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Knowledge Towards the Impact of Indoor Environment and Lifestyle on Dry Eye

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Abstract

This research aims to measure the level of Knowledge (symptoms, complications, prevention, potential indoor environmental risk factors, the 20-20-20 rule) of dry eye syndrome DES among adults in Malaysia. Data were gathered from a random sample of 315 Malaysian adults in Klang Valley. The study participants were 18 to 60 years [mean (± SD) age = 34 ± 8]. Females represented a slightly higher percentage of the sample (55.66%). Of the 318 participants, most respondents (65.5%, n = 208) had a bad knowledge about dry eye syndrome. Only 86 adults had good Knowledge about the impact of the indoor environment and lifestyle on dry eye syndrome during the COVID-19 pandemic. Findings revealed that, MAs' knowledge significantly differ by participant's qualification ($\chi 2$ = 27.6, p=0.002), age ($\chi 2$ = 15.4, p=0.018). Education level and age were associated with Knowledge ($p< 0.05$). Results revealed significant determinants of good Knowledge about the DES in the age group 29-39 years with (OR: 1.647, 95%CI: 1.097-2.471, P =0.016). Adults who are living in Kuala Lumpur, Gombak. And Klang & Petaling have similar odds of good Knowledge compared to other living areas. Finally, the health sector was a potential predictor of good Knowledge (OR: 4.246,95%CI: 1.781-10.124, P=0.001). Nevertheless, none of the other demographical variables had a potential predictor of good Knowledge about dry eye syndrome. Therefore, healthcare professionals should raise public awareness regarding dry eye illness problems, especially on potential indoor environmental risk factors.

Keywords: Knowledge, Indoor Environment and Lifestyle, Dry Eye Syndrome, Malaysian Adults

Introduction

Dry eye disease DED is a developing public health concern that affects people's quality of life and their ability to see clearly and have a substantial socioeconomic impact[1]. A variety of inflammatory causes of DE is an ocular surface disease and a common ocular surface disorder [2] .It can be described by the tear film's breakdown of equilibrium. Which may lead by visual tear film instability, hyperosmolarity symptoms of the lacrimal gland, possible damage to the ocular surface inflammation, and disorders of the neurosensory system [3]. Thus, individuals with DE may suffer visual impairment, pain, redness, dehydration, and other diseases related to every eye cause a feeling of burning and scratching on the eye's surface and the sense that there is something inside[3].

The tear film is an essential part of our vision. It is made up of water, lipids, and proteins, protects our eyes from hazardous substances while also keeping them lubricated and pleasant. Unfortunately, DE is caused by an issue with our tear film, which means our eyes aren't getting enough lubricant. As a result,

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we are plagued by a variety of potentially unpleasant sensations. These include stiff, sore eyes, eye fatigue, sensitivity to light, and blurred vision. [4] Many people may experience occasional DES throughout life, but chronic dryness can eventually lead to eye pain and blurred vision. Therefore, evaporative DE are concerning for many eye care professionals. Still, it impacts the evaporative form of the DE starting to show up in younger individuals. The environmental factors have been linked to the onset and severity of the evaporative DE [5].

Vision problems and eye disease can come from tools, environment, chemicals, heavy light, radiation or physical setting of the workstations that may cause vision problems or eye injuries [6]. Environmental influence is one of the attributing factors for health status [7]. The eye is directly exposed to the outside. It, therefore, is endangered by a multitude of factors occurring in an individual's surroundings [7]. For instance, variations in temperature, airflow velocity and relative humidity, and passive cigarette smoking have demonstrated to alter the tear film homeostasis (by increasing tear film evaporation) and exacerbate DED symptoms.

In addition, chronic exposure to traffic derived air pollution can contribute to DED characterised by symptoms and signs of tear film instability[8]. Moreover, regular interaction with electronic display technology and lack of outdoor activities might worsen the development of DES .

Nowadays huge parts of the global population are spending a lot of time at their residence due to the current unidentified (COVID-19) pandemic [7]. Most adult population with DE assumes that they have been exposed to an indoor atmosphere more than before. Even though the consequences of these impacts of the interior environment on disease processes and symptoms have been widely investigated for some pulmonary illnesses, such as asthma and chronic obstructive pulmonary disease, less is known about the effects of the indoor environment on dry eyes[8,9]. The term environment is broadly used to refer to any external and internal bodily states habitually experienced by an individual, such as demographic factors (i.e., age, region), lifestyle factors (i.e., contact lens wear), environmental factors (i.e. humidity) and physiological or genetic factors (i.e. health conditions).

The stability of the eye tear film are affected by environmental and occupational risk factors[10,11]. These environments are usually called "buildings' microclimate" and share low humidity and the daffiness of the air. Also, the amount of pollution and the effect of free radicals can add to the lipids of the eye's surface.

While examining the impact of the indoor environment on ocular symptomatology, it's important to examine not only the components that are common to both indoor and outdoor environments (humidity, temperature, ventilation, and pollutants) but also lighting and the use of visual display units (e.g., tablets, computers and smartphones, increasing exposure to digital devices [12] .This can worsen the symptoms of DES, mostly caused by the interior environment and interactions between living and lifestyle habits. Therefore, [12] have investigated the online survey used to determine lifestyle habits, awareness, and symptoms. The study concluded that lifestyle and habits significantly impact DE Indoor Environment (Living and Lifestyle) symptoms near work. Furthermore, restricted outdoor activities have been linked to the development and progression of DES, which could be exacerbated during and after the COVID-19 pandemic outbreak because of dramatic changes in lifestyle and habits [13]. Working in an indoor environment, on the other hand, revealed slightly more indicators of eye dryness [14].

Most of the previous research conducted at different locations addressed and considered the computer vision syndrome prevalence, Knowledge and associated factors [15]. However, it's noted that there was a lack of studies that consider the effects of indoor living environment and lifestyle on DES symptoms in adults. Furthermore, the majority of what is known about the DE is focused on the ambient (or outside) environment. Unfortunately, there is a scarcity of information on the impact of IE on DE symptoms [16].

It's worthy of mentioning that there is an imperative need to implement strategies to increase further awareness of ocular diseases to reduce the risk of visual complications[10]. Thus, public awareness should be raised of risk factors related to DES. Therefore, this study attempts to assess the basic Knowledge toward the impact of IE on dry eye syndrome among adults' in Klang Valley Malaysia. Thus, this paper considered as a prototype to identify the Knowledge towards the impact of indoor environment in terms of living and lifestyle factors on DES among adults' in Klang Valley Malaysia which recognised as research priori.

Materials and Methods

Healthy Malaysian adults would answer an online questionnaire delivered by social media to measure the Knowledge among adults in Klang Valley areas aged from 18 to 60 years. Z Score method has been utilised to calculate the sample size was 385 participants. However, a total of 318 respondents have been considered in the statistical analysis after data cleaning and filtering the uncompleted duplicates, unusable responses. A self-designed questionnaire was developed in English and translated to Bahasa Melayu language used to assess the Knowledge among adults in Klang Valley. Socio-demographic data e.g., age, gender, ethnicity, education, employment status, residential area, living area, Occupation and nature of the job was reported. Public Knowledge about DES was assessed. Questions about familiarity with the diseases, familiarity with their risk factors, symptoms, the prevention, and the causes. participants were asked about potential indoor environmental risk factors (lifestyle factors and (living environment) were asked and also assessed. Chi-square test was used to compare the variables at a 5.0% level of significance. The binary logistic regression analysis has been utilized to evaluate the substantial determinants of good Knowledge about DES amid adults' in Klang Valley.

Results

In the population of interest, a total of 318 mas were interviewed during the survey, with females reaching 177 (55.66%), while males 141 (44.34%). The age group from 29 to 39 years was the most representative group and mean age (34 years ± sd 8). 64.78% of the population is from urban areas, 34.26 % Malaysian, 7.23% Chinese, 5.66 % Indian; 52.83 from other nations. Living area in Kuala Lumpur has the highest percentage of 56.29%, the next both Hulu Langat and "Klang & Petaling" have the same percentage of around 13%, then living area in Gombak is with 21% and the lowest percentage is 1.89% is for others living areas. Master degrees" has the highest percentage of 39.62%, the next is the qualification "bachelor degrees" with a percentage of 25.79%, while only 1.26% had an elementary school. The employment of "private sector" has the highest percentage of 43.71%, the next employment of "government sector" is with a percentage of 31.76%. Unemployed, retiree and others are negligible. "Education sector" has the highest percentage of 26.10%, the next is "engineering" with a percentage of 18.87%. The occupations with "health sector" and "economy and business" have the same the percentage around 9%. Finally, the rest of occupations are negligible. The majority of the sample 74.53% have indoors nature of job while 25.47% have outdoors nature jobs. Additionally, the majority spend inside the building >8 hours/day.

Knowledge

The knowledge-related portion had 9 questions about dry eye syndrome and were answered on a yes/no/I don't know basis potions adapted from previous research 4 One point was assigned to the correct option answer, and 0 points were assigned to the wrong answer where the knowledge score was calculated accordingly17. For more accurate classification, Bloom's cut-off was utilised to classify knowledge scores17 for the knowledge and practice scores. Scores of ≥80% were considered good, and scores between 60–79% were considered fair. In comparison, scores of <60% were assigned as poor 17. The maximum total score varied from 0 to 9, with an average knowledge score of 7.2 (SD = 0.96, range 0–9) among the participants. This implies that the participants, on average, achieved 80% of the questions correctly ((7.2/9) ×100). A cut-off level score of ≤7.2 indicated low Knowledge; meanwhile, a score of ≥7.3 (more than 80% of the total score) portrayed good Knowledge. About (34.5%, n=110) of participants obtained scores above 7.2, considered to have a good knowledge level towards the impact of indoor environment and lifestyle on dry eye.

Chi-Square Tests for Malaysian adults ' Knowledge, and Demographics data

Chi-Square has been utilised to determine a significant relationship between the MAs' Knowledge, and demographics categorical variables. Findings revealed that, MAs' knowledge significantly differ by participant's qualification ($\chi 2 = 27.6$, $p=0.002$), age ($\chi 2 = 15.4$, $p=0.018$). Additionally, education level and age were associated with Knowledge ($p< 0.05$), but the participant's employments did not influence Knowledge score.

Factors associated with an acceptable level of Knowledge about DES.

The binary logistic regression analysis has been utilized to evaluate the substantial determinants of good Knowledge about Dry Eye Syndrome amid adults' populations in Klang Valley . After categorizing

Knowledge based on knowledge score, the total score ranges from 0-9, and ≤7 indicated poor Knowledge about DES. In contrast, a score of ≥7.2. there were only (34.5%, n=110) respondents who demonstrated good Knowledge regarding DES symptoms. Binary logistic analysis was employed to identify the predictors of the extent of Knowledge among adults' populations in Klang Valley. Results revealed significant determinants of good Knowledge about the DES in the age group 29-39 years with (OR: 1.647, 95%CI: 1.097-2.471, P =0.016). Interestingly, participants with High School qualifications have better Knowledge about DES than other qualifications with (OR: 0.171, 95%CI: 0.031-0.928, P=0.041). Adults who are living in Kuala Lumpur, Gombak., and Klang & Petaling have similar odds of good Knowledge compared to other living areas. Finally, Good Knowledge was found to be a potential predictor of the health sector (OR: 4.246,95%CI: 1.781-10.124, P=0.001). Nevertheless, none of the other demographical variables had good Knowledge about DES.

Discussion

In general, the level of Knowledge concerning dry eye symptoms was low. Our result completely agreed with research presented in [19] which evaluated Knowledge of DE among Chinese Physicians in Singapore. More than a third of participants thought that think DES has widely spread in Malaysia as a common condition and should be treated, but is not severe enough to affect daily activities or not significant enough to be a socioeconomic burden., it's clear that most of the participants have various indoor environmental conditions but they don't know which optimal to prevent eye dryness and its side effects[9,13]. Additionally, our results were consistent with [10,18], they found that participants had observed a poor knowledge and attitude toward DES among the Saudi Arabian population, including that most of the participants did not have a routine ophthalmologist visit and tended to use electronic devices for a long time without a break knowing about their risk.

Conclusion

The level of Knowledge regarding dry eye syndrome symptoms among adults' populations in Klang Valley is very poor. DED is still not completely understood especially related to lifestyle habits. it's clear that most of the participants have various indoor environmental conditions but they don't know which optimal to prevent eye dryness and its side effects. A patient's quality of life is significantly adversely affected by dry eye disease, which is widely prevalent and is increasing in incidence. Lots of attention has been paid to the risk factor of the indoor environment.

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Self

Conflict of Interest

Nil

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