• Brief Report •

Prevalence of meibomian gland dysfunction in staffs and faculty members of a Chinese university

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Received: 2019-08-06 Accepted: 2020-05-27

Abstract

● **AIM:** To assess the prevalence of meibomian gland dysfunction (MGD) in staffs and faculty members of Sichuan University, China.

● **METHODS:** The records of the annually systemic physical examination of 4404 consecutive staffs and faculty members of Sichuan University were analyzed retrospectively. Ocular symptoms and signs of ocular surface were evaluated.

● **RESULTS:** MGD was diagnosed in 1424 participants (32.3%), with a mean age of 43.0±9.6y. Of these, 718 (50.4%) were females and no significant difference was found between males and females. The highest prevalence was found in the age 50-59y (36.0%). Logistic regression analysis showed that age is an impact factor of MGD (P<0.001, odds ratio=1.014).

● **CONCLUSION:** The prevalence of MGD in staffs and faculty members of a Chinese university is 32.3%, and increases with age.

● **KEYWORDS:** meibomian gland dysfunction; prevalence; university; physical examination

DOI:10.18240/ijo.2020.10.23

Citation: Gao JG, Chen J, Tang Y, Chen DN. Prevalence of meibomian gland dysfunction in staffs and faculty members of a Chinese university. *Int J Ophthalmol* 2020;13(10):1667-1670

INTRODUCTION

Meibomian gland dysfunction (MGD) is the leading cause of dry eye disease; it is a chronic, diffuse abnormality of the meibomian glands, commonly characterized by terminal duct obstruction and/or qualitative/quantitative changes in the glandular secretion. It may result in alteration of the tear film, symptoms of eye irritation, clinically apparent inflammation, and ocular surface disease[1]. The reported prevalence of dry eye varies widely from 3.5% to almost 70%[2-9]. Recent years, MGD have aroused more and more attention, some clinic-based and population-based studies[10-13] have reported the prevalence of MGD ranges from 8.6% to 74.5%. However, the study populations of most studies were middle-aged and elderly, only one study[12] took the youth population as the main research object. In the present study, we performed a population-based study at a university in China, aiming to study the prevalence of MGD of young and middle-aged population.

SUBJECTS AND METHODS

Ethical Approval The study was approved by the Ethics Committee of West China Hospital of Sichuan University and followed the tenets of the Declaration of Helsinki. The participants were staffs and faculty members from Sichuan University who participated in the 2018 annually systemic physical examination, including eye examination. All participants gave their oral informed consent.

The diagnosis of MGD was based on slit-lamp examination and symptoms, the cases could be diagnosed with MGD only when one or more positive signs were present and at least one symptom related to MGD was experienced often. Slit-lamp examination of all participants was performed by one ophthalmologist. Signs related to MGD included viscous or waxy white secretion or no secretion at all when applying moderate pressure to the middle part of the upper eyelid by cotton swab, presence of lid margin telangiectasia, plugging of meibomian gland orifice, and irregular lid margin. MGD related symptoms were dry eye, foreign body sensation, red eye, burning sensation, eye pain, itching of eye, vision fluctuation, crusting or secretion on lashes, eyelids get stuck.

Statistical Analysis Data analysis was performed using SPSS for Windows (version 25.0; IBM-SPSS, Chicago, IL, USA). The age of all cases and different groups were calculated or

Table 1 Prevalence of MGD by age and sex

Groups	Total	MGD		Male			Female			P^b
		n (%)	P^a	Total	MGD, *n* (%)	P^a	Total	MGD, *n* (%)	P^a	
Total	4404	1424 (32.3)		2205	706 (32.0)		2199	718 (32.7)		0.34
Age groups			0.001			0.326			0.003	
≤29y	363	92 (25.3)		154	41 (26.6)		209	51 (24.4)		0.628
30-39y	1554	474 (30.5)		739	224 (30.3)		815	250 (30.7)		0.912
40-49y	1292	430 (33.3)		616	205 (33.3)		676	225 (33.3)		1
50-59y	1108	399 (36.0)		625	212 (33.9)		483	187 (38.7)		0.101
≥60y	87	29 (33.3)		71	24 (33.8)		16	5 (31.3)		1
Age groups			0.003			0.202			0.002	
≤49y	3209	996 (31.0)		1509	470 (31.1)		1700	526 (30.9)		0.909
≥50y	1195	428 (35.8)		696	236 (33.9)		499	192 (38.5)		0.112

MGD: Meibomian gland dysfunction. [a]Prevalence difference in each age groups; [b]Prevalence difference between males and females.

compared using Student's *t*-test, the prevalence of MGD was calculated for the total study population and for each gender and age group, using Pearson Chi-square tests, and a logistic regression model was used to determine whether gender and age are impact factors of the prevalence of MGD. All *P* values were two-sided and considered statistically significant when the values were <0.05.

RESULTS

In total of 4404 participants (2205 males and 2199 females), with a mean age of 42.2±9.7y (range, 19-85y) were recruited. MGD was diagnosed in 1424 participants (32.3%), with a mean age of 43.0±9.6y, which was significantly different from those who were not diagnosed with MGD (41.8±9.7y, *P*<0.0001).

The prevalence of MGD for each age group is presented in Table 1. No significant difference was found between males and females overall (*P*=0.34) or each age groups. The prevalence of MGD increased significantly with the increase of age (*P*=0.001); the highest prevalence was found in the age 50-59y (36.0%). In females, we found a consistent trend with increasing ages (*P*=0.003). However, among males, the prevalence of MGD were not significantly different with increasing ages (*P*=0.326). Similarly, when using logistic regression model, we found that age is an impact factor (*P*<0.001, odds ratio=1.014), while gender is not (*P*=0.40). Furthermore, in females, we found significant difference in prevalence of MGD before 50y and after 50y (30.9% *vs* 38.5%, *P*=0.002); the difference was not found among males (31.1% *vs* 33.9%, *P*=0.202).

Interestingly, the prevalence of MGD between participants from the Institute of Physical Education (27.4%) and the University Library (40.4%) was significant difference (*P*=0.04), while the participants from the Institute of Physical Education (49.0±9.2y) was older than participants from the University Library (46.2±8.9y, *P*=0.03).

DISCUSSION

This is the first population-based study of investigating the prevalence of MGD in a Chinese university staffs and faculty members. The prevalence of MGD in this study was 32.3%; there was no significant difference between males and females. However, the prevalence of MGD increased significantly with increasing ages in all participants and in females. Furthermore, we found that the prevalence of MGD of participants from the University Library (40.4%) is much higher than participants from the Institute of Physical Education (27.4%).

The prevalence of MGD in the present study (32.3%) was within the range (3.5% to 70%) of the worldwide reported prevalence of MGD[2-6,10,12-14]. However, it was a little lower than the prevalence of MGD in reports from Asian populations (46.2% to 74.5%)[3,6,11,13]. This inconsistency can be explained by several reasons. First of all, the difference of age of the participants in different studies, the mean age was 71.1y in the study from Japan[11], 58.7y in the study form Singapore Malay[13], while in the present study it was 42.2y. Second, the inconsistency in diagnostic criteria and classification of MGD, in the Singapore Malay Eye Study[13] and Japanese study[11], MGD was defined only by slit-lamp examination, including symptomatic MGD and asymptomatic MGD, while in our study we defined MGD not only by slit-lamp examination, but also by related symptoms, referring as symptomatic MGD. When only referring to symptomatic MGD, the prevalence in our study (32.3%) was much higher than that in the study from Japan (11.2%)[11]. Last, the study populations were different, in the present study the participants were staff and faculty members from a Chinese university, while in the Japanese study they focused on the patients scheduled for cataract surgery[11], and in the Singapore Malay Eye Study, the authors randomly picked some adults as their study population[13].

Our study found that age is an impact factor, while gender is not; it is consistent with the studies from Japan[11], Ghana[12] and

Spain[10]. Furthermore, we found that the highest prevalence of MGD was in the age 50-59y, especially in females, which is in agreement with Japanese study[11], and the study[13] carried in Singapore Malay which showed that postmenopausal women has a higher prevalence. It is well-known that sex steroid hormones, such as androgens, have an important impact on the development of MGD[15-17]. While on the contrary, the Spanish study found a decrease of prevalence of MGD in subjects between 50 and 59 years old[10]. The reason for this is not clear but it may have something to do with the ethnic difference.

Interestingly, the present study found that the prevalence of MGD of participants from the University Library is higher than that of participants from the Institute of Physical Education. This difference may have something to do with the different durations of computer use (the participants from University Library were supposed to have the longer duration) and the indoor environment[3]. Studies showed a high rate of dry eye disease in visual display terminal users[18-20] and the blink rate as well as amplitude were reduced when using a computer[18-19]. It remains unclear that whether the duration of computer use is a risk factor for the development of MGD or just make the MGD more symptomatically.

Our study has some limitations. First, the identity of our participants is too complicated to reflect the characteristics of each department, for example, cleaners were included in every department, so it is hard to compare the prevalence of MGD between departments, and we just compared the prevalence of MGD between participants from Institute of Physical Education and from University Library. Second, we just investigated the prevalence of symptomatic MGD, which was not comprehensive enough. Third, we did not do more tests about the MGD or dry eye disease, such as Schirmer test, tear film breakup time, and fluorescein staining, thus we could not compare the data about these tests. Fourth, the correlated data of participants we collected was too little, thus we could not explore more risk factors of the development of MGD, such as systematic diseases, working environment, medications taking.

Our study showed that the prevalence of MGD in a Chinese university recruiting in-service faculty members is high, and it increases with increasing age. Further study is supposed to be comprehensive, to investigate the prevalence of asymptomatic MGD, the risk factors for the development of MGD, and to study whether the propaganda and education of MGD to the faculty of the university can influence the prevalence or not.

ACKNOWLEDGEMENTS

Foundation: Supported by the National Natural Science Foundation of China (No.81870665).

Conflicts of Interest: Gao JG, None; **Chen J,** None; **Tang Y,** None; **Chen DN,** None.

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