

## EVALUATION OF AETIOLOGICAL FACTORS FOR MEIBOMIAN GLAND DYSFUNCTION IN RURAL POPULATION

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### ABSTRACT

#### BACKGROUND

Meibomian Gland Dysfunction (MGD) is widely prevalent condition that is associated with evaporative dry eye disease. Many a times, patients are not symptomatic, so the condition goes unnoticed in early stages.

The aim of the study is to investigate the association of MGD in relation to age, occupation and lid hygiene in rural population.

#### MATERIALS AND METHODS

In our prospective observational study, 100 patients in each case and control group were enrolled and detailed personal history including occupational, medical and drug history was recorded. Symptoms and visual acuity of patients was recorded followed by examination of lids, adnexa, ocular surface and surrounding nasal and paranasal area. MGD was graded as per the quality and expressibility of meibomian gland secretion.

#### RESULTS

Prevalence of MGD increases with advancing age. Chi-square test is suggestive of strong association with increasing age and MGD ( $\chi^2=58.3$ ;  $P<0.0001$ ). MGD in rural population is more severe in animal handlers as compared to farmers and other occupations. Chi-square test of association was statistically significant ( $\chi^2=51.49$ ,  $P <0.0001$ ).

#### CONCLUSION

We conclude that prevalence of MGD increases with advancing age and severity of MGD is more in animal handlers as compared to farmers and other occupations. Patient education on correct lid scrubbing and effective lid warming practices must be followed meticulously.

#### KEYWORDS

MGD, Occupation and MGD, MGD and Animal Handler, Lid Hygiene and MGD.

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#### BACKGROUND

Meibomian Gland Dysfunction (MGD) prevalence in general population varies from 50-75%. The spectrum of MGD varies from seborrhoea, thick secretion to no secretion at all on expression of lid margin.

MGD is classified in obstructive and non-obstructive variety. Basic pathologic mechanism in non-obstructive MGD is destruction of glands itself due to increased bacterial overload. Obstructive MGD on the other hand is caused due to hyperkeratinisation of ductal epithelium. This is seen in seborrheic conditions or in inflammatory conditions, which alters the lipid contents of meibomian secretion. Seborrhoea patients mainly complain of burning due to increased free fatty acid in their meibomian secretion, while those with

plugged glands have crusting, FB sensation, tearing or recurrent chalazion.

Normal tear film is composed of three layers. Innermost mucus layer helps in stabilising aqueous layer over hydrophobic ocular surface. Middle aqueous layer keeps the ocular surface wet. Outermost lipid layer is secreted by Meibomian glands that prevents evaporation of tears. Whatever is the pathology of MGD, ultimate effect of reduced meibomian secretion is unstable tear film due to increased evaporation of tears. This leads to increase tear osmolarity and ocular surface inflammation. Ultimately, it starts the vicious cycle of dry eye.

Our aim is to achieve a stable tear film. Scrubbing and warming of lids helps in normalising and mobilising the meibomian secretion. Thorough scrubbing of lid margin,<sup>1</sup> decreases the bacterial load and effective lid warming<sup>2,3,4</sup> help in better drainage of clogged meibomian ductal openings. Preservative-free artificial tears are added to maintain tear film and reduce tear osmolarity. In addition, systemic Doxycycline<sup>5</sup> and topical Azithromycin,<sup>6</sup> both alone or in combination are used. Antibiotics use in MGD decreases bacterial load, as well as, it helps in improving meibomian secretion.

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**Aim-** This study was undertaken to investigate the association of MGD in relation to age, occupation and lid hygiene in rural population and to adequately manage the condition.

**Objective-** To study the aetiological factors of MGD in rural patients attending OPD at tertiary care hospital. Take appropriate medical measures to prevent chronicity and recurrences thereby preventing dry eye diseases and to provide patient education on appropriate lid hygiene.

**MATERIALS AND METHODS**

Institutional ethics committee approval was taken for our prospective study.

Patients attending OPD at tertiary care hospital were screened for MGD during October 2016 to March 2017. Patients reporting to OPD with MGD were enrolled in our prospective study as cases and demographically comparable cases without MGD were used as control. Hundred patients were included in each group. These cases were investigated in detail including personal history, systemic comorbidity and drug history. Occupation of the patient, duration of near work with special reference to exposure to heat, sunlight and dust was recorded through questionnaire. Symptoms like burning, itching, grittiness, crusting of lid margin and discharge from the eyes were enquired for. Time of itching and itching over forehead, nose, canthus, eyebrows and lid margin were recorded. Examination of lids for redness, thickening, vascularisation and maceration at canthus was carried out. Any cyst or tumour and seborrheic plaques at lid margin were noted. Presence of papillary hyperaemia, status of opening of meibomian glands was recorded and graded as per meibomian gland expression scores. Grade 0 no disease; grade 1, serous secretion on compressing lid margins; grade 2, toothpaste like thick white secretion on compression; and grade 3, blocked openings with no secretion on compression. Examination of surrounding nasal and paranasal area and ocular surface was carried out. Visual acuity of patient, any corneal infiltration, thinning and vascularisation was noted and TUBT (tear-film breakup time) was recorded.

Patients were instructed to use baby shampoo for thorough lid scrub. Lid warming was advised using clean face towel or cotton balls soaked in warm water for five minutes five times a day. They were especially instructed to keep the towel warm throughout the procedure by submersing it in warm water repeatedly. They were instructed to maintain lid hygiene even after cessation of symptoms to prevent recurrence.

Appropriate medical management was provided in the form of preservative-free tear supplements on as and when

necessary basis. Appropriate form (drops gel, ointment) was prescribed keeping in mind maximum retention time without blurring.

Topical antibiotic- Azithromycin was prescribed in all patients at bedtime minimum for one month to improve meibomian secretion. Systemic doxycycline was given to patients older than 12 yrs, only with thickened and hyperaemic lids. Patient were instructed to follow after 1 week and after one month and thereafter as and when necessary.

Skin referral was carried out for comorbid diseases like atopy and seborrhea while corneal infiltration was managed using topical steroid drops under supervision in addition to routine management protocol for MGD.

**Statistical Analysis-** Data of the study was collected and entered in Microsoft excel and was analysed for statistical significance. Chi-square test of significance was applied to draw conclusion.

**RESULTS**

**Age-** Out of 100 patients, maximum number of patients with MGD were found in age group of 40 to 60 and 60 to 80. Prevalence of MGD increases with age, this has been seen in our study too (Chi-square test,  $X^2=58.3$ ,  $P=<0.0001$ ).

Less than 20	20-40	40-60	60-80	Above 80
3	18	39	36	4

**Table 1. Age**

Two students above 20 yrs. were suffering from acne and were on retinoid treatment. Out of them, one medical student had history of drug allergy and had attack of angioneurotic oedema after consuming prawn. One 17-year-old girl student was found to have blocked meibomian gland opening in both eyes and she even had persistent epithelial defect in one eye.

Youngest patient in our study was 8-year-old student with good hygiene and good nutritional status, but suffering from dust allergy and dry skin. He even had punctate staining of both corneas inferiorly and clogged meibomian glands with TBUT less than 10 secs. in both eyes.

**Sex-** Male:female ratio was 52:48 in case group, while it was, 46:54 in control group.

**Occupation-** 38 patients were farmer, 22 were animal handlers (involved in care of domestic animals), 19 were housewives and 17 patients were involved in some form of activities dealing with dust-like labourers, factory workers, vendors, carpenter, shop owner, etc.

Farmer		Animal Handler		Housewife		Student		Others (Carpenter, Factory Worker, Vendor, Shop Owner, etc.)	
Case	Control	Case	Control	Case	Control	Case	Control	Case	Control
38	56	22	13	19	14	4	0	17	17

**Table 2. Occupation**

Chi-square test ( $x^2=5.174$ ;  $P=0.15$ ), prevalence of MGD does not differ significantly with respect to occupation.

No Discharge	Muroid	Mucopurulent	Purulent	Watery
7	12	33	17	31

**Table 3. Type of Discharge**

Grading	Farmer	Animal Handler	Housewife	Other
Grade 1	31	-	17	12
Grade 2	7	13	1	3
Grade 3	-	9	1	3

**Table 4. Severity of MGD**

Chi square of association was applied to see association of severity with occupation. Significant difference was observed for severity of MGD to occupation. Chi-square test ( $X^2=51.49$ ;  $P<0.0001$ ). As seen in Table No. 4, grade 1 severity of MGD was seen in farmers and housewives, while grade 2 and grade 3 were more common in animal handlers.

Corneal vascularisation was noticed in 17 patients. Only one patient had corneal vascularisation in superior half. He was also positive for rheumatoid factor. Rest others had corneal vascularisation inferiorly only.

Thickening of lid margin was noticed in 51 patients. Maceration of lateral canthus was seen in 24 patients, while 5 patients had maceration at both the canthus.

19 patients had punctate staining of cornea mostly marked inferiorly. Filamentary keratitis was noticed in one patient, while diffuse punctuate keratitis was also seen in one patient only.

Burning	Itching	FB Sensation	Crusting
41	58	40	28

**Table 5. Symptoms**

**DISCUSSION**

MGD is widely prevalent condition that is associated with evaporative dry eye disease. Many a times, patients are not symptomatic, so the condition goes unnoticed in early stages. In last few years, increased attention has been paid to this condition due to overall increased incidence. Different factors have been studied in relation to MGD by various researchers.

**Age-** Prevalence of MGD increases with increasing age. This has been noticed in Japanese study.<sup>7</sup> Our findings also confirms this (Chi-square test  $X^2=58.3$ ;  $P<0.0001$ ). In our study, 39 patients were there in 41 to 60 years of age and 36 were found in 61 to 80 years. Only 4 patients were there above 80 years of age. This could be due to less number of population in this group due to poor life expectancy.

In a study published in BJO BY Christophe Baudouin,<sup>8</sup> number of MGD patients  $\leq 30$  years were 33% as compared to 72%  $>60$  years. In our study, this was 10% and 49%, respectively.

Out of total 10 in  $\leq 30$  age group, 4 patients were involved with near work for more than 6 hours, 2 of them were working for 8 to 10 hours on computer daily. One was dealing with handling of construction material. So, overall all patients who developed MGD in young age, i.e. below 30 years had some predisposing factor like exposure to dust,

animal handling, allergy, acne, prolonged computer work, etc.

**Occupation-** Association of occupation has not been studied in MGD studies though dry eye study by Khurana et al<sup>9</sup> found 32% patient farmers, 28% labourers, 5% housewives, 4% office workers and 12% students. In our study, 38% were farmers, 22% patients were animal handlers, 19% were housewives and 6% were involved with near work for more than 6 hours. Rest were group of patients who had exposure to dust more than general population like labourers, construction workers, sweeper, vendors, carpenter, painter, lab assistant, etc. No statistically significant association to MGD with occupation was seen in our study, but severity of MGD was significantly related to occupation statistically.

**Severity of MGD-** 63%, 24% and 13% patients were there in grade 1, 2 and 3, respectively, as per meibomian gland classification based on expressibility of meibomian secretion. Grade 3 that is no secretion from meibomian gland on compression of lid margin. Significant difference was observed for severity of MGD to occupation. Chi-square test of association was ( $X^2=51.49$ ;;  $P<0.0001$ ). Grade 2 and 3 severity was more common in animal handlers.

Out of total of 13 patients with most severe grade 3 MGD, 9 were animal handlers, rest others were lab technician, construction worker, ordinance factory worker and housewives.

**Comorbidity-** Increased incidence of MGD has been reported in diabetics. 56% prevalence of MGD has been found in diabetics by one study.<sup>10</sup> In contrast, MGD was found in only 4% diabetics as compared to 17% hypertensive patients in our study. These all hypertensive patients were on antihypertensive medication. Hypertension itself is the contributory factor or it's effect of antihypertensive treatment is not known. 5% patient had arthritis involving mainly knee joint and they were on medication on as and when required basis only, one patient had history of positive rheumatoid factor. Non-Steroidal Anti-Inflammatory Drug (NSAID) and antihypertensive are known to cause dry eye.

Iranian study<sup>11</sup> has also found significant correlation between HT, DM and MGD.

**Symptoms-** Nine patients had some form of allergy, while 3 patients had history of doing painting work of building for more than 5 yrs. painting is known to be associated with meibomian gland dysfunction.

19% patients with MGD had dandruff in our study. 9 patients had some lid lesion in the form of ectropion, entropion, marginal chalazion or some cystic lesion in either lid.

Total of 58 patients had itching in the eyes. Out of those 13 patients complained of itching in the morning and 4 in the evening, 16 patients had itching throughout the day, while rest had itching at any time of the day.

Seborrhea is responsible for obstructive variety of MGD and prevalence of seborrheic patients was also found to be high (41%) in rural population in our study as compared to 46.9% in another study.<sup>10</sup> These patients mainly complain of burning due to increased free fatty acid in their meibomian secretion. 37% patient had foamy discharge over the lid margin suggestive of meibomitis.

Patient with poor hygiene were found to have MGD more frequently than others and they improved symptomatically as well as objectively with lid hygienic measures. Alghamdi Y A et al<sup>12</sup> also found subjective improvement in his study population on lid hygiene compliance.

### CONCLUSION

We conclude that prevalence of MGD increases with advancing age and severity of MGD is more in animal handlers as compared to farmers and other occupations. Patient education on correct lid scrubbing and effective lid warming practices must be followed meticulously.

**Limitations-** Photographic documentation should have been carried out of meibomian glands and more questions about hygienic practices in day-to-day life should have been asked.

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