EVALUATION OF PREVALENCE OF ANXIETY AND DEPRESSION AMONG GLAUCOMA PATIENT WITH DELAY IN CARE DUE TO COVID-19 PANDEMIC IN KELANTAN USING HOSPITAL ANXIETY AND DEPRESSION SCALE QUESTIONNAIRE

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DISCLAIMER

I hereby certify that the work in this dissertation is my own except for quotations and summaries which have been duly acknowledged. I declare that I have no financial of interest in the instruments and the computer software in this study.

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TABLE OF CONTENTS

ABSTRAK

PENGENALAN

Glaukoma adalah penyebab utama kebutaan di seluruh dunia di mana glaukoma sudut terbuka (POAG) adalah jenis yang utama diikuti oleh glaukoma sudut tertutup (PACG). Kajian terdahulu mendapati bahawa tahap kebimbangan dan kemurungan dalam kalangan pesakit glaukoma adalah lebih tinggi berbanding dengan populasi normal. Sebaliknya, pandemik sindrom pernafasan akut coronavirus 2 (SARS-CoV-2) telah mengubah penyampaian penjagaan kesihatan global selepas Pertubuhan Kesihatan Sedunia (WHO) mengisytiharkannya sebagai Kecemasan Kesihatan Awam bagi Kebimbangan Antarabangsa pada 30 Januari 2020 dan pandemik pada 18 Mac 2020. Kerajaan Malaysia telah menguatkuasakan kawalan pergerakan atau Perintah Kawalan Pergerakan (PKP) yang membataskan pergerakan orang masuk dan keluar kawasan untuk mencegah penyebaran COVID-19. Akibatnya, rawatan telah ditangguhkan dan individu yang menghidap penyakit kronik seperti pesakit glaukoma semakin bimbang dan risau tentang risiko kehilangan penglihatan mereka.

OBJEKTIF

Untuk menilai kelaziman kebimbangan, kemurungan, dan faktor yang berkaitan dengannya dalam kalangan pesakit glaukoma dengan kelewatan dalam rawatan akibat pandemik COVID-19 di Kelantan menggunakan Skala Kecemasan dan Kemurungan Hospital (HADS) versi Bahasa Melayu.

KAEDAH PENGAJIAN

Kajian keratan rentas ini telah dijalankan antara Januari 2021 dan Jun 2022 di kalangan 160 pesakit glaukoma yang menghadiri Klinik Oftalmologi, Hospital Raja Perempuan Zainab II, Kelantan, dan Klinik Oftalmologi, Hospital Universiti Sains Malaysia. Semua jenis pesakit glaukoma berumur antara 40 hingga 80 tahun tanpa masalah psikiatri, pekak atau gangguan pendengaran, dan komorbiditi okular lain telah dimasukkan dalam kajian ini. Pesakit yang layak menjalani penilaian ketajaman penglihatan, pemeriksaan okular lengkap, dan penilaian fundus melalui biomikroskop lampu celah. Data demografi terperinci dengan sejarah okular dan sistemik telah diambil. Soal selidik HADS versi bahasa Melayu telah dibacakan kepada pesakit glaukoma. Ujian "Pearson chi-square" dan "Fisher exact" digunakan untuk mengenal pasti faktor yang berkaitan dengan kebimbangan dan kemurungan.

KEPUTUSAN

Seratus enam puluh pesakit telah dimasukkan dalam kajian ini. Lapan puluh dua daripadanya adalah lelaki (51.2%) dan 78 (48.8%) adalah perempuan. Purata umur pesakit adalah 65.70 tahun. Seratus tiga puluh tiga orang (82.1%) merupakan pesakit Melayu dan 129 pesakit mempunyai penyakit bersama (80.6%). Kejadian kebimbangan dan kemurungan disebabkan oleh kelewatan rawatan di kalangan pesakit glaukoma kami adalah 11.3% dan 13.1% masing-masing. Kedua-duanya kebimbangan dan kemurungan dikaitkan dengan lateraliti ($P = 0.001$, $P < 0.001$), bilangan antiglaukoma ($P = 0.01$, $P = 0.010$), dan tiada sejarah keluarga glaukoma ($P = 0.019$, $P = 0.003$).

KESIMPULAN

Pesakit glaukoma di kedua belah mata dan mereka yang memerlukan lebih banyak rawatan antiglaukoma mengalami lebih banyak kebimbangan dan kemurungan semasa pandemik COVID-19 dan Perintah Kawalan Pergerakan (PKP), berbanding dengan mereka yang menghidap penyakit glaukoma di sebelah mata dan memerlukan jumlah rawatan antiglaukoma yang lebih rendah. Walau bagaimanapun, kajian kami tidak menemui hubungan yang signifikan antara riwayat keluarga positif untuk glaukoma dan kebimbangan atau kemurungan di kalangan pesakit glaukoma. Oleh itu, dalam keadaan pandemik atau PKP pada masa hadapan, adalah penting untuk memberi keutamaan kepada temujanji yang perlu dijalankan dengan segera bagi pesakit glaukoma.

Kata kunci: glaukoma, pandemik COVID-19, PKP, kebimbangan, kemurungan

ABSTRACT

INTRODUCTION

Glaucoma is the leading cause of irreversible blindness worldwide with primary open angle glaucoma (POAG) as the predominant subtype followed by primary angle closure glaucoma (PACG). Previous studies conducted before have shown that the level of depression and anxiety among glaucoma patient is higher compared to normal population because it had affected their quality of life. On the other hand, severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) pandemic had changed global healthcare delivery after World Health Organization (WHO) had declared it a Public Health Emergency of International Concern on January 30, 2020 and a pandemic on March 18, 2020. The Malaysian government has enforced a lockdown or Movement Control Order (MCO) that limits people's movement in and out of an area in order to prevent the spread of COVID-19. As a result, treatment has been delayed and individuals with chronic conditions such as glaucoma patients have become increasingly anxious and concerned about the potential risk of losing their eyesight.

OBJECTIVE

To evaluate the prevalence of anxiety, depression, and its associated factors among glaucoma patients with delay in care due to the COVID-19 pandemic in Kelantan using the Hospital Anxiety and Depression Scale (HADS) Malay version.

METHODOLOGY

This cross-sectional study was conducted between January 2021 and June 2022 among 160 glaucoma patients who attended the Ophthalmology Clinic, Hospital Raja Perempuan Zainab II, Kelantan, and Ophthalmology Clinic, Hospital Universiti Sains Malaysia. All types of glaucoma patients aged between 40 to 80 years old without psychiatry problems, deaf or hearing impairment, and other ocular comorbidities were included in this study. Eligible patients underwent visual acuity assessment, complete ocular examinations, and fundus evaluation via slit lamp biomicroscope. Detailed demographic data with ocular and systemic history were taken. The Malay version of HADS questionnaire was read out to glaucoma patients. Pearson chi-square test and Fisher exact test were used to identify the associated factors associated with anxiety and depression.

RESULTS

One hundred and sixty patients were included in the study. Eighty-two were men (51.2%) and 78 (48.8%) were women. The mean age of the patients was 65.70 years. One hundred and thirty-three (82.1%) were Malay patients and 129 patients had comorbidities (80.6%). The prevalence of anxiety and depression due to delay in care among our glaucoma patients was 11.3 % and 13.1% respectively. Both anxiety and depression were associated with laterality ($P = 0.001$, $P < 0.001$), number of antiglaucoma ($P = 0.01$, $P = 0.010$), and no family history of glaucoma ($P = 0.019$, $P = 0.003$).

CONCLUSION

Glaucoma patients with bilateral disease and those who require a higher number of antiglaucoma treatments experience more anxiety and depression during the COVID-19 pandemic and Movement Control Order (MCO), compared to those with unilateral disease and lower numbers of antiglaucoma treatments. However, our study did not find a significant association between a positive family history of glaucoma and anxiety or depression among glaucoma patients. Therefore, in the event of future pandemics or lockdowns, it is important to prioritize urgent appointments for glaucoma patients.

Keywords: glaucoma, COVID-19 pandemic, MCO, anxiety, depression

CHAPTER 1:

INTRODUCTION

1.1 Glaucoma

Glaucoma is one of the major causes of blindness globally with two subtypes, primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG) (Zhang et al., 2021). Glaucoma causes visual field deficits and eventually loss of visual acuity due to the death of retinal ganglion cells (RGCs) and their axons in the optic nerve (Tham et al., 2014; Almasieh & Levin, 2017). Approximately 64.3 million people aged 40 to 80 worldwide are thought to have glaucoma, with numbers expected to rise to 76.0 million by 2020 and 111.8 million by 2040 (Tham et al., 2014).

Despite advancements in glaucoma care over the past few decades, it remains a disease that can cause blindness (Vaajanen *et al.*, 2022). The rise in the number of glaucoma cases is becoming a cause for concern in Malaysia, particularly because half of all glaucoma cases worldwide are reported in the Asian population (Al-Naggar et al., 2020). A study on Chinese individuals living in Singapore revealed that the incidence of blindness in one eye is 27% for POAG and 50% for PACG, while the occurrence of blindness in both eyes is 9% for POAG and 29% for PACG (Foster et al., 2021). Glaucoma patients with visual impairments are more susceptible to developing depression and have a greater likelihood of experiencing personal injuries, including motor vehicle accidents, particularly in older age groups (Shaikh, Yu & Coleman, 2014).

Patients with glaucoma may require lifelong and the primary objectives of managing glaucoma are to decelerate the advancement of the disease and maintain an acceptable quality of life (Foster et al., 2021). Multicenter clinical trials have demonstrated the efficacy of reducing intraocular pressure in preventing the onset and slowing the progression of the disease (Heijl *et al.*, 2002).

1.2 Anxiety and Depression Among Glaucoma Patients

According to American Psychiatric Association, depression is a state of unhappiness and/or loss of interest in once-enjoyed activities. It can impair your ability to perform at work and home and cause several mental and physical issues (APA, 2017). Depression is characterized by sadness, lack of interest or pleasure, feelings of guilt or poor self-worth, disturbed sleep or eating, exhaustion, and difficulties focusing (WHO, 2017). Meanwhile, anxiety is an emotion characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure (APA, 2017).

Anxiety and depression are the two most common types of psychological disorders in some chronic medical illnesses (Horsten et al., 2000; Spertus et al., 2000). Glaucoma is considered a chronic illness that requires continuing care (Shin *et al.*, 2021). Previous studies have demonstrated that glaucoma patients are more likely to experience anxiety and depression (Zhou et al., 2013).

A study was conducted by Mabuchi to assess the prevalence of anxiety and depression in Japanese patients with primary open angle glaucoma (POAG) using Hospital Anxiety and Depression Scale questionnaire. The study has shown that the prevalence of POAG patients with anxiety was 13% and depression was 10.9% which was significantly higher than the reference group (Mabuchi et al., 2008). On the other hand, the prevalence of glaucoma patients in Brazil with anxiety and depression was 10.08% (Abe et al., 2021). A similar study carried out in China to assess the prevalence of anxiety and depression in Chinese glaucoma patients has shown that the prevalence of anxiety and depression was 22.92% and 16.40% respectively which was significantly higher than the normal levels in the general Chinese population (Zhou et al., 2013). Meanwhile, a study conducted by Tastan et al in Turkey has found that the prevalence of anxiety was 14.0% and depression was 57.0% among the participants with glaucoma (Tastan *et al.*, 2010).

According to studies by Odberg on the impact of glaucoma on Norwegian patients' quality of life, more than 80% of patients expressed unpleasant feelings after knowing that they had the disease, and one-third were terrified of losing their vision (Odberg et al., 2001).

1.3 COVID-19 Pandemic

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) which was officially designated as COVID-19 by the World Health Organization (WHO) was first discovered in Wuhan, Hubei Province, China, in January 2020 (Ciotti et al., 2020). It first originated as a cluster of unexplained cases of pneumonia in December 2019 which was linked to a seafood market in Wuhan, caused by a novel coronavirus (Khor et al., 2020; Zhang & Ma, 2020). The WHO declared a pandemic on March 12, 2020, as a result of the global spread of SARS-CoV-2 and the thousands of fatalities brought on by coronavirus disease (COVID-19) (Ciotti et al., 2020).

Like other respiratory viruses, SARS-CoV-2 spreads primarily through the respiratory pathway with high infectivity (Han *et al.*, 2020; Kampf *et al.*, 2020). Droplet transmission is the main recognized route of the virus, however, spread via aerosol is also suspected to be another important route (Gonzalez et al., 2021). This virus is extremely contagious and typically presents as a mild-to-moderate respiratory tract infection. However, in some populations, it may also cause multi-organ failure, acute respiratory distress syndrome, cytokine storm, and disseminated intravascular coagulation (Ciotti et al., 2020).

In Malaysia, the first case was reported on January 25, 2020, and there was a significant increase in cases starting in March 2020 (Ho & Tang, 2020). The

government of Malaysia has implemented a lockdown or Movement Control Order (MCO) which restricts the movement of people into or out of an area to contain the COVID-19 pandemic (Ho & Tang, 2020; Shah et al., 2020).

To comply with governmental restrictions and lower the risk of developing new cases, numerous medical organizations around the world have recommended discontinuing routine diagnostic and surgical work (Romano et al., 2020). Only urgent or emergency care should be given; routine consultations and elective operations were advised to be postponed (Romano et al., 2020., Roberto et al., 2022)

1.4 Delay in Care due to COVID-19 Pandemic

Ophthalmologists are more susceptible to COVID-19 infection during the pandemic due to the physical contact they have with patients while performing examinations (Yadav & Tanwar, 2022). The close proximity of the slit-lamp biomicroscopic examination during ophthalmic examinations may place the ophthalmologist at a higher risk of inhaling aerosolized particles from respiratory droplets and contact (Olivia Li et al., 2020).

In order to decrease the virus transmission from person to person during the COVID-19 pandemic, several national ophthalmology committees advise against receiving any non-urgent or non-emergency therapy (Romano et al., 2020). For this reason, ophthalmology centers from various countries have delayed 57% to almost 100% of glaucoma treatment, such as Poland (100%), France (95%), Ireland (95%), Turkey (95%), Russia (97%), Portugal (90%), Spain (100%), and Italy (57%) (Pomara, Volti & Cappello, 2020; Romano et al., 2020; Wong, Leo & Tan, 2020; Yang et al., 2020).

A study conducted in China to investigate mental health and to describe the correlation between anxiety and depression in glaucoma patients during the COVID-19 pandemic has found a high proportion of anxiety and depression in glaucoma patients during the COVID-19 pandemic (Zhou et al., 2022). The lockdown interfered with

glaucoma patients' follow-up schedules and prevented the majority of them from receiving in-person care. Limited options for purchasing eyedrops and keeping track of intraocular pressure may have a negative impact on glaucoma sufferers' mental health by increasing their risk of anxiety and sadness (Zhou et al., 2022).

It becomes necessary to risk assess and postpone elective surgical procedures and outpatient visits that can be delayed, especially in older patients and those with comorbidities, while taking into account the specific medical and social circumstances of each patient (Romano et al., 2020). Patients with chronic diseases faced enormous hurdles as a result of these uncertain circumstances, including difficulty in getting access to medical care and obtaining medication. As a result, the pandemic disrupts the continuity of medical care, which may cause the disease to develop and make treatment more challenging (Subathra *et al.*, 2021). Because of that it is expected that the glaucoma patients would feel more anxious especially those with poor vision as this will affect their daily activities (Ayub, de Vasconcelos & Costa, 2021).

1.5 Hospital Anxiety and Depression Questionnaire

The Hospital Anxiety and Depression Scale (HADS), which has anxiety and depression subscales, was created by Zigmond and Snaith in 1983 to detect anxiety and depression in patients at non-psychiatric clinics (Zigmond & Snaith, 1983). It is extensively used and has been proven to be helpful for determining the presence of anxiety and depressive symptoms in both primary care clinic patients and the general population (Bjelland et al., 2002; Snaith, 2003).

HADS questionnaire consists of 14 items, seven of which are used to assess anxiety and seven of which are used to assess depression, and takes between two to five minutes to be completed (Abe et al., 2021). A total of 42 points, or 21 points on each scale, can be earned by scoring each item from 0 to 3 (Zigmond & Snaith, 1983). For both scales, scores of less than 7 indicate non-cases, while score of 8 to 10 are mild cases, 11 to 14 are moderate cases and 15 to 21 are severe cases (Stern, 2014).

This scale has also been shown to be a valid measure of the severity of these disorders of mood and therefore the repeated administration of the scale at subsequent visits to the clinic will give the physician useful information concerning progress (Zigmond, A.S. & Snaith, 1983). It has been validated in many languages, countries, and settings including general practice and community settings (Bjelland et al., 2002; Snaith, 2003).

1.6 Rationale of Study

The COVID-19 pandemic, which has affected the entire world including our country, has led to the enforcement of lockdowns and movement control orders (MCOs). As a result, many outpatient clinics, elective procedures, and surgeries have been postponed to minimize the risk of infection among patients and healthcare workers. This situation may cause glaucoma patients, particularly those with poor vision, to feel more anxious as it can affect their daily activities.

As a result of the COVID-19 pandemic in our country, many clinic appointments, procedures, and elective surgeries have been postponed, causing glaucoma patients, especially those with poor vision, to feel more anxious as it can impact their daily routines. Consequently, it is expected that the prevalence of anxiety and depression among this population group may be higher compared to the glaucoma patients before the pandemic era, not only due to their ocular issues but also due to the stress and anxiety resulting from the postponement of clinic appointments and glaucoma surgeries.

As far as we know, there is no available data or reports in Asia, including Malaysia, that focus on the prevalence of anxiety and depression related to the postponement of care among glaucoma patients during the COVID-19 pandemic. By utilizing the HADS questionnaire which has anxiety and depression subscales to gather

information on the delay in care among glaucoma patients caused by the pandemic, we anticipate that the resulting data could benefit the healthcare system at large, and particularly the ophthalmology fraternity, in the event of future pandemics.

References

Abe, R. Y., Silva, L. N. P., Silva, D. M., Vasconcellos, J. P. C. & Costa, V. P. (2021) Prevalence of depressive and anxiety disorders in patients with glaucoma: a cross-sectional study. *Arquivos Brasileiros de Oftalmologia*. Conselho Brasileiro De Oftalmologia, **84**(**1**), 31–36.

Almasieh, M. & Levin, L. A. (2017) Neuroprotection in Glaucoma: Animal Models and Clinical Trials. *Annu. Rev. Vis. Sci*, **3**, 91–120.

Al-Naggar, R. A., Alshaikhli, H., Al-Rashidi, R. R. & Saleh, B. (2020) Glaucoma among the Malaysian Community. *Scientific World Journal*. Hindawi Limited, **2020**.

Ayub, G., de Vasconcelos, J. P. C. & Costa, V. P. (2021) The impact of covid-19 in the follow-up of glaucoma patients in a tertiary center: A comparison between pre-pandemic and pandemic periods. *Clinical Ophthalmology*. Dove Medical Press Ltd, **15**, 4381–4387.

Bjelland, I., Dahl, A. A., Haug, T. & Neckelmann, D. (2002) *The validity of the Hospital Anxiety and Depression Scale An updated literature review*.

Bowen, R. C., Senthilselvan, A. & Barale, A. (2000) *Physical Illness as an Outcome of Chronic Anxiety Disorders*.

Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W. C., Wang, C. bin & Bernardini, S. (2020) The COVID-19 pandemic. *Critical Reviews in Clinical Laboratory Sciences*. Taylor and Francis Ltd., 365–388.

dell'Omo R, Filippelli M, Virgili G, et al. (2022) *Effect of COVID-19-related lockdown on ophthalmic practice in Italy: A report from 39 institutional centers*. European Journal of Ophthalmology. *European journal of ophthalmology*, *32*(1), 695–703. https://doi.org/10.1177/11206721211002442

Derogatis, L. R., Morrow, G. R., Fetting, J., Penman, D., Piasetsky, S., Schmale, A. M., Henrichs, M., M Carnicke, C. L., Rochester Medical Center, of, Morrow, N. & Penman, Y. (1983) *The Prevalence of Psychiatric Disorders Among Cancer Patients*. Available at: http://jama.jamanetwork.com/.

Foster, P. J., Buhrmann, R., Quigley, H. A. & Johnson Br J, G. J. (2002) *The definition and classification of glaucoma in prevalence surveys*. Available at: http://bjo.bmj.com/.

Gonzalez, D., Karpman, M., Kenney, G. M. & Zuckerman, S. (2021) *Delayed and Forgone Health Care for Nonelderly Adults during the COVID-19 Pandemic Findings from the September 11-28 Coronavirus Tracking Survey*.

Han, Q., Lin, Q., Ni, Z. & You, L. (2020) Uncertainties about the transmission routes of 2019 novel coronavirus. *Influenza and other Respiratory Viruses*. Blackwell Publishing Ltd, 470–471.

Heijl, A., Cristina Leske, M., Bengtsson, Bo, Hyman, L., Bengtsson, Boel & Hussein, M. (2002) *Reduction of Intraocular Pressure and Glaucoma Progression Results From the Early Manifest Glaucoma Trial Arch Ophthalmol*. Available at: https://jamanetwork.com/.

Ho, K. & Tang, D. (2022) Movement control as an effective measure against Covid-19 spread in Malaysia: an overview.

Horsten, M., Mittleman, M. A., Wamala, S. P., Schenck-Gustafsson, K. & Orth-Gomér, K. (2000) Depressive symptoms and lack of social integration in relation to prognosis of CHD in middle-aged women. The Stockholm Female Coronary Risk Study. *European Heart Journal*, **21**(**13**), 1072–1080.

Kampf, G., Todt, D., Pfaender, S. & Steinmann, E. (2020) Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*. W.B. Saunders Ltd, 246–251.

Khor, V., Arunasalam, A., Azli, S., Khairul-Asri, M. G. & Fahmy, O. (2020) Experience from Malaysia During the COVID-19 Movement Control Order. *Urology*. Elsevier Inc., 179–180.

Mabuchi, F., Yoshimura, K., Kashiwagi, K., Shioe, K., Yamagata, Z., Kanba, S., Iijima, H. & Tsukahara, S. (2008) *High Prevalence of Anxiety and Depression in Patients With Primary Open-angle Glaucoma J Glaucoma*.

Odberg, T., Jakobsen, J. E., Hultgren, S. J. & Halseide, R. (2001) The impact of glaucoma on the quality of life of patients in Norway. *Acta Ophthalmologica Scandinavica*, **79**(**2**), 116–120.

Olivia Li, J. P., Shantha, J., Wong, T. Y., Wong, E. Y., Mehta, J., Lin, H., Lin, X., Strouthidis, N. G., Park, K. H., Fung, A. T., McLeod, S. D., Busin, M., Parke, D. W., Holland, G. N., Chodosh, J., Yeh, S. & Ting, D. S. W. (2020) Preparedness among Ophthalmologists: During and Beyond the COVID-19 Pandemic. *Ophthalmology*. Elsevier Inc., 569–572.

Pomara, C., Volti, G. L. & Cappello, F. (2020) Covid-19 deaths: Are we sure it is pneumonia? please, autopsy, autopsy, autopsy!. *Journal of Clinical Medicine*. MDPI.

Romano, M. R., Montericcio, A., Montalbano, C., Raimondi, R., Allegrini, D., Ricciardelli, G., Angi, M., Pagano, L. & Romano, V. (2020) Facing COVID-19 in Ophthalmology Department. *Current Eye Research*. Taylor and Francis Ltd, 653–658.

Shah, A. U. M., Safri, S. N. A., Thevadas, R., Noordin, N. K., Rahman, A. A., Sekawi, Z., Ideris, A. & Sultan, M. T. H. (2020) COVID-19 outbreak in Malaysia: Actions taken by the Malaysian government. *International Journal of Infectious Diseases*. Elsevier B.V., **97**, 108–116.

Shaikh, Y., Yu, F. & Coleman, A. L. (2014) Burden of undetected and untreated glaucoma in the United States. *American Journal of Ophthalmology*. Elsevier Inc., **158**(**6**), 1121-1129.e1.

Shin, D. Y., Jung, K. I., Park, H. Y. L. & Park, C. K. (2021) The effect of anxiety and depression on progression of glaucoma. *Scientific Reports*. Nature Research, **11**(**1**).

Snaith, P. (2003) *Health and Quality of Life Outcomes The Hospital Anxiety And Depression Scale*. Available at: http://www.hqlo.com/content/1/1/29.

Spertus, J. A., McDonell, M., Woodman, C. L. & Fihn, S. D. (2000) Association between depression and worse disease-specific functional status in outpatients with coronary artery disease. *American Heart Journal*. Mosby Inc., **140**(**1**), 105–110.

Stern, A. F. (2014) The Hospital Anxiety and Depression Scale. *Occupational Medicine*, **64**(**5**), 393–394.

Subathra, G. N., Rajendrababu, S. R., Senthilkumar, V. A., Mani, I. & Udayakumar, B. (2021) Impact of COVID-19 on follow-up and medication adherence in patients with glaucoma in a tertiary eye care centre in south India. *Indian Journal of Ophthalmology*. Wolters Kluwer Medknow Publications, **69**(**5**), 1264–1270.

Tastan, S., Iyigun, E., Bayer, A. & Acikel, C. (2010) Anxiety, depression, and quality of life in Turkish patients with glaucoma. *Psychological Reports*, **106**(**2**), 343–357.

Tham, Y. C., Li, X., Wong, T. Y., Quigley, H. A., Aung, T. & Cheng, C. Y. (2014a) Global prevalence of glaucoma and projections of glaucoma burden through 2040: A

systematic review and meta-analysis. *Ophthalmology*. Elsevier Inc., **121**(**11**), 2081–2090.

Tham, Y. C., Li, X., Wong, T. Y., Quigley, H. A., Aung, T. & Cheng, C. Y. (2014) Global prevalence of glaucoma and projections of glaucoma burden through 2040: Asystematic review and meta-analysis. *Ophthalmology*. Elsevier Inc., **121**(**11**), 2081–2090.

Vaajanen, A., Purola, P., Ojamo, M., Gissler, M. & Uusitalo, H. (2022) Changes in incidence and severity of visual impairment due to glaucoma during 40 years – a register-based study in Finland. *Acta Ophthalmologica*. John Wiley and Sons Inc, **100**(**5**), 534–540.

Wong, J. E. L., Leo, Y. S. & Tan, C. C. (2020) COVID-19 in Singapore - Current Experience: Critical Global Issues That Require Attention and Action. *JAMA - Journal of the American Medical Association*. American Medical Association, 1243–1244.

Yadav, M. & Tanwar, M. (2022) Impact of COVID-19 on glaucoma management: A review. *Frontiers in Ophthalmology*. Frontiers Media SA, **2**.

Yang, X., Yu, Y., Xu, J., Shu, H., Xia, J., Liu, H., Wu, Y., Zhang, L., Yu, Z., Fang, M., Yu, T., Wang, Y., Pan, S., Zou, X., Yuan, S. & Shang, Y. (2020) Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *The Lancet Respiratory Medicine*. Lancet Publishing Group, **8**(**5**), 475–481.

Zhang, N., Wang, J., Chen, B., Li, Y. & Jiang, B. (2021) Prevalence of Primary Angle Closure Glaucoma in the Last 20 Years: A Meta-Analysis and Systematic Review. *Frontiers in Medicine*. Frontiers Media S.A.

Zhang, Y. & Ma, Z. F. (2020) Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: A cross-sectional study. *International Journal of Environmental Research and Public Health*. MDPI AG, **17**(**7**).

Zhou, C., Qian, S., Wu, P. & Qiu, C. (2013) Anxiety and depression in Chinese patients with glaucoma: Sociodemographic, clinical, and self-reported correlates. *Journal of Psychosomatic Research*, **75**(**1**), 75–82.

Zhou, W., Lin, Haishuang, Ren, Y., Lin, Hao, Liang, Y., Chen, Y. & Zhang, S. (2022) Mental health and self-management in glaucoma patients during the COVID-19

pandemic: a cross-sectional study in China. *BMC Ophthalmology*. BioMed Central Ltd, **22**(**1**).

Zigmond, A.S. & Snaith, R. P. (1983) The Hospital Anxiety and Depression scale. *Acta Psychiatry Scandinavia*, **67**(**6**), 361–370.

CHAPTER 2:

OBJECTIVES

2.1 General Objective

To evaluate the prevalence of anxiety, depression, and its associated factors among glaucoma patient with delay in care due to COVID-19 pandemic in Kelantan using Hospital Anxiety and Depression Scale (HADS) Malay version

2.2 Specific Objectives

2.2.1 To determine the prevalence of anxiety among glaucoma patient with delay in care due to COVID-19 pandemic using HADS Malay version

2.2.2 To determine the prevalence of depression among glaucoma patient with delay in care due to COVID-19 pandemic using HADS Malay version

2.2.3 To identify the associated factors of anxiety level among glaucoma patient with delay in care due to COVID-19 pandemic using HADS Malay version

2.2.4 To identify the associated factors of depression level among glaucoma patient with delay in care due to COVID-19 pandemic using HADS Malay version

CHAPTER 3:

MANUSCRIPT

3.0 Title: Evaluation of Prevalence of Anxiety and Depression Among Glaucoma Patient With Delay In Care Due to COVID-19 Pandemic in Kelantan Using Hospital Anxiety and Depression Scale Questionnaire And Its Associated Factors

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