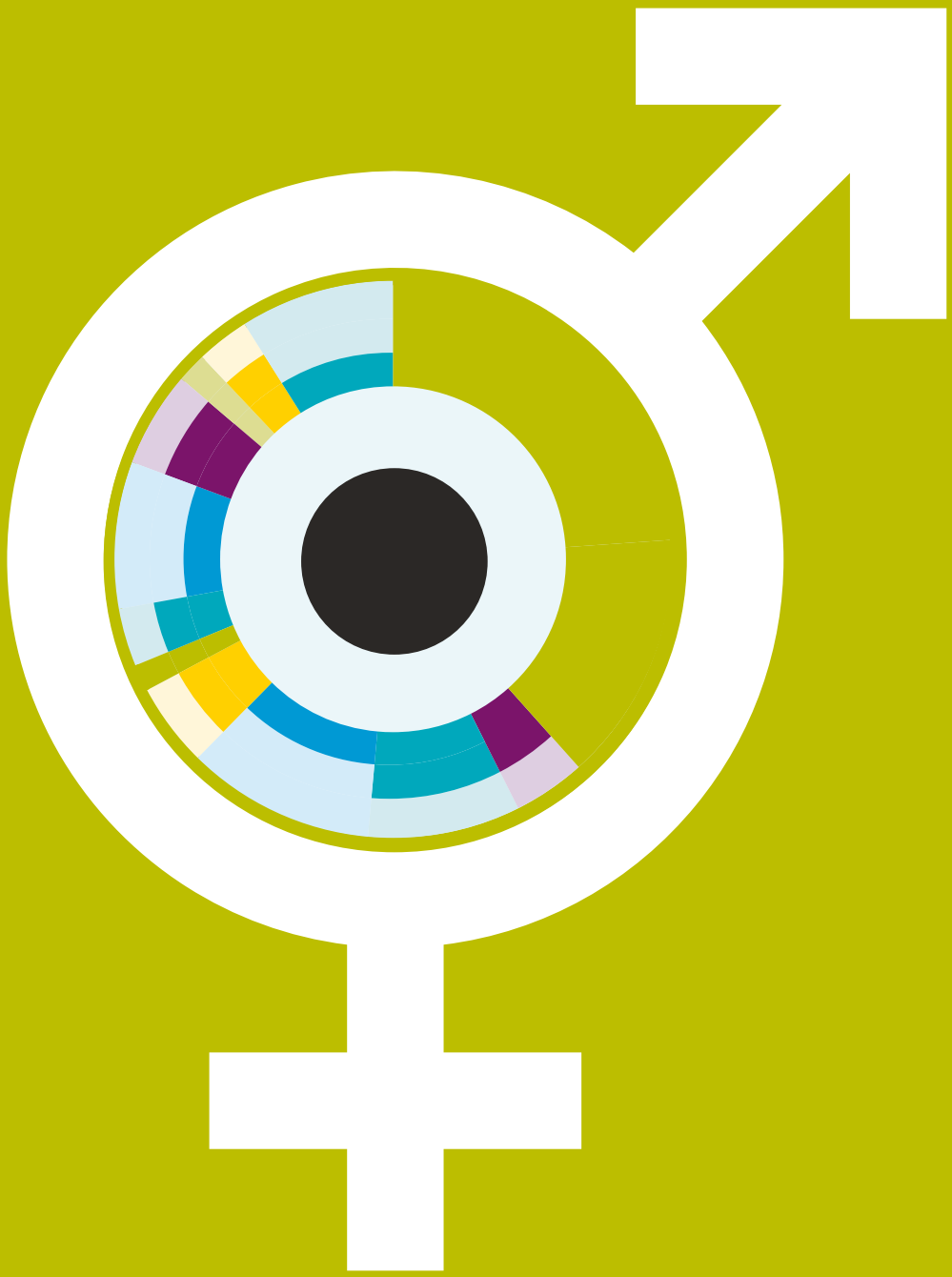
THE COLLEGE OF OPTOMETRISTS



OPTICAL SECTOR WORKFORCE SURVEY 2015:

REPORT ON FURTHER ANALYSIS OF GENDER PAY DIFFERENCES

Professional Excellence in Eye Health

THE COLLEGE OF OPTOMETRISTS

Acknowledgments

We would particularly like to thank the Association of Optometrists (AOP) for their support as co-funder of this project. In addition to providing funding, the AOP staff team has assisted in the process of reviewing and editing this report. We would also like to thank the contributors to the Optical Workforce Survey project (OWS 2015), since this project relied heavily on that data.

The College gratefully acknowledges the work of Dr Catey Bunce and the team at King's College, London, without whose statistical expertise this report would not have been possible.

Foreword

College President, Professor Edward Mallen MCOptom

When the 2015 Optical Workforce Survey (OWS 2015) project raised the question of a possible gender pay gap, it was unexpected, but the College was clear that this was something that needed further investigation. Following discussion with the Association of Optometrists, we were pleased that they agreed that this was a question that should be followed up, and that they were willing to support that work.

As with many research projects, the OWS 2015 produced a great deal of data, and the original project did not have scope to pursue all of the possible questions that the data set was capable of answering. The indication that there could be an issue relating to equity of remuneration for men and women was unexpected. Fortunately, an initial review of the data suggested that further analyses could be undertaken to explore this issue.

The findings from this project raise questions for the sector. The evidence from the OWS 2015 is that, at the time the survey was carried out, there was a significant difference between the remuneration received by male and female optometrists, which could not be accounted for by part time working, age, length of time in the profession or other key factors. The scale of this gender pay gap was significant – 27%.

Clearly, time has passed since this survey was carried out. It will be helpful to the profession and the wider sector that employs optometrists to see the results of more recent workforce data collection exercises, due to be published later this year. If that research shows a similar gap, this will provide a clearer picture of where things stand right now.

As a profession any inequality in remuneration must be a real concern.

We hope that our members will take the time to read this report, and consider the implications of this research, for them as individuals, as employers, and for the profession and sector generally.

We hope that the organisations within the sector that have remits relating to supporting optometrists as employees, or representing the organisations that employ optometrists, will read this report and consider it carefully.

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AOP Chairman, Michael George MCOptom

The AOP was concerned at the findings about pay disparity in the 2015 Optical Workforce Survey. There are many factors that might affect pay levels—hours of work; length of time in the job; management responsibilities; qualifications, to name a few—but on the face of it we could not see how such a large difference between men's and women's earnings could be explained.

We were very pleased when the College agreed that they would also like to explore this further, and were happy to contribute to the further work that is reported here.

This work was designed to analyse the reasons for the variation and rule out potentially confounding factors. We think that the researchers have done a very thorough job of re-analysing the OWS data, and now we can see that the differences in salary cannot be explained by the obvious variables.

The OWS findings prompted us to include questions on salary in our recent Optometrists' Futures survey. These findings confirmed that younger optometrists and women earn less than older optometrists and men. There were also statistically significant differences by geographical area.

The AOP is currently working with its members to identify what support and guidance we can give employers and employees, to ensure people are rewarded fairly.

Association of Optometrists

Executive Summary

Key findings

- Median annual earnings from optometry were £39,000 (inter quartile range was £28,000 to £50,000), based on the OWS 2015 data.
- The estimated mean difference between male and female earnings was 27%, with men earning more than women.
- This difference in male and female remuneration was found to remain even after adjusting for potentially confounding factors such as: part-time working; age; ethnicity; desire to progress with career; whether the individual had taken a career break, and primary work setting.
- The data from the OWS 2015 does not provide evidence that allows us to determine the specific causes of the gender pay gap.
- Both male and female optometrists reported high levels of job satisfaction.
- There was not found to be a significant difference in reported levels of job satisfaction between men and women.

Key messages

This research does not provide evidence to inform an understanding of the mechanisms that may underlie the differences in remuneration.

Additional research would be of benefit to explore whether this gender pay difference remains an issue, but also to investigate the causes of this gap.

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Introduction

The College's 2015 Optical Workforce Survey (OWS) gathered data about the optometry and dispensing optics workforce, including demographic data and information about income. The analysis of the data relating to income suggested that there might be a difference between reported salary levels for men and women working as optometrists. The original analysis had not been specifically focused on exploring this aspect of the data, and the additional work to properly investigate this possible difference was beyond the scope of the original project.

The College and the Association of Optometrists (AOP) agreed that it was important to investigate this finding further to determine whether there was a difference between the earning of male and female optometrists, and if so, to try to understand the possible factors influencing this. The AOP and the College jointly funded the extension project. The College engaged the expertise of Dr Catey Bunce at King's College, London and her team to carry out the detailed review and further analyses of the OWS 2015 data.

Objective

This analysis was conducted to improve the profession's understanding of the OWS 2015 data, particularly with regard to the potential differences in salary across gender suggested by the initial OWS 2015 analysis. Analysis was conducted also to better inform the profession's understanding of the factors associated with key features of the data reported in the OWS 2015 in relation to job satisfaction, career progression and future intentions relating to the profession.

Background

In 2015, the College of Optometrists and other leading sector organisations conducted a survey to gain a clearer picture of the optical workforce. The survey gathered key information about optometrists and dispensing opticians to build a picture of current workforce levels and the issues that will impact on its future.

Organisations which leant support to this endeavour were:

Association of British Dispensing Opticians (ABDO)

Association of Optometrists (AOP)

Federation of Ophthalmic and Dispensing Opticians (FODO)

General Optical Council (GOC)

Local Optical Committee Support Unit (LOCSU)

Optometry Schools Council

Optometry Scotland

Optometry Wales

Optometry Northern Ireland

This project reports upon additional analyses conducted on data captured for optometry members only and thus subsequent comments relate to this aspect of the survey. The sample for the optometrist survey was a randomised sample of 2,000 College members. The survey was conducted online and by post and the combined response rate (online and postal questionnaires) for optometrists was 641 questionnaires (32.05%). The total number of optometrist questionnaires completed to the end was 598 (29.9%).

The survey highlighted that it found high levels of job satisfaction, low evidence of any skills gaps and a significant percentage of the workforce pursuing further professional development, over and above the regulator's CET requirements.

The initial analysis of the OWS 2015 data did, however, suggest there may be issues within the sector in relation to gender pay equality but since there were limitations in relation to the analyses undertaken, these results were treated cautiously, and considered grounds for further investigation rather than firm evidence of a definite issue.

Methods

Anonymised data from the OWS 2015 project were provided by the College of Optometrists to the Unit of Medical Statistics, Kings College London. Analysis was to be conducted in four stages:

- Review and reorganisation of OWS 2015 data
- Investigation of missing data
- GOC-OWS 2015 calibration
- Further analysis to examine predictors of salary, moderators of the relationship between gender and salary, predictors of job satisfaction and moderators of the relationship between gender and job satisfaction

Results

Review and reorganisation of OWS 2015 data

Initial efforts were spent on reviewing and reorganising the OWS 2015 data to enable analysis within STATA statistical software and to allow GOC-OWS 2015 callibration. Whilst some data cleaning had been conducted, additional data cleaning and combining of categories was required (since the number of subjects in the original categories was frequently too small to allow for cross tabulation) to allow for multi-variable exploration.

The OWS 2015 dataset contained over 450 variables. Some of these were the original variables captured during the OWS survey, others were recoded variables that had been created during the original analysis.

The GOC dataset was not available at the time of initial exploration of the OWS data but the scoping for this project had identified the following variables as being relevant to callibration:

i. Age
ii. Gender
iii. Ethnicity
iv. Location
v. Date of first registration / Date of most recent registration
vi. Full / part time working / locum working
vii. Future intentions relating to professional practice
viii. Education / training / qualifications.

The data analyst thus identified the following OWS 2015 variables as being potentially relevant to the research questions for this further investigation, and requiring further investigation.

- Age (q48age)
- Sex (q49)
- Ethnicity (q50ethnicitybygroup)
- Year of registration (q3)
- Number of qualifications: if the person completing the questionnaire has any other qualifications or professional affiliations (q5suppnumberofqualifications)
- Location of workplace: City/Rural/Town/Other (q27)
- Country of residence: England/Northern Ireland/ Scotland/Wales/Other(q53)
- Career progression: defined as a desire for further training and interest of specific further training (q15, q16)
- Quit - retire: did the person completing the questionnaire plan to leave optometry in the next 5 years (q40)
- Income (q36numeric)
- Working time equivalent (wte) (q29recodedaswte)
- Career Break: whether or not the optometrist had had a career break (q7)
- Primary work setting: franchisee/practice, locum, employed, other (q28grouped1).
- Job Satisfaction scale:
  1. Physical working conditions (q37a)
  2. Level of autonomy independence in your job (q37b)
  3. Colleagues and fellow workers (q37c)
  4. Recognition you receive for good work (q37d)
  5. Amount of responsibility you are given (q37e)
  6. Remuneration (q37f)
  7. Opportunity to use your abilities (q37g)
  8. Hours of work (q38h)
  9. Amount of variety in your job (q37i)
  10. Overall job satisfaction (q37other).

Investigation of missing data

The project plan aimed to investigate the impact of non-response to the survey, and the possible effect of missing resposnes to certain questions from some respodents. The preferred approach was to compare the OWS 2015 data set to GOC data to explore the extent to which the OWS 2015 respondent group was similar to or different from the GOC population (i.e. all registered optometrists in the UK) on key characteristics of interest in these anlyses. Due to the fact that GOC data was not available to the research team, the approach used was to access all publicly available data on the optometry profession, and also to examine the OWS 2015 data set internally for the effects of missing data from those who have completed the questionnaire.

Table 1: Non completion rate by exploratory variable for OWS 2015 dataset.

		Incomplete data	
Exploratory factors		**n**	**(% of Total = 641)**
Age (years)		72	11.2
Sex (male or female)		63	9.8
Ethnicity		81	12.6
Year of registration		16	2.5
Number of qualifications		26	4.1
Location		45	7.0
Country of residence		63	9.8
Career progression (yes or no)		15	2.3
Quit-retire (yes or no)		3	0.5
Income		105	16.4
Working time equivalent (Wte)		43	6.7
Career Break (yes or no)		1	0.2
Primary Work Setting		57	8.9
Job Satisfaction scale	Physical working conditions	55	8.6
	Level of autonomy independence in your job	57	8.9
	Colleagues and fellow workers	57	8.9
	Recognition you receive for good work	59	9.2
	Amount of responsibility you are given	56	8.7
	Remuneration	57	8.9
	Opportunity to use your abilities	56	8.7
	Hours of work	55	8.6
	Amount of variety in your job	57	8. 9
	Overall Job Satisfaction	55	8.6

There is debate amongst the statistical community in relation to thresholds for missingness and little empirical data evaluating missingness within surveys. There is, however, consensus that it is important to report the degree of missingness and evaluate whether or not data are likely to be missing completely at random. Imputation may be conducted in order to improve the precision of estimates made (greater sample sizes increase power and confidence in estimation), however imputation makes assumptions about the nature of the missing data which may be impossible to assess. It may be acceptable therefore to provide an available case analysis but explictly report missingness so that readers may make their own deductions based upon their subject area expertise.

The age, sex and ethnicity of those providing information on income was compared with those who did not and we did not identify any overt differences.

Table 2: Explore missing data on income against age, sex and ethnicity.

Exploratory factor	Income Missingness			Mann-Whitney U test*	Chi-squared test
	No		Yes		
	N=536 (83.6%)		N=105 (16.4)	*p*-value	*2*, df, *p*-value
Age (Median, IQR**)	46 (34 to 55)		51 (36 to 60)	0.0671	-
Sex	Male n, row %	216 (88.9)	27 (11.1)	-	*2*=0.3734, df=1, *p*=0.541
	Female	303 (90.4)	32 (10.6)		
Ethnicity	Non-white	85 (87.6)	12 (12.4)	-	*2*=1.3259, df=1, *p*=0.250
	White	423 (91.4)	40 (9.6)		

* Two-sample Wilcoxon rank-sum test (Mann-Whitney U test)

** IQR: Interquartile range (25% to 75% quartiles)

GOC-OWS 2015 calibration

Data were not provided by the GOC. Attempts were made by the data analyst to identify country level data on age, gender and ethnicity of the optometrist workforce. Table 3 provides the GOS workforce statistics for England and Wales. This did provide data upon gender and this was compared against the OWS 2015 data using a Chi-square test.

Table 3: Comparison of GOS data with OWS data in 2015, by gender for England & Wales combined.

Country	Sex	GOS 2015 N = 12702	OWS 2015 N = 412	Chi-squared test
		n (% of N)	n (% of N)	x^2, df, p-value
England & Wales	Male	5587 (44 %)	169 (41 %)	x^2 =1.4253, df=1, p=0.233
	Female	7115 (56 %)	243 (59 %)	

The data analyst contacted the team responsible for creating the GOS workforce report in order to assess whether or not it would be possible to determine age but received the following response

"Thank you for your enquiry – you are correct that the data we download does include information on the date of birth of optometrists. However, the completion of this particular data field is so incomplete (over half of records do not have a DOB) that we are unable to produce any meaningful statistics from it. Historically this has been the case also. Therefore, we are unable to produce any data on the age profile of this workforce"

Further analysis to examine predictors of salary, moderators of the relationship between gender and salary, predictors of job satisfaction and moderators of the relationship between gender and job satisfaction

Factors associated with salary and satisfaction

Of the 641 questionnaires completed by optometrists, 536 (83.6 %) reported information on income. Of the 536 respondents, 15 reported an income of greater than £100,000.

Subsequent analysis was conducted on the 521 subjects with an income of less than £100,000 (termed 'capped income' below).

Gender was recorded on 536 individuals. Of these 12 were reported as "not stated", 4 preferred not to answer and there was one responder who stated that they were transgender. Subsequent analysis was conducted using the variable 'sex' which was captured on 519 subjects.

Of the 15 subjects reporting an income of greater than £100,000, 2 were female, 12 were male and the remaining respondent did not state their gender.

Table 4: Descriptive statistics of putative factors associated with income.

Exploratory factor		N= 521
Age (years, Median, IQR[1])		46 (34 to 55)
Male		204 (40.40)
Ethnicity[2]	Non-white	84 (16.97)
	White	411 (83.03)
Year of registration (years, Min, Max)		(1964 to 2014)
Year of registration[3]	1964 - 2009	429 (83.95)
	2010 - 2014	82 (16.05)
Number of qualifications (Median, Min, Max)		1 (0 to 6)
Location of workplace	City	157 (30.19)
	Town	316 (60.77)
	Rural	36 (6.92)
	Other	11 (2.12)
Country of residence	England	381 (75.60)
	Northern Ireland	33 (6.55)
	Scotland	56 (11.11)
	Wales	34 (6.75)
Career progression[4]	No	220 (42.47)
	Yes	298 (57.53)
Overall Job Satisfaction[5] (Median, IQR)		6 (5 to 6)
Quit-retire[6]	No	460 (88.46)
	Yes	60 (11.54)
Capped income (£, Median, IQR)		38000 (28000 to 50000)
Wte (Median, IQR)		1 (0.7 to 1)
Career Break	No	380 (73.08)
	Yes	140 (26.92)
Primary Work Setting	Employed	254 (50.10)
	Franchisee/Practice	155 (30.57)
	Locum	86 (16.96)
	Other	12 (2.37)

[1] IQR: Interquartile range (25% to 75% quartiles)
[2] Combining categories of ethnicity [white vs non-white]
[3] Combining years of registration into categories [1964-2009, 2010-2014] as per OWS report
[4] Combining categories of further training and interest of specific further training into career progression [yes vs no]
[5] Overall job satisfaction is a 7-point scale ranging from 1 (extremely dissatisfied) to 7 (extremely satisfied)
[6] Combining results of planning to leave optometry within 5 years [yes vs no]

A histogram of capped income showed skewness. However, this was remedied by application of a square root transformation. Linear regression was then conducted to assess unvariate associations with capped income.

Table 5: Univariate linear regressions with dependent variable - the transformed capped income - are presented with their regression coefficients and 95 % confidence intervals.

Model	Exploratory factor		Coefficient	95 % Confidence Interval	*P*-value
1	Age		0.48	**(0.17 to 0.80)**	**0.003***
2	Sex	Male	1		
		Female	-38.69	**(-46.30 to -31.08)**	**0.000**
3	Ethnicity	Non-white	1		
		White	12.74	**(1.67 to 23.81)**	**0.024**
4	Year of registration		-0.34	**(-0.66 to -0.02)**	**0.034**
5	Number of qualifications		4.34	**(0.27 to 8.41)**	**0.036**
6	Location of workplace	City	1		
		Other	17.81	(-10.94 to 46.57)	0.224
		Rural	-10.06	(-27.10 to 6.96)	0.246
		Town	-5.23	(-14.23 to 3.76)	0.254
7	Country of residence	England	1		
		Northern Ireland	-32.79	**(-49.27 to -16.30)**	**0.000**
		Scotland	-8.58	(-21.58 to 4.41)	0.195
		Wales	-9.53	(-25.78 to 6.72)	0.250
8	Career progression	No	1		
		Yes	-11.92	**(-20.05 to -3.80)**	**0.004**
9	Overall Job Satisfaction		3.76	**(0.78 to 6.73)**	**0.013**
10	Quit-retire	No	1		
		Yes	-0.92	(-13.60 to 11.75)	0.886
11	Wte		104.38	**(88.13 to 120.63)**	**0.000**
12	Career Break	No	1		
		Yes	-22.95	**(-31.88 to -14.03)**	**0.000**
13	Primary Work Setting	Employed	1		
		Franchisee/Practice	25.42	**(16.49 to 34.35)**	**0.000**
		Locum	-11.90	**(-22.83 to -0.97)**	**0.033**
		Other	9.56	(-16.32 to 35.45)	0.468

*Results in bold statistically significant ($p<0.05$)

Univariate analysis supported the analysis conducted previously that had suggested an assocation bewteen gender and income.

However, unvariate analysis also indicated strong associations between income and each of:

- Age
- Ethnicity
- Year of registration
- Number of qualifications
- Country of residence
- Whether or not the individual was seeking to progress their career or not
- Overall job satisfaction
- Whole time equivalent
- Whether or not the individual had had a career break and
- Primary work setting.

It was therefore possible that the apparent association between gender and income might be explained by confounding. In order to explore this a correlation matrix was constructed and this showed strong associations between sex and some of the factors that had been shown to be associated at univariate level with income. These were age, ethnicity, whether or not the individual was seeking to progress their career or not, whole time equivalent, whether or not the individual had had a career break and primary work setting. It was, therefore, plausible that the association identified between gender and income was a result of confounding by one or more of these factors.

Forward stepwise multivariable regression was conducted on all exploratory factors with an entry level significance of 0.05 and a restriction that sex was included in the model fitted. This showed that even after adjustment for these factors, there was an assocation bewteen income and sex.

Table 6: Multivariable linear regression coefficients and 95 % confidence intervals.

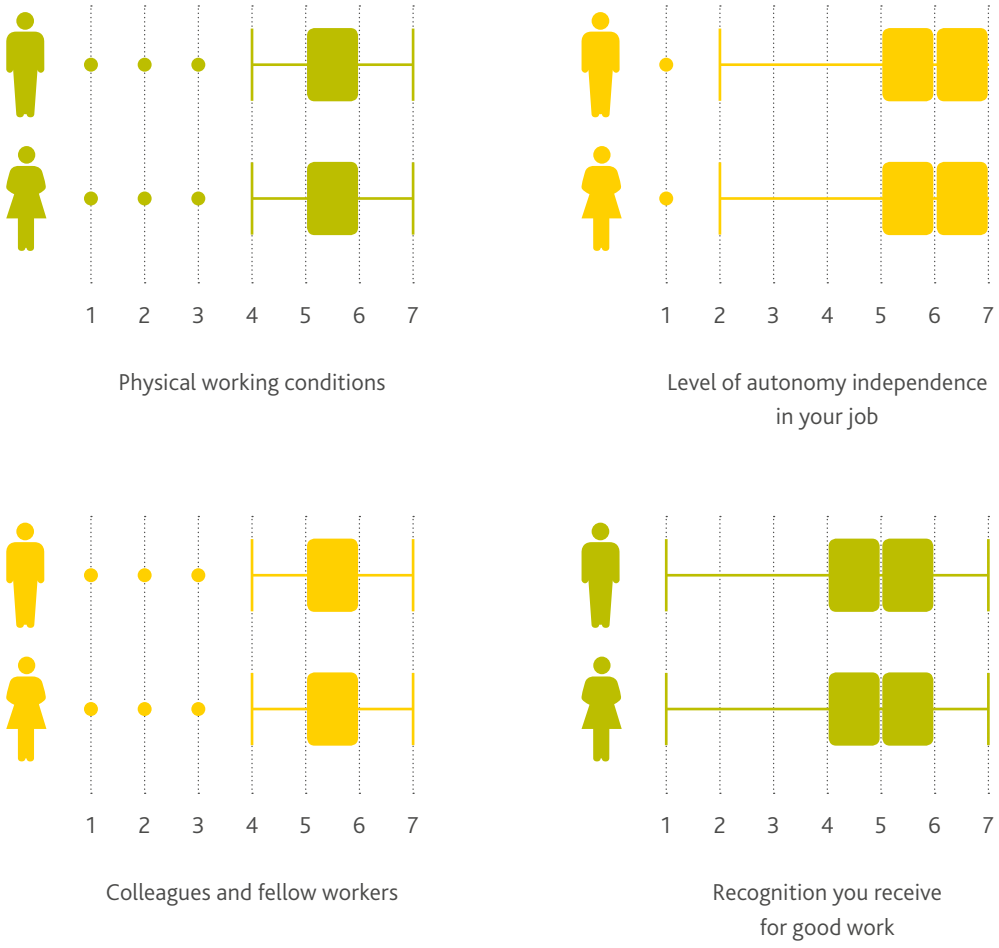
Model	Exploratory factor		Coefficient	95 % Confidence Interval	P value
1	Sex	Male	1		
		Female	-19.94	**(-28.19 to -11.69)**	**0.000***
	Wte		101.89	**(83.91 to 119.86)**	**0.000**
	Age		0.34	**(0.006 to 0.676)**	**0.045**
	Country of residence	England	1		
		Northern Ireland	-25.89	**(-39.59 to -12.18)**	**0.000**
	Number of qualifications		5.30	**(1.72 to 8.88)**	**0.004**
	Primary Work Setting	Employed	1		
		Franchisee/ Practice	10.23	**(1.88 to 18.58)**	**0.016**
	Career progression	No	1		
		Yes	-9.27	**(-16.86 to -1.68)**	**0.017**
	Quit-retire	No	1		
		Yes	-11.96	**(-22.98 to -0.94)**	**0.033**

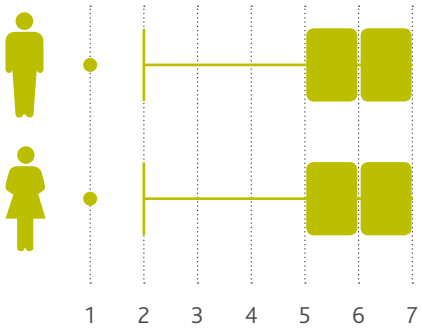
It should be noted that whilst there was evidence of an association between overall job satisfaction and capped income at the univariate level, this was not evident within the multiple variable model.

OWS 2015 had asked responders to rate their overall job satisfaction and satisfaction with a list of 10 individual job factors using a scale of 1-7 (1 = extremely dissatisfied and 7 = extremely satisfied).

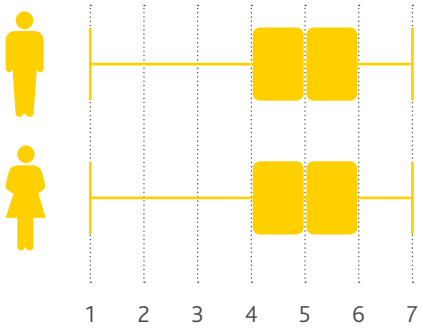
Box plots were constructed to examine in further detail the relationship beween job satisfaction and sex. Summary statistics were computed (median and interquartile ranges) and where differences were observed a Rank Sum test was conducted.

Figure 1: Job satisfaction and sex.

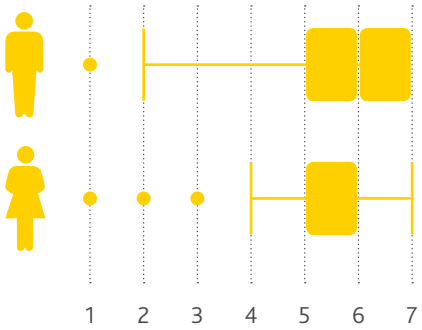




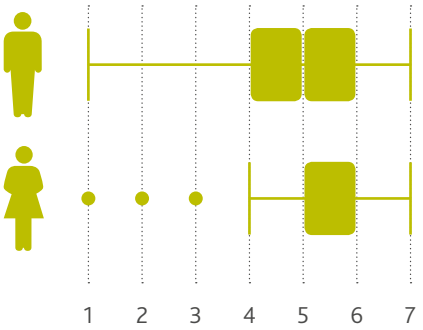
Amount of responsibility you are given



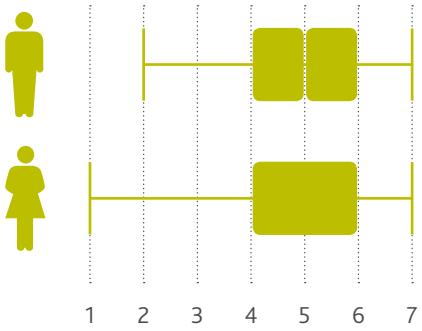
Remuneration



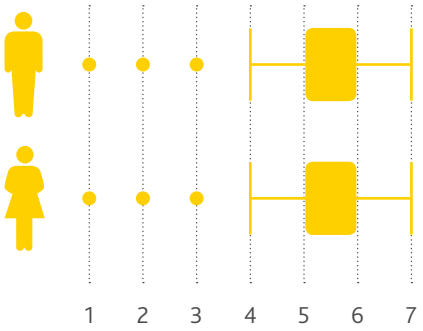
Opportunity to use your abilities



Hours of work



Amount of variety in your job



Overall job satisfaction

Table 7: Job Satisfaction by sex.

Job Satisfaction scales[1]	Sex (Median, IQR)		Mann-Whitney U test
	Male	Female	*p*-value
Physical working conditions	6 (5 to 6)	5 (5 to 6)	0.0047*
Level of autonomy independence in your job	6 (5 to 7)	6 (5 to 7)	-
Colleagues and fellow workers	6 (5 to 6)	6 (5 to 6)	-
Recognition you receive for good work	5 (4 to 6)	5 (4 to 6)	-
Amount of responsibility you are given	6 (5 to 7)	6 (5 to 7)	-
Remuneration	5 (4 to 6)	5 (4 to 6)	-
Opportunity to use your abilities	6 (5 to 7)	6 (5 to 6)	-
Hours of work	5 (4 to 6)	6 (5 to 6)	0.0663
Amount of variety in your job	5 (4 to 6)	6 (4 to 6)	0.2583
Overall job satisfaction	6 (5 to 6)	6 (5 to 6)	-

[1] Job satisfaction scales are 7-point scales ranging from 1 (extremely dissatisfied) to 7 (extremely satisfied)

Discussion

The data suggests that even after adjustment for key confounders there is an assocation between sex and income with men earning more than women. The scale of the difference in reported income between men and women is 27%. This compares to reported gender pay differences in pharmacy of between 21% and 31% in the private sector, and small differences (5%) often in favour of women for hospital pharmacists (Torjesen, 2018). For dentistry the General Dental Council reported a difference of 10.4%, with female dentists earning less than males on average across the profession (General Dental Council, 2017).

Although these estimates for dentistry and pharmacy appear based on reliable data, it is unclear from the reports available in the public domain whether efforts were made to control for factors such as part-time working or time since first registration within the profession. As a result the reports for both pharmacy and dentistry indicate that these may be among the factors influencing the gender pay difference found.

For optometry the data also suggests that there are high levels of satisfaction amongst men and women, and overall no evidence of a significant difference between them. There is evidence that women are on average one point less satisfied than men with their physical working conditions. The fact that there is not a significant difference in the reported levels of job satisfaction between men and women in optometry, may suggest that salary is not the primary factor in determining whether optometrists enjoy and value their roles. This should not be taken as an indication that the difference in pay between men and women in optometry is not a matter of concern, since the fact that there may not have been widespread awareness of the presence of a gender pay gap in the optometry profession may also contribute to this.

This research does not provide evidence for the specific mechanisms behind the differences in remuneration for men and women. Within the limitations of this research there is no specific evidence that there is inequality in the opportunities for women to progress to more senior / better remunerated roles; or in the manner in which remuneration rates for a given role in a given setting are determined. However, there seems to be a basis for employers to review their procedures for setting salary levels and awarding pay increases or bonuses to staff. Employers may also wish to consider processes for staff appraisal, review and promotion; along with the benefits of senior staff involved in these procesess receiving unconscious bias training.

Limitations

This analysis did not adjust for non-response since GOS data were not available. Figures in the public domain suggest that the OWS 2015 participant sample does not differ significantly to the GOS workforce in England and Wales in relation to sex. The data from the OWS 2015 does not enable us to develop a refined or definitive explanation for the factors contributing to the difference in remuneration rates found.

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