

Back pain in ophthalmology: National survey of Indian ophthalmologists

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Purpose: The aim is to assess the prevalence, severity, and associations of back pain among Indian ophthalmologists. **Methods:** A self-reporting questionnaire was sent to ophthalmologists with valid e-mail addresses registered with the All India Ophthalmological Society. The survey was open for responses for 2 months. **Results:** A total of 651 (5.96%) responses were obtained; 394 (61%) males and 257 (39%) females. Half (50%) of responses were obtained from doctors belonging to 31–40 years' age group. Two hundred and thirty (35%) of the ophthalmologists had height ranging from 161 to 170 cm and 443 (68%) had weight ranging from 51 to 75 kg. Four hundred and eighty-one (73.8%) of the respondents had <15 years of ophthalmic experience. Cataract (346; 53.1%) and general ophthalmology (342; 52.5%) were commonly practised by the ophthalmologists. Time spent in the outpatient department (OPD) was 39.37 ± 16.32 h/week and in the operating theater 13.64 ± 9.89 h/week, respectively. Self-reported prevalence of back pain was 70.5%. Fully 49% of respondents had low back pain, followed by neck pain (33%) and upper extremity symptoms (16%). Age <50 years (odds ratio [OR] = 2.4485), female gender (OR = 2.0265), long working hours in OPD (OR = 1.6524), and performing retinal lasers and indirect ophthalmoscopy (OR = 3.3251) showed positive association with back pain. The intolerable back pain was noted in <7% of the respondents. Around 398 (61%) respondents felt that their back pain was exacerbated while doing work and 86.6% felt that up to 5 h/week was lost due to persistent backache. Yoga and some form of exercise (74.3%) was practised to alleviate back pain. **Conclusion:** Back pain symptoms appear to be common among ophthalmologists. Awkward posture and prolonged working hours are responsible for developing back pain among ophthalmologists. Performing yoga and regular exercises, modifications in instrumentation and creating a larger workforce of eye care practitioners are needed to prevent ophthalmologists from developing back pain.

Key words: Back pain, ergonomics, ophthalmologists, prevention

In India, prevalence of neck and back pain in the medical community has ranged from 56% to 60% as estimated by various studies.^[1,2] Rubin estimated that 15%–20% of adults have back pain in a year and 50%–80% of individuals suffer at least one episode of back pain in their lifetime.^[3] A higher prevalence of neck, hand/wrist, and lower back pain was noted among the ophthalmologists and optometrists compared with family medicine physicians.^[4] Repetitive tasks, prolonged, or awkward cramped positions and bending/twisting were noted risk factors.^[4] India is a country with a very large population and currently the ophthalmologist to patient ratio is extremely low.^[5] This has led to an increase in the workload on the ophthalmologists and other allied eye care professionals in the country. The prevalence of back and neck pain among ophthalmologists in India has not been previously studied and therefore, we conducted a survey to estimate their prevalence and study the possible risk factors for developing back pain among eye care professionals.

Methods

Ethics approval for this study was obtained from the organization's Institutional Review Board. The study was based on a 17-point web-based questionnaire derived

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from previously published papers describing work-related neck and back pain. Before finalizing the questionnaire, it was administered to 20 practicing ophthalmologists of the Institute and revised in response to their feedback. The questionnaire comprised objective questions with multiple options to choose from. The questions were in the forced choice format. The participants of this survey remained completely anonymous as the questionnaire did not require them to identify themselves with names. The questionnaire included information on the participants such as age, gender, duration of professional involvement in eye care services, ophthalmology subspecialty (including specialties such as anterior segment, retina, and glaucoma), weight and height category, history of back pain before joining ophthalmology, number of working hours per week, type of work performed, and the number of working hours lost per week due to back pain. The participants were also asked about the frequency and duration of exercise taken each week. The participants' perceptions of physical discomfort (severity of pain) while working were determined using an analogue "0–5" scale as previously described by Burckhardt and Jones.^[6]

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The study population consisted of ophthalmologists who were members of All India Ophthalmological Society and had valid e-mail addresses in the members' directory. The questionnaire was posted on a website meant for hosting surveys (<https://docs.google.com/forms>) and the link emailed to the ophthalmologists along with an invitation letter to participate in the anonymous survey. This was done by one of the authors from his account. Once hosted on the website, there was no option of altering the questionnaire. All emails were sent in 1 month (February 2017). The survey was open for responses for 2 months (February and March 2017) after which it was closed and the data analyzed.

In calculating the sample size for the survey, we used online sample size calculator (<http://www.raosoft.com/samplesize.html>)⁷¹ and assumed that 60% of eye care professionals would have neck and back pain symptoms. To achieve 95% confidence interval (CI) and 5% acceptable error margin, 360 participants were required. We increased the sample by 20% to adjust for incomplete participation so that the final sample size needed was at least 432 subjects.

Data analysis was performed with statistical software SPSS 17.0.0 (SPSS Inc., Chicago, USA). The idea was to report the data as a descriptive summary of demographic and work-related data. Odds ratios (ORs), risk ratios (RR), and 95% CIs were calculated to evaluate the association between demographic and work practice characteristics on back pain symptoms. Multivariate logistic regression analysis was carried out to identify the association of different variables with back pain.

Results

The questionnaire was sent to 10,922 ophthalmologists with valid email addresses. A total of 651 (5.96%) replies were obtained, of which 394 (61%) were from male ophthalmologists and 257 (39%) from female ophthalmologists. Fully 322 (50%) responses were obtained from the ophthalmologists belonging to the age group of 31–40 years, whereas 230 (35%) of the ophthalmologists had height (230; 35%) ranging from 161 to 170 cm and 443 (68%) had weight ranging from 51 to 75 kg. More than 50% of the respondents had ≤1–10 years of experience in ophthalmic practice [Table 1]. The various subspecialty interests of respondents were as follows: cataract (346; 53.1%), general ophthalmology (342; 52.5%), medical retina (189; 29%), surgical retina (163; 25%), glaucoma (147; 22.6%), cornea and refractive surgery (106; 16.3%), pediatric ophthalmology and strabismus (50; 7.7%), oculoplasty (48; 7.3%), and neuroophthalmology (35; 5.37%) [Fig. 1]. The amount of time spent in the outpatient department (OPD) was 39.37 ± 16.32 h/week and operating theater (OT) was 13.64 ± 9.89 h/week, respectively. The self-reported prevalence of back pain reported in our survey was 70.5%. Low back symptoms were most common (49%), followed by neck pain (33%) and upper back pain (16%). The intolerable back pain was noted in ≤7% of the respondents. Fully 398 (61%) respondents felt that their back pain was exacerbated while doing work; mainly while doing surgeries (299; 45.9%), seeing patients in the OPD/doing procedures (212; 32.6%) and while doing retinal lasers/indirect ophthalmoscopy (166; 25.5%). Around 157 (24.1%) respondents felt that chronic back pain had resulted in a reduction of the time they could give to

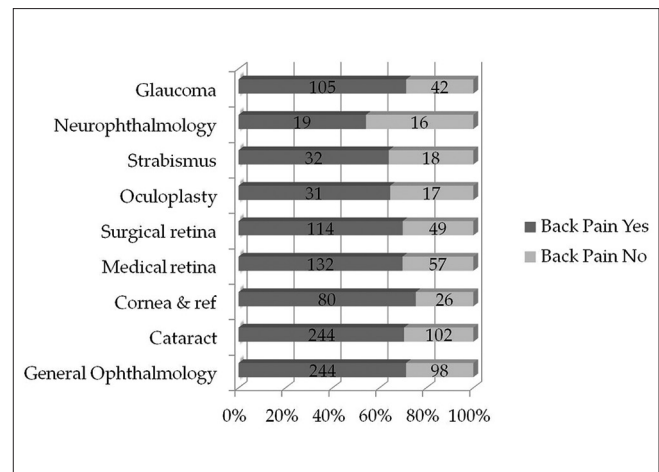


Figure 1: Respondents practicing different sub-specialties in the survey

their ophthalmic practice. Fully 564 (86.6%) respondents felt that up to 5 h/week was lost due to persistent backache. Of all respondents with pain, 74.3% (341/459) reported they were doing some form of exercise/yoga, 32.5% (149/459) were taking non-steroidal anti-inflammatory drugs 9.37% (43/459) had received physiotherapy/treatment from a chiropractor, and 0.87% (4/459) had undergone surgery.

Of those who completed the exercise section of the questionnaire, 45.9% (299/651) undertook some form of regular exercise, with a mean of 3.53 h per week, while 26.1% (170/651) performed cardiovascular exercise, and 22% (143/651) performed strength and/or resistance exercises.

Analysis

OR with 95% CI were calculated to test the association of individual factors with back pain. Univariate analysis with independent factors such as age <50 years ($P < 0.0001$), female gender ($P = 0.0001$), ophthalmic experience <15 years ($P = 0.0034$), prolonged hours of working in the OPD ($P = 0.0315$) and performing retinal lasers, and indirect ophthalmoscopy ($P < 0.0001$) showed a strong association with back pain. Height, weight, time spent in OT, and type of work (anterior segment/posterior segment) did not show statistically significant association with back pain [Table 2]. Multivariate logistic regression analysis was performed to test the simultaneous association of different variables with back pain. On analysis, we found that ophthalmologist's age <50 years ($P = 0.047$), female sex ($P = 0.000$) and ophthalmologists performing retinal lasers and indirect ophthalmoscopy ($P = 0.000$) had a statistically significant and positive association with back pain. Years of ophthalmic experience ($P = 0.649$) and duration of time spent in OPD ($P = 0.058$) did not show a statistically significant association with back pain. OR, RR, and 95% CI were calculated to find the association of different types of subspecialty with back pain [Table 3]. Doctors practicing subspecialties such as squint and pediatric ophthalmology (RR = 0.8785, 95% CI = 0.7015–1.1001), neuroophthalmology (RR = 0.76, 95% CI = 0.5585–1.0342), oculoplasty (RR = 0.8785, 95% CI = 0.7015–1.1001), and surgical retina (RR = 0.994, 0.8853–1.1159) showed no risk of developing back pain.

Table 1: Response to the neck and back pain questionnaire

	Respondents, <i>n</i> (%)	Back pain	
		Yes, <i>n</i> (%)	No, <i>n</i> (%)
Age			
<30	93 (14.2)	70 (10.7)	23 (3.5)
31-40	322 (49.4)	232 (35.6)	90 (13.8)
41-50	133 (20.4)	102 (15.6)	31 (4.7)
51-60	59 (9.1)	31 (4.7)	28 (4.3)
>60	44 (6.7)	24 (3.6)	20 (3.1)
Sex			
Male	394 (60.5)	256 (39.3)	138 (21.2)
Female	257 (39.5)	203 (31.1)	54 (8.2)
Height (cm)			
<150	19 (2.9)	16 (2.4)	3 (0.5)
151-160	188 (28.8)	147 (22.5)	41 (6.3)
161-170	230 (35.3)	154 (23.6)	76 (11.7)
171-180	167 (25.6)	109 (16.7)	58 (8.9)
>180	47 (7.2)	33 (5.1)	14 (2.1)
Weight (kg)			
<50	24 (3.6)	22 (3.3)	2 (0.3)
51-75	443 (68)	316 (48.5)	127 (19.5)
76-100	172 (26.4)	114 (17.5)	58 (8.9)
>100	12 (1.8)	7 (1)	5 (0.8)
Years in ophthalmic practice			
<5	176 (27)	129 (19.8)	47 (7.2)
6-10	190 (29.1)	139 (21.3)	51 (7.8)
11-15	115 (17.6)	87 (13.3)	28 (4.3)
16-20	63 (9.6)	48 (7.3)	15 (2.3)
>20	107 (16.4)	56 (8.6)	51 (7.8)
Work preference			
Anterior segment	323 (49.6)	220 (33.7)	103 (15.9)
Posterior segment	143 (21.9)	102 (15.6)	41 (6.3)
Extra ocular	17 (2.6)	13 (1.9)	4 (0.7)
Combination	168 (25.8)	124 (19)	44 (6.8)
Type of work			
Anterior segment	408 (62.6)	289 (44.3)	119 (18.3)
Posterior segment	243 (37.4)	170 (26.2)	73 (11.2)
Type of ophthalmic work that exacerbates the back pain			
While doing retinal lasers/indirect ophthalmoscopy	166 (25.5)	143 (21.9)	23 (3.6)
While doing surgeries/OPD	485 (74.5)	316 (48.5)	169 (26)

OPD: Outpatient department

Discussion

This is the first cross-sectional study of back and neck pain in this occupational group from India. Our study reported a 70% prevalence of self-reported neck and back pain in ophthalmologists in India. The pain was mild and tolerable in nature and relieved by regular exercise and yoga.

The study participants included only ophthalmologists, whereas other studies have included all eye care professionals.^[8] Our respondents were younger and had spent less time in ophthalmic practice in comparison with those from other studies.^[9,10] However, in our study, the prevalence of neck and back pain was higher in ophthalmologists of

age <50 years ($P < 0.0001$) compared to older ophthalmologists. In addition, we also found a higher prevalence of back pain among ophthalmologists with <15 years of ophthalmic experience ($P = 0.0034$). This is in contrast to that noted by Long *et al.*^[11] The number of women joining ophthalmology has been increasing^[12,13] leading to a higher prevalence of back pain amongst female ophthalmologists. In this study, the respondents belonged to a younger age group. Younger ophthalmologists spend longer working hours in OPD, cater to a larger number of patients and also perform procedures such as retinal lasers and indirect ophthalmoscopy. In this study, ophthalmologists with age <50 years were predominantly females (240/257; 93.4%). These factors could be responsible for the higher prevalence of

Table 2: Odds ratios and 95% confidence intervals for the association between various risk factors and development of back pain

Risk factor	OR	95% CI	P
Age (years)			
<50	2.4485	1.5906-3.7691	<0.0001
>50			
Gender			
Females	2.0265	1.4074-2.9179	0.0001
Males			
Experience in ophthalmology (years)			
<15	1.7376	1.2005-2.5152	0.0034
>15			
Weight (kg)			
<75	1.362	0.9462-1.9669	0.0962
>75			
Height (cm)			
<170	1.3394	0.9411-1.9063	0.1046
>170			
Predominant type of work			
Anterior segment	1.0429	0.7367-1.4763	0.8129
Posterior segment			
Amount of time spent in OPD (h/week)			
>50	1.6524	1.0457-2.6113	0.0315
<50			
Amount of time spent in OT (h/week)			
>15	1.2283	0.8481-1.7789	0.2764
<15			
Type of work which exacerbates back pain			
Retinal lasers/IO	3.3251	2.061-5.3646	<0.0001
Surgeries/seeing patients			

P<0.05 is considered statistically significant .OR: Odds ratio, CI: Confidence interval, OPD: Outpatient department, OT: Operation theater, IO: Indirect ophthalmoscopy

back pain in young ophthalmologists. The percentage change in the prevalence of back pain before and after starting ophthalmic work was 59.3%. Ophthalmologists with long working hours in the OPD (>50 h/week) showed higher odds of developing back pain compared to those working for <50 h/week (OR = 1.6524, 95% CI = 1.0457–2.6113, $P = 0.0315$). Similarly, doctors having long OT schedules (>15 h/week) have a higher chance of developing back pain, though it is not statistically significant (OR = 1.2283, 95% CI = 0.8481–1.7789, $P = 0.2764$). Awkward sitting postures for long hours in the OPD along with increased workload are responsible for the higher prevalence of back pain. In our study, we noted a higher risk of back pain to be associated with specialty branches like cataract (RR = 1.0004, 95% CI 0.9056–1.1051), general ophthalmology (RR = 1.0254, 95% CI = 0.9280–1.1329), cornea and refractive surgery (RR = 1.0768, 95% CI = 0.9512–1.2189), glaucoma (RR = 1.0351, 95% CI 0.9221–1.1619), and medical retina (RR = 1.0817, 95% CI = 0.9781–1.1962).

Ophthalmologists performing specialty work in pediatric ophthalmology (RR = 0.8785, 95% CI = 0.7015–1.1001), neuro-ophthalmology (RR = 0.76, 95% CI = 0.5585–1.0342), oculoplasty (RR = 0.8785, 95% CI = 0.7015–1.1001), and surgical retina (RR = 0.994, 95% CI = 0.8853–1.1159) showed lesser risk of having back pain. This could be due to the lesser volume of ophthalmic work and cases in these subspecialties.

Increasing prevalence of back pain among ophthalmologists has led to a reduction in manpower hours per week. In this study, about 86% of the respondents felt that up to 5 h/week was lost due to persistent backache. As chronic back pain could be one of the important causes for absenteeism among Indian ophthalmologists, interventions to prevent or reduce this could improve the working capacity of eye care staff.^[14] The study also shows the equal prevalence of back pain among the anterior segment and posterior segment specialists. The use of the operating microscopes by surgeons and neck flexion during a slit-lamp examination for long periods may contribute to neck and back pain. Dhimitri *et al.*^[9] noted that higher ophthalmologists' workloads were associated with a higher rate of neck pain.

In this study, the response rate was only 5.96%. However, while calculating the sample size, we assumed the prevalence of back pain to be about 60%. In reality, the prevalence of back pain among ophthalmologists was 70%. Hence, the sample of 651 responses was adequate to make a meaningful conclusion of the study. The cross-sectional study design is the major limitation of our study. As with any such studies, temporal relationships between events are unknown, and hence cause and effect cannot be deduced from any association. Several biases like response and recall bias can occur in cross-sectional studies. Furthermore, other independent risk factors such as smoking, obesity, and psychosocial factors were not assessed, which may be relevant to both prevention and treatment. We also wanted to capture a subjective impact using a self-reporting questionnaire. Comparison with other studies needs to be interpreted with caution given differences in the definition of back pain, the population studied, response rate and description of prevalence (point prevalence, annual prevalence, and lifetime prevalence).

Conclusion

The rate of reported neck and back pain among Indian eye care doctors was 70%. The nature of the pain was mild and tolerable. It was reported equally by both anterior segment and posterior segment ophthalmologists. Performing yoga and regular exercise tend to alleviate the pain. In addition, minimal modifications in the instrumentation like adjustments in the height of the slit-lamp, operating table and/or microscope eyepieces to maintain the neck and back in a neutral position to avoid unnecessary extension or flexion is necessary to bring down the prevalence of back pain and decrease the rate of absenteeism due to it. Raising the doctor to patient ratio and reducing the workload on ophthalmologists are equally important to prevent eye care providers from developing back pain.

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Conflicts of interest

There are no conflicts of interest.

Table 3: Odds ratios, relative risk and 95% confidence intervals for the association between the type of subspecialty and presence of back pain

Type of specialty	Pain		OR	95% CI	P	RR	95% CI	P	Harm/ benefit
	Yes (n)	No (n)							
Cataract									
Yes	244	102	1.0014	0.7145-1.4035	0.9937	1.0004	0.9056-1.1051	0.9937	Harm
No	215	90							
General ophthalmology									
Yes	244	98	1.0886	0.7770-1.5250	0.6218	1.0254	0.9280-1.1329	0.6224	Harm
No	215	94							
Cornea and refractive surgery									
Yes	78	26	1.3071	0.8089-2.1120	0.274	1.0768	0.9512-1.2189	0.2423	Harm
No	381	166							
Glaucoma									
Yes	105	40	1.1271	0.7474-1.6997	0.568	1.0351	0.9221-1.1619	0.5588	Harm
No	354	152							
Strabismus and pediatric ophthalmology									
Yes	30	18	0.676	0.3672-1.2445	0.2086	0.8785	0.7015-1.1001	0.259	Benefit
No	429	174							
Neuro-ophthalmology									
Yes	19	16	0.475	0.2388-0.9448	0.0338	0.76	0.5585-1.0342	0.0808	Benefit
No	440	176							
Oculoplasty									
Yes	30	18	0.676	0.3672-1.2445	0.2086	0.8785	0.7015-1.1001	0.259	Benefit
No	429	174							
Medical retina									
Yes	164	57	1.3167	0.9152-1.8943	0.1382	1.0817	0.9781-1.1962	0.1263	Harm
No	295	135							
Surgical retina									
Yes	113	48	0.9798	0.6636-1.4466	0.9181	0.994	0.8853-1.1159	0.9184	Benefit
No	346	144							

n: Number of responses, OR: Odds ratio, CI: Confidence interval, RR: Risk ratio

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