, $\eta^2=.053$) as well as an interaction ($F(2/2645)=3.184$; $p=.042$, $\eta^2=.002$).

In the fixed-term employments gender doesn't influence the contract duration significantly, but the weekly working time of an employee. In contrast to the previous findings [11] a main

effect of contract type on the variable *weekly working time* was found ($F(1/2645)=25.207$, $p<.001$, $\eta^2=.009$), whereas no effect was present on the variable *contract duration* ($F(1/2645)=1.627$, $p=.202$, $\eta^2=.001$). We could observe the interdependence between these two variables. Men have longer weekly working times ($M=.838$, $SD=.008$) than women ($M=.787$, $SD=.007$).

The factor contract type affects the variable *contract duration* ($F(1/2646)=146.895$; $p<.001$, $\eta^2=.053$) as well as the variable *weekly working time* ($F(1/2646)=6.811$, $p=.009$, $\eta^2=.003$).

Generally, new employed staff has longer contract durations ($M=25.438$, $SD=.531$) and longer weekly working times ($M=.826$, $SD=.008$) than retained employees (contract duration: $M=17.379$, $SD=.401$; weekly working time: $M=.799$, $SD=.006$). An interaction between both variables was observed.

In contrast to men, the contract duration of women who were newly employed and those who were retained differed strongly from each other (women: arithmetic mean new hire=28.812; arithmetic mean retained=16.157; men: arithmetic mean new hire =25.065; arithmetic mean retained =18.601). The same circumstances were revealed with regard to the weekly working time: on average newly hired women work 80,8 % of a full-time job (retained female employees work 76,6 %). Newly employed men work 84,3 % of a full-time week (retained male employees 83,2 %).

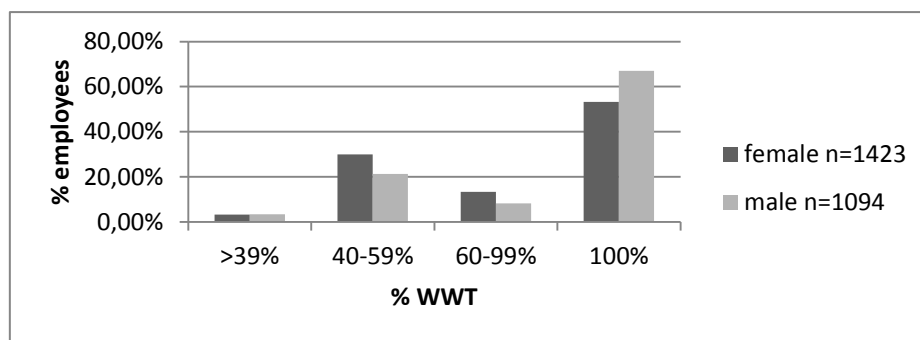


Fig. 2. Distribution of weekly working time by gender (1=100% WWT, i.e. full time)

During early academic and clinical career men and women are on equal terms when it comes to fixed-term contracts. But we found out, that men receive contracts with longer working hours more often (men: 84 %; women: 78 %). This fact leads to a gender pay gap and prospectively to a gender pension gap in the future.

Differences in the permanent working contracts

The analysis is based on contracts from 124 employees, of whom 47 were women and 77 were men. We found a main effect of the factor gender ($F(2/119)=8.132$; $p<.001$, $\eta^2=.012$), but no main effect of the parameter contract type ($F(2/119)=1.697$; $p=.188$).

There was a main effect of gender on the variable weekly working time as well as on the variable age. In general men had longer weekly working times ($M=.973$, $SD=.021$) than women ($M=.888$, $SD=.026$) and they were older at the beginning of their employment (men: $M=42.565$, $SD=.651$; women: $M=39.708$, $SD=.789$).

Table 3. Results from MANOVA, p : α - error margin

	Factors/parameters	Gender	Contract type	Interaction
Fixed-term	CoD	$p=.202$	$P<.001$	
	wwt	$P<.001$	$P=.009$	
	total	$P<.001$	$P<.001$	$P=.042$
Permanent	age	$P=.006$		
	wwt	$P=.013$		
	total	$P<.001$	$P=.188$	$P=.006$

Men were also twice as likely to perceive a permanent contract as women. This implicates the better opportunities for men to plan their career and family formation, rather than women.

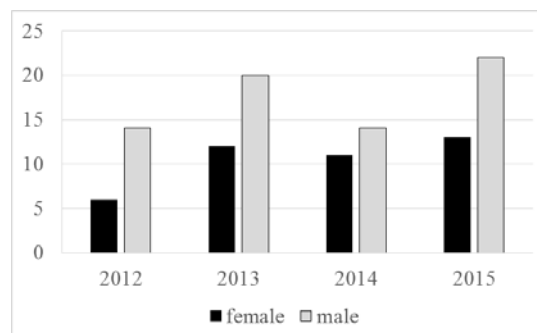


Fig. 3. Number of all permanent work contracts by gender

Parental leave in interdependence to the academic career stage

In the present work we analyzed the gender differences, the academic career stage and the age structure in interdependence to the claim of parental leave. From 2013 to 2015 women applied for parental leave 178 times and men 47 times. On average women claimed 170 days of parental leave and men only 47 days (the medium age for both genders 35,5 years). The parental leave is most commonly claimed between the ages of 31 and 35 (m/f).

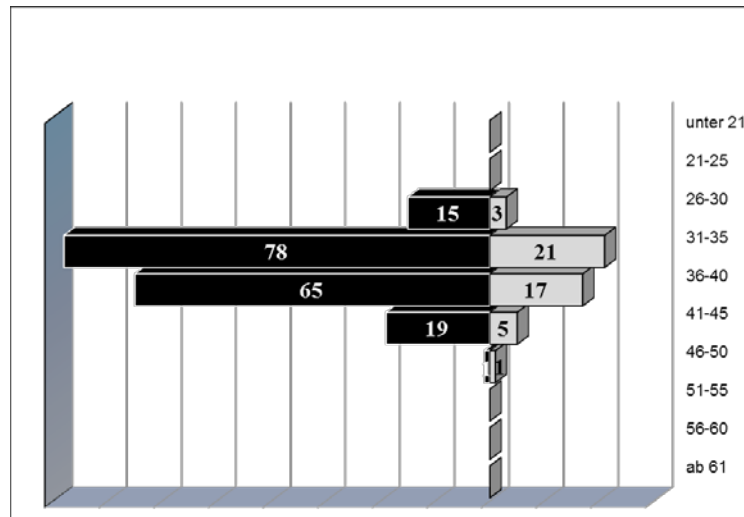


Fig. 4. Number of employees in parental leave in interdependence to the employee's age and gender (black colour: female employees, grey: male employees)

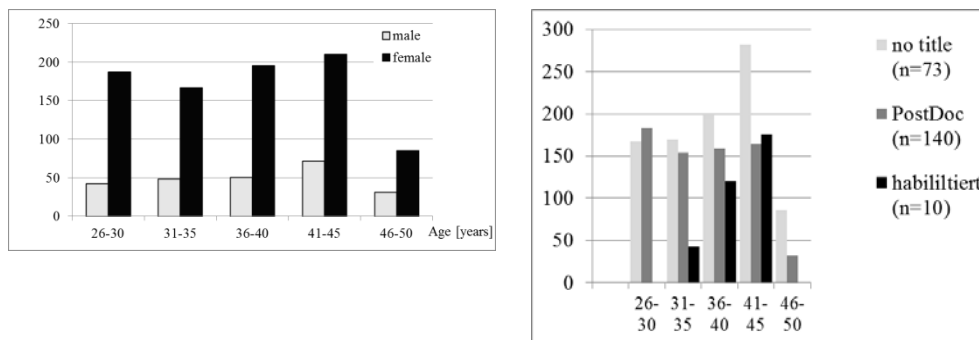


Fig. 5. An average duration of parental leave in days in interdependence to the employee's gender and age (figure 5.A) and in interdependence to the employee's qualification stage and age (both genders m/f) (figure 5.B)

The duration of parental leave increases with age (m/f) among employees, who have no doctorate and those who have received a postdoctoral lecture qualification. Whilst the researchers with a postdoctoral lecture qualification claim a significantly shorter parental leave between the age of 31 to 35 years (less than 50 days), this duration more than triples between the age of 41 to 50 years (on average 175 days). The number of employees having a doctorate remains almost the same in every age category. There is no difference between the fixed-term and the permanent employees or the stage of the clinical career with regards to the duration of parental leave.

These results lead to the conclusion that gender among of all analyzed factors has the greatest influence on the claim and the duration of parental leave. We came to the conclusion, that male academic staff claims parental leave infrequently and for shorter periods of time, comparing to female ones.

3.2. Findings on the benefits through mentoring

The academic sphere is governed by a strict game that functions according to a peculiar long-standing game manual, which remains invisible, intransparent and unclear especially for the early stage researchers who are newcomers in the field. Nowadays, researchers have to pass through certain qualification steps in their academic careers in a limited period of time, which lasts twelve years (case Germany). The famous rush hour of life for female researchers between 30-40 years is the peak of the intensive scientific career and simultaneously the time to plan their family and raise children. This strict system disadvantages the underrepresented group of female researchers in particular, for whom twelve years are often insufficient to reach a leading position in academia.

Mentoring as a measure against discrimination

The SelmaMeyerMentoring program was initiated and developed by the central equal opportunities officer and endorsed by the university management. The president of the university is traditionally a patron of the program and many professors are eager to ready to be mentors for the younger researchers.

Since 2006 the program has been supporting early stage female researches. The program consists of three modules (one-to-one mentoring, workshops and networking events) and lasts regularly 18 months. Already 385 mentees from all faculties took part in it.

We analyse the key skills that mentees can develop through participation in the female-oriented mentoring program and we assume that these skills can contribute to successful career of female researchers in medicine.

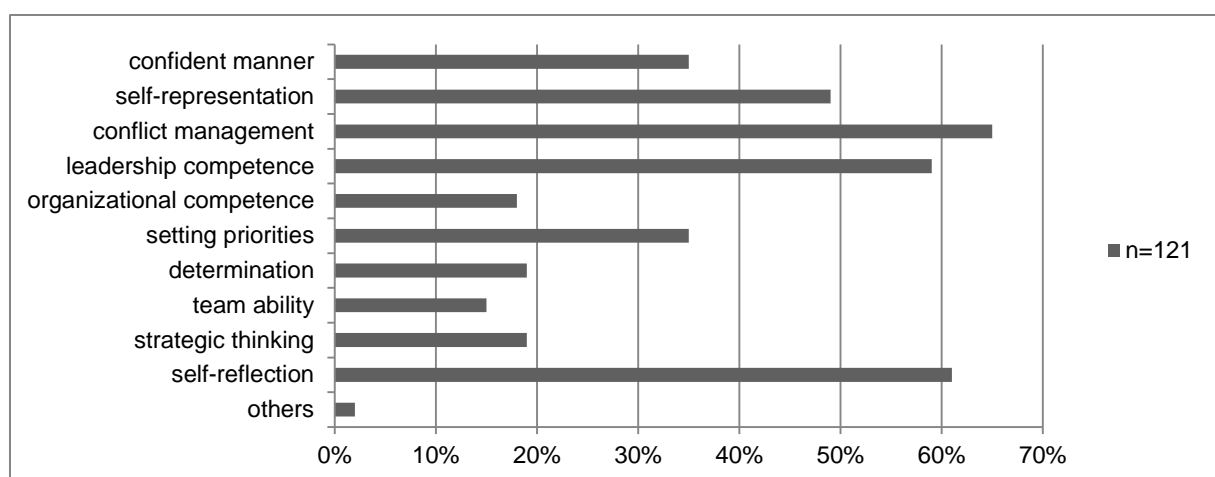


Fig. 6. Key skills developed through mentoring program

Such soft skills as conflict management, self-reflection, leadership, self-representation, confident manner and setting priorities were the most frequently mentioned skills which mentees gained and built through participation in the program.

Through the acquisition of external mentors, mentoring programs effectively gather their experiences making their inside information available to early stage researchers. Experienced mentors support the development of the early career scientists in one-to-one mentoring relationship by sharing their experiences and outlining the paths to their careers.

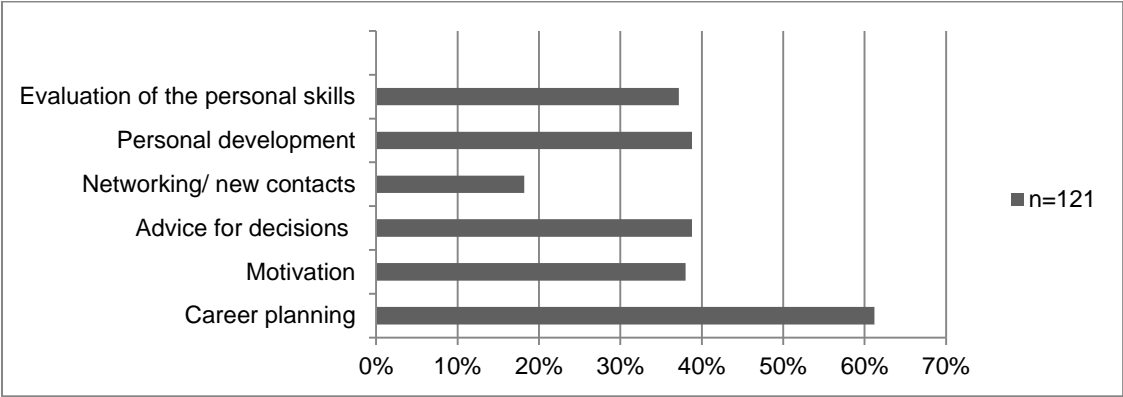


Fig. 7. The skills and competencies the mentees learned from their mentors, %.

According to the empirical data from surveys, mentees effectively questioned their mentors about their career choices, motivation, advice, personal development and estimation of their own skills and found the experience especially supportive. The board of experienced researchers is seen as a valuable resource for the younger researchers to develop their careers in academia. Experienced mentors support the younger academics by sharing their experiences and describing their career paths.

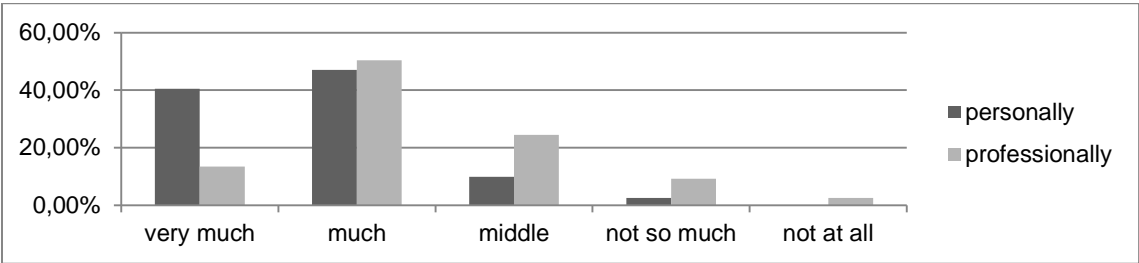


Fig. 8. Personal and professional benefits of mentees through mentoring program, n=121

The survey results demonstrate the high satisfaction of mentees. 87,6% of them mentioned that they could benefit personally and 63,8% benefited professionally though participation in the program.

With much consideration of special issues and requirements of early-stage female researchers, mentoring offers a hierarchy-free space for the casual exchange of the insider knowledge between experienced mentors and developing mentees. Through communication with more experienced mentors and with the peers from other disciplines, mentees managed to expand their existing networks and to get a chance to exchange knowledge between different disciplines and professional groups.

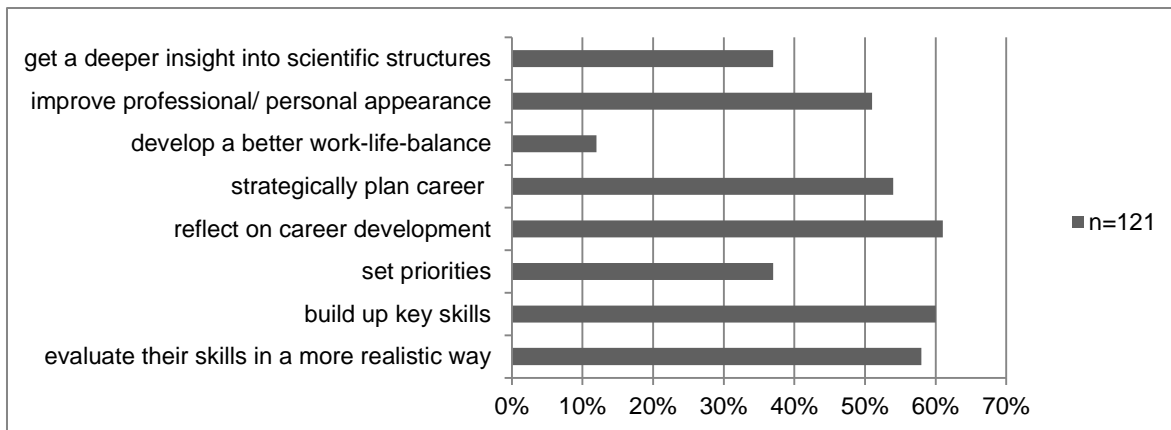


Fig. 9. Through mentoring mentees were able to...

Through mentoring the mentees were able to reflect on career development (61% of mentees mentioned it), build up key skills and competencies (60%) and evaluate their own skills in a more realistic and objective way (58%). Besides the mentees learned to plan their career strategically (54%) and to improve professional/ personal appearance (51%). 37% of mentees got a deeper insight into scientific structures. 12% of them learned to develop a better compatibility of family and career.

3.3. Conclusion

In this article we analyzed the working conditions of female researchers at the Medical Faculty and showed certain signs of discrimination of female academic medical staff, which are not obvious at a first glance. Our main findings are: men are twice as likely to perceive a permanent contract as women; male academic staff receives contracts with longer working hours more often and claims parental leave infrequently and for shorter periods of time, comparing to female academic staff.

These findings implicate the better opportunities for male academic staff to plan their career and family formation, rather than for female; the results explain also the gender pay gap and a gender pension gap in the future.

We came to the conclusion that female researchers need special female-oriented mentoring programs with the help of which they can improve their soft skills. We examined the results of the mentoring program that precisely sets the goal of more female management in academia and enables early career female researchers to identify, develop and systematically implement their personal skills and competences in strategical planning of their academic careers. In particular, we analysed the benefits and the key skills that mentees from medicine field gained through participation in the female-oriented mentoring program and came to the

conclusion that the female researchers of all qualification stages can build skills essential for successful realisation of their career and social standing. That is why structured formal mentoring programs that encourage and empower female researchers to stay in academia can be viewed as one of the effective instruments of the equal opportunities policy at German universities.

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