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Original Article

KNOWLEDGE, ATTITUDE & PRACTICE (KAP) ON BOOSTER DOSE OF COVID-19 VACCINE IN MALAYSIAN ADULTS

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ABSTRACT

COVID-19, also known as coronavirus disease, was caused by SARS-CoV-2 originating from Wuhan, China, in December 2019. More than two years has been passed and now world is facing Omicron wave. Ministry of health (MOH) of Malaysia rolled out Booster dose for Covid-19 to fight against the new variant and now widens its vaccine roll-out to those as young as five years old to combat the disease. In this cross-sectional study was conducted from May 18th, 2022 to June 11th, 2022 through Google form. The questionnaire comprises 33 questions covering demographic data and the KAP of the respondents. The link to the survey was distributed through social media platforms such as Facebook, Instagram, Telegram, and WhatsApp and received over 400 responses. The inclusion criteria for this study were Malaysian citizens aged 18 and above who had received the Covid-19 vaccine and its booster dose. The SPSS statistical package version 28 was used to analyze all data. Less than 10% of the respondents have moderate knowledge, 30% of the respondents have a poor to moderate attitude and 80% of the respondents have poor and moderate practice about booster dose of COVID-19 as they are not sure about the effectiveness of it. There was no significant difference (p >0.05) between age, gender, religion and ethnicity groups regarding KAP of booster dose. Awareness of Booster dose of Covid-19 is significantly improved among the Malaysians because of government vaccine campaign and implication mysejahtera to monitor health status of people. A larger population sample with a longer period of study would reflect a better impression of KAP on booster dose.

INTRODUCTION

COVID-19 infection from human to human is caused by Severe Acute Respiratory Syndrome Virus 2 which is known as (SARS-CoV-2). It will result in a disease called coronavirus disease which was found in 2019 (COVID-19) [1]. In March 2020, the World Health Organization (WHO) announced that the disease COVID-19 as a pandemic. The virus that causes COVID-19 appears to spread easily between people and researchers will continue to discover more about how it spreads over time, the available data shows that it spreads through close personal contact with infected people within a 2-meter distance. The virus also spreads through released respiratory droplets when an infected person sneezes, breathes, coughs, or talks, the virus in the air droplets can be inhaled or enter into the mouth, nose, or eyes of a nearby person. However, COVID-19 can sometimes be spread by exposure to small droplets or mists that remain in the air for several minutes or hours. This is called airborne transmission [2]. Signs and symptoms of Covid-19 may appear two to 14 days after exposure [3]. The period after exposure to the virus and before symptoms appear is called the incubation period [4]. Common signs and symptoms may include fever, cough, tiredness and loss of taste or smell. Other symptoms of the disease include shortness of breath or difficulty breathing, muscle pain, sore throat, runny nose, headache, chest pain, redness eye (conjunctivitis), nausea, vomiting and diarrhea [2]. Signs and symptoms of Covid-19 may appear two to 14 days after exposure [3]. Symptoms of Covid-19 can range from mild to severe, as some people may have only a few symptoms, while others have no symptoms at all [5].

As an effect, some people may feel worse about a week after they start, such as worsening shortness of breath and pneumonia. The risk of developing severe symptoms of Covid-19 infection increases with age. Also, certain conditions may increase the risk of developing severe symptoms from COVID-19, including serious heart disease, cancer, chronic obstructive pulmonary disease, having type 1 or type 2 diabetes, obesity, hypertension, smoking, chronic kidney disease, sickle cell disease or thalassemia, pregnancy and asthma [6]. The U.S. A recent study showed that unvaccinated people who had previously had Covid-19 were twice as likely to have

a recurrence as those who did get vaccinated. The Centers for Disease Control and Prevention (CDC) recommend a booster dose for people age 65 or older, some people who have been fully vaccinated and whose immune response has weakened over time, such as people who had an organ transplant. People with weakened immune systems may not develop adequate protection after taking two doses of the mRNA-combined COVID-19 vaccine [7]. The additional dose may improve the level of protection against Covid-19. The third dose should be given at least 28 days after the second dose of the mRNA vaccine [8].

METHODOLOGY

This is a cross-sectional and descriptive study which involves 424 samples. Data was collected from 18th May 2022 until 11th June 2022. Online Google form was created and distributed during the worldwide epidemic since it seemed to be an easy approach to build a questionnaire and collect data more methodically.

The questionnaire consisted of four parts: socio-demographic, knowledge, attitude and practices regarding Booster Dose of COVID-19 Vaccine for Malaysian Adults. 33 questions were used regarding three dimensions, which were knowledge, attitude and practical regarding Booster Dose of COVID-19 Vaccine for Malaysian Adults. A pilot study was performed involving 18 people randomly. Any errors have been rectified and later distributed among Malaysian adults via social media such as WhatsApp, Facebook, Telegram and Instagram.

Malaysian citizens, Age 18 and above were included in the study while non-Malaysian citizens, age 18 and below were excluded. The participants range in age from 18 to 77 years old. We selected 424 Malaysians out of 432 Malaysians at a certain age. Eight responses are excluded because they are not eligible based on our inclusion criteria.

The sample size was calculated using Cochrane formula. The sample of 424 was obtained with 5% of allowable error (e) at 95% of confident interval (CI) or Z in the Cochrane formula.

Data analysis

Questions about COVID-19 booster vaccination were used to measure knowledge among the population in Malaysia. Malaysian adults citizens were categorized based on their responses. each response was given a score ranging from 1 to 16 with a “1” for the strongly disagree answer and a “5” for answering strongly agree a cut-off level classified as in Table 1.

Questions about COVID-19 booster vaccination were used to measure attitude among the population in Malaysia. Malaysian adults citizens were categorized based on their responses. each response was given a score ranging from 1 to 16 with a “1” for the strongly disagree answer and a “5” for answering strongly agree. A cut-off level classified as in Table 2.

Questions about COVID-19 booster vaccination were used to measure practice among the population in Malaysia. Malaysian adults citizens were categorized based on their responses. each response was given a score ranging from 1 to 16 with a “1” for the strongly disagree answer and a “5” for answering strongly agree. A cut-off level classified as the Table 3.

Data analysis was performed using SPSS version

Table 1: Score and knowledge level

Number of scores	Knowledge on booster dose of COVID-19 vaccine
1-16	Poor knowledge
17-32	Moderate knowledge
33-50	Good knowledge

Table 2: Score and attitude level

Number of scores	Attitude on booster dose of COVID-19 vaccine
1-16	Poor attitude
17-32	Moderate attitude
33-50	Good attitude

Table 3: Score and practice level

Number of scores	Practice on booster dose of COVID-19 vaccine
1-16	Poor practice
17-32	Moderate practice
33-50	Good practice

28. The following statistical methods were used:
    Descriptive statistics – to describe the socio-demographics of respondents.
    Chi-Square Test – to see the association between variables.
    One Way ANOVA – to see the difference of mean between two or more groups.

RESULTS

The number of participants in this study was 424 respondents which constitute of 57.3% (243) females and 42.7% (181) males (Figure 1). The respondents were categorized into six age groups. The highest number of respondents was from young adults (18-27 years old) which is 328 (77.8%), followed by older adults (28-37 years old) which is 33 (8%), and middle age (38-47 years old) (Figure 2). The majority of ethnicity was Malay with 302 respondents (71.2%), followed by Indian with 76 respondents 17.9%), Chinese with 30 respondents (7.1%) and other ethnicity with 16 respondents (3.8%) (Figure 3). For religion, the highest percentage was Islam (83.3%), followed by Hindu (8.5%), Buddha (4.5%) and Christian (3.5%) (Figure 4).

The single respondents were 336 (79.2%), married 84 (19.8%) and divorced or separated or widowed were only 4 (0.9%) (Figure 5). Most respondents had tertiary education (75.0%), followed by respondents with pre-university (17.5%), and primary and secondary school (7.6%) (Figure 6). Most of the respondents were from the northern peninsular of Malaysia (Kedah) with 19.8%, followed by respondents from the middle peninsular (Perak) (15.3%), Penang (6.4%), southern peninsular – Johor (4.5%) and lastly from East Malaysia with only 1.4% (Figure 7). Most respondents were living in urban areas (75%) compared to rural areas (25%) (Figure 8).

Knowledge Towards Booster Dose of COVID-19 Vaccines

The total number of respondents is 424. Their responses were analysed and categorized based on their scores. Respondents with 1 to 16 correct answers were considered as having poor knowledge. Those with 17 to 32 correct answers were considered as having moderate knowledge. While respondents who answered 33 to 50 questions correctly were considered as having good knowledge. Our study revealed that 394 respondents have good knowledge of COVID-19 booster vaccination, followed by 30 respondents with moderate knowledge and 0 respondents with poor knowledge. The percentages are 92.9%, 7.1% and 0.0% respectively (Table 4).

Figure 9 shows the knowledge of Malaysian adults on different questions on the Booster dose of COVID -19 vaccine. Most of the participants have high knowledge of COVID-19 booster doses (Question 1). However, they have the least knowledge of the post-booster effect and technology of the vaccine (Question 3 and Question 4).

Attitude Towards Booster dose of COVID-19 Vaccines

The total number of respondents is 424. Their responses were analysed and categorized based on their scores. Respondents with 1 to 16 correct answers were considered as having poor attitude. Those with 17 to 32 correct answers were considered as having moderate attitude. While respondents who answered 33 to 50 questions correctly were considered as having a good attitude. Our study revealed that 297 respondents have a good attitude toward COVID-19 booster vaccination, followed by 124 respondents with a moderate attitude and 3 respondents with a poor attitude. The percentages are 70.0%, 29.2% and 0.7% respectively. This data is shown in Table 4.

Figure 10 depicts respondents' answers for ten questions regarding attitudes towards COVID-19 vaccine. Overall, question 6 and 7 has the most positive answer which are respondents think that taking a booster dose is a social responsibility and booster dose will protect them from COVID-19 infection. Whereas Question 4 has the highest disagreement which is booster dose is prohibited in their religion.

Practice Towards Booster dose of COVID-19 Vaccine

The total number of respondents is 424. Their responses were analysed and categorized based on their scores. Respondents with 1 to 16 correct answers were considered as having poor practice. Those with 17 to 32 correct answers were considered as having moderate practice. While respondents who answered 33 to 50 questions correctly were considered as having good practice. Our study revealed that 58 respondents have good practice on COVID-19 booster vaccination, followed by 365 respondents with moderate practice and 1 respondent with poor practice. The percentages are 13.7%, 86.1% and 0.2% respectively. This data is shown in Table 4.

Figure 11 shows the results of practice towards COVID-19 booster dose in which Malaysian population rejects booster dose mainly due to underlying health condition (Question no 2) or due to currently suffering from any form of illness (Question no 3). The figure also tells us that the practice of boosters is not effective among the Malaysian population as their knowledge and attitude.

Inferential tests were done like One-way ANOVA for age, Ethnicity and religion and t-test for gender and area of residence, it is found that there is no significance of difference of knowledge ($p > 0.05$) in between gender, age, ethnicity, religion and area of residence. And the same indifference to attitude differences in Age, ethnicity, religion and area of residence. However, there are significant differences in attitude between males and females ($p < 0.05$). There was a significant association ($p < 0.05$) between practice category and gender and ethnicity. There was no significant association ($p > 0.05$) between practice category and age, religion and area of residence group.

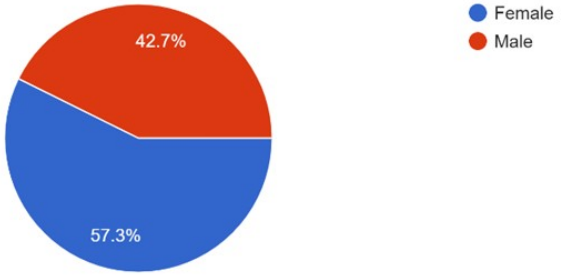


Figure 1: Gender

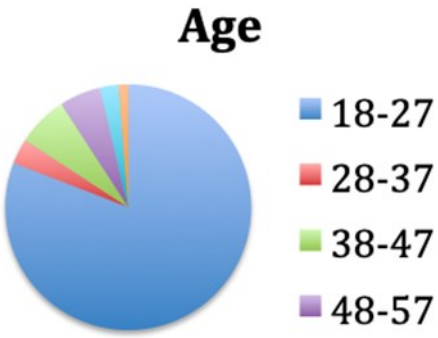


Figure 2: Age groups

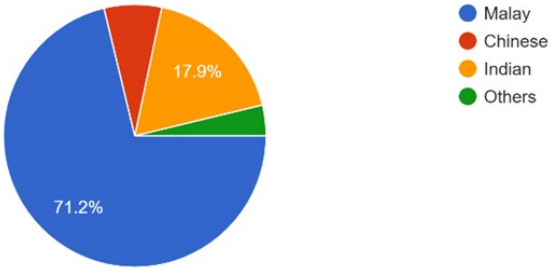


Figure 3: Ethnicity

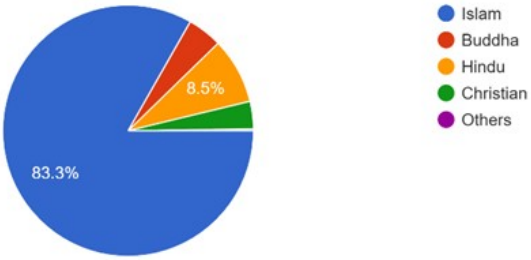


Figure 4: Religion

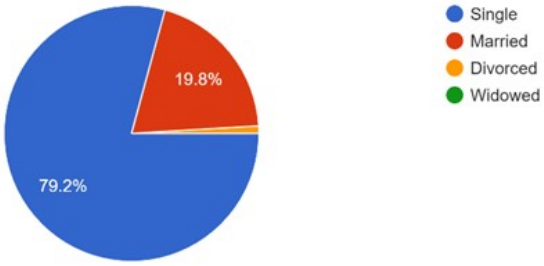


Figure 5: Marital status

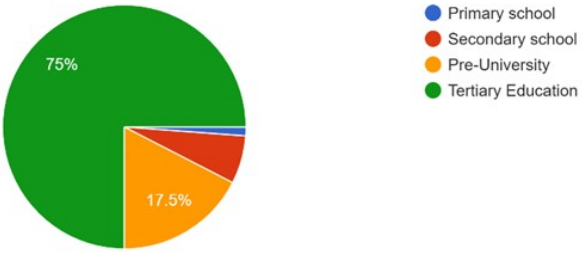


Figure 6: Education

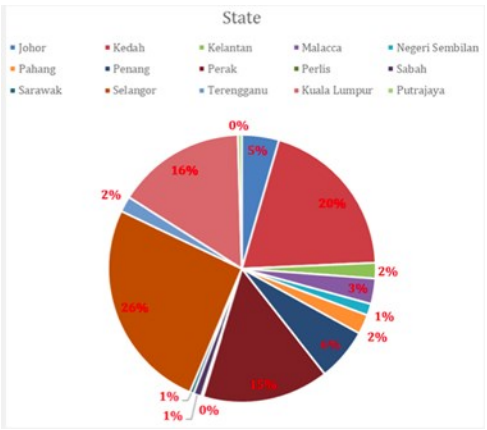


Figure 7: State

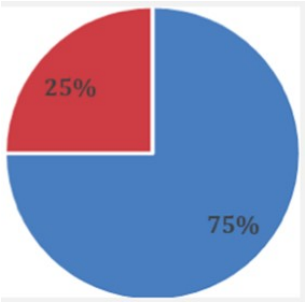


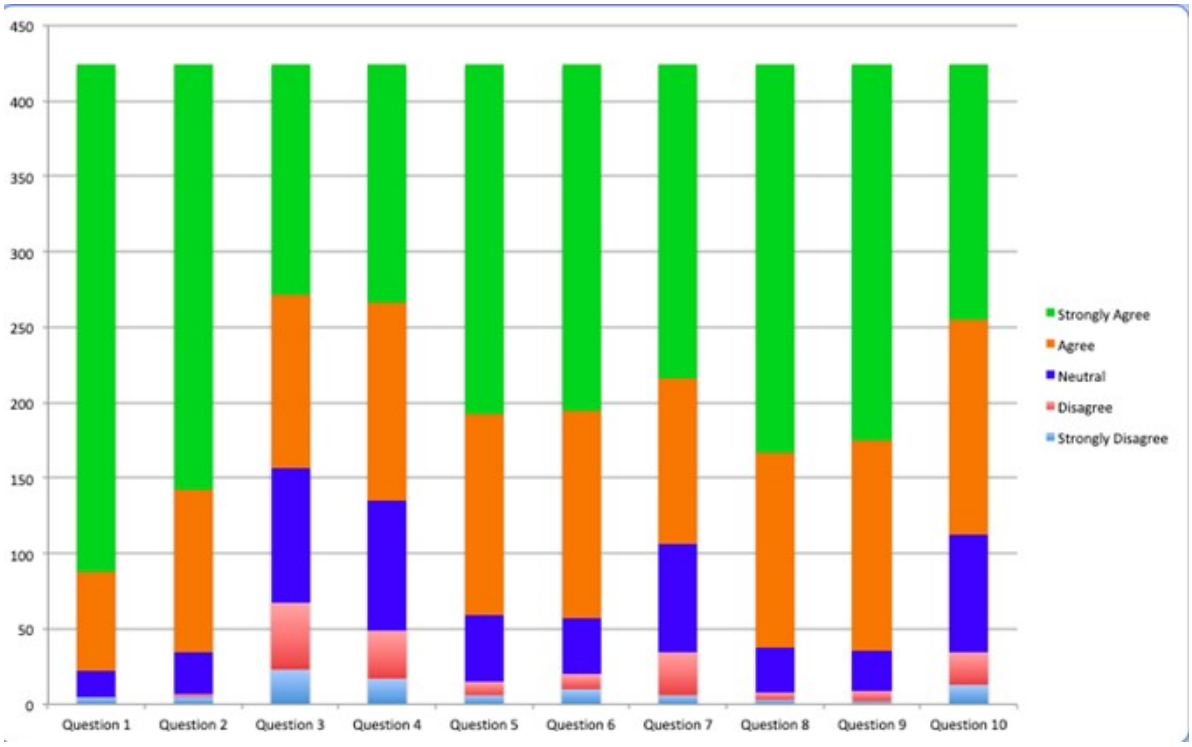
Figure 8: Urban vs Rural area

Table 4: Level of Knowledge, Attitude and Practice towards Booster dose of COVID-19 vaccine

KNOWLEDGE	SCORE RANGE	COUNT	PERCENTAGE
GOOD	33-50	394	92.9%
MODERATE	17-32	30	7.1%
POOR	1-16	0	0%

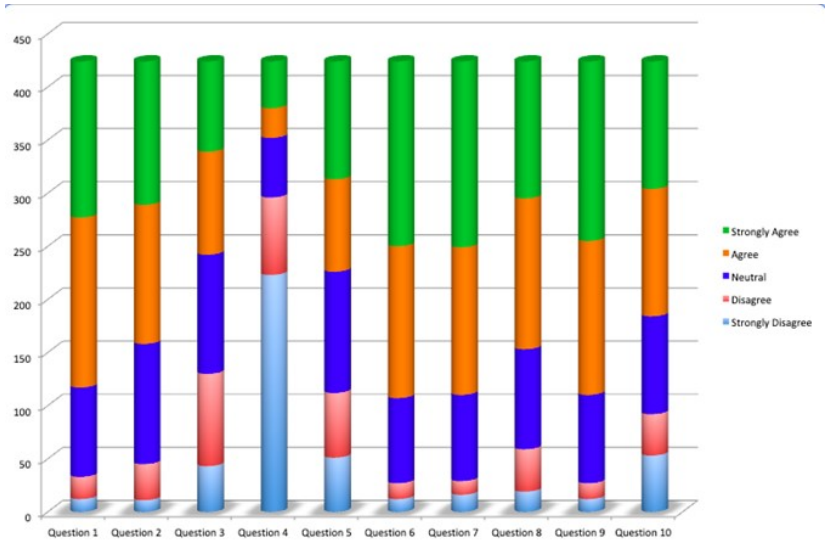
ATTITUDE	SCORE RANGE	COUNT	PERCENTAGE
GOOD	33-50	297	70.0%
MODERATE	17-32	124	29.2%
POOR	1-16	3	0.7%

PRACTICE	SCORE RANGE	COUNT	PERCENTAGE
GOOD	33-50	58	13.7%
MODERATE	17-32	365	86.1%
POOR	1-16	1	0.2%



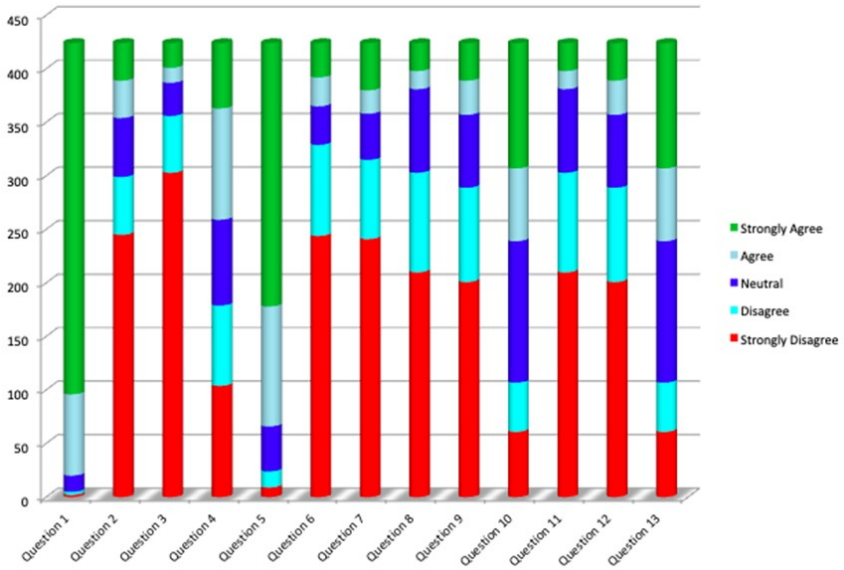
Q1: I am aware of the existence of booster vaccination
Q2: I know the importance of the COVID-19 booster vaccination
Q3: I am aware of the most common post effect of the COVID-19 booster vaccination
Q4:I am aware of the content/technology of the COVID-19 booster vaccinations
Q5:I am aware of why I have to take COVID-19 booster vaccination after second dose
Q6:I am aware of how COVID-19 booster vaccination increase our immunity
Q7:I am aware of the different companies that produce COVID-19 booster vaccination
Q8:I know that who should be prioritized first to take the COVID-19 booster vaccination
Q9:I am aware of the type of Covid-19 booster vaccine provided by the Ministry Of Health
Q10:I am aware of why the Malaysian government doesn't make COVID-19 booster vaccine as compulsory vaccination

Figure 9: Knowledge on Booster dose of COVID-19 vaccine among Malaysian adults



Q1: COVID 19 Booster vaccination can provide me long term immunity
Q2: COVID 19 Booster vaccination can cause serious health complications to certain people
Q3: COVID 19 Booster vaccination is only required for high risk groups like senior citizens, people with comorbidities and healthcare professionals
Q4: COVID 19 Booster vaccination is prohibited in my religious teachings
Q5: COVID 19 Booster vaccination should be made mandatory by the government
Q6: I believe that taking the booster COVID-19 vaccine is a societal responsibility
Q7: I believe COVID-19 booster vaccine will be useful in protecting me from the COVID-19 infection
Q8: I believe that taking the COVID-19 booster vaccination will help in eradicating COVID-19 infection
Q9:I feel the benefits of taking the COVID-19 booster vaccination outweighs the risks involved
Q10: I am willing to get the COVID-19 booster vaccination even if I have to pay to get it

Figure 10: Attitude on Booster dose of COVID-19 vaccine among Malaysian adults



Q1: I have received one of the COVID-19 vaccines
Q2: If yes, which vaccine product(s) did you receive?
Q3: I have a health condition or undergoing treatment that makes me moderately or severely immune-compromised and not suitable for COVID-19
Q4: I have completed 2 doses of the vaccine
Q5: I am currently suffering from any kind of illness and receiving treatment or medication and not suitable for COVID-19 booster vaccination.
Q6: I have the following disease. Name of the disease:
Q7: I experienced a moderate or severe side effect of the previous COVID-19 dose
Q8: My family already takes a booster dose
Q9: I do not take the booster dose because I am not sure of the effectiveness of the booster dose effective or not
Q10: I do not take the booster dose because I am worried about the adverse effects of the booster dose
Q11: I do not take the booster dose because I am at risk at getting severe covid-19 infection
Q12: It is difficult to get a booster dose from a nearby vaccine centre
Q13: Booster dose also protect others who are not fully vaccinated

Figure 11: Practice on Booster dose of COVID-19 vaccine among Malaysian adults

In the questionnaire, respondents were tested for causes of rejection of booster dose in practice questions. The reasons are shown in Figure 11. The main reasons were having underlying diseases and health concerns.

DISCUSSIONS

This study showed that the percentage of respondents with good knowledge of Booster doses of COVID-19 vaccination is high (92.9%). This percentage shows that most Malaysians have good knowledge of COVID-19 vaccination [9]. A study conducted by USIM stated that most Malaysians obtained their information regarding COVID-19 vaccination via internet websites especially the official Ministry of Health (MOH) website [10]. Only a small percentage of the participants of the research were using traditional mass media like newspapers, radio, magazines and news on television to get the newest information about the COVID-19 vaccination. It is known that information acquired by mass media is better compared to social media. The usage of mass media to get information is preferred because it brings out more healthy behaviour in the internet consumer compared to social media. This definitely will influence their decision to get booster dose vaccination [11]. It is also known that poor knowledge of the COVID-19 booster vaccination is due to a low level of education, poor economic status and getting information from unreliable sources while high knowledge of the COVID-19 booster vaccination is due to a high level of education, higher economic status and getting information from reliable sources [12].

In another study in Malaysia, it is found that females have higher knowledge regarding the COVID-19 booster vaccination compared to males [13]. However, this will impact the attitude as knowledge-able females will have poor acceptance towards the COVID-19 booster vaccination. Next, it is also acquired that people who prefer foreign booster vaccination over domestic booster vaccination have poor knowledge. Apart from that, people who are 20 years old and below has lower knowledge about COVID-19 booster vaccinations while people who are 30 years old and above have higher knowledge which is in line with our study. This is because the older generation shows more interest in obtaining current issues including health-related issues compared to the younger generation that opted for entertainment-related issues. In our study, there is no difference between the area of residency and their total knowledge of booster doses of COVID-19 Vaccination [14].

Most of the participants have a good attitude regarding COVID-19 booster vaccination (70.0%). There is a significant difference in gender and attitude toward COVID-19 vaccination by the participants. Based on the previous studies conducted by other researchers from various institutes, it is obtained that the acceptance of booster doses of the COVID-19 vaccine varied amongst different groups [15]. For the first example, students from health and sciences major in degree have a better understanding and better perception of the COVID-19 booster vaccination compared to students that are not majoring in health and sciences degree courses. This is due to what they have learned throughout their university life leading them to have a better understanding of immunology and pathology [17].

Closely related to the previous point, it is observed that people with higher education and incomes have better attitudes on the COVID-19 booster vaccination [18]. This is because they can have more access to the technologies and resources to get the accurate and latest information about the vaccination and the outbreak itself. Apart from that, people who have contracted the COVID-19 virus previously or their close acquaintances did, will have positive acceptance of the COVID-19 booster vaccination because they are more aware of the importance of getting the vaccination and the benefits of getting vaccination outweigh the side effects that it may cause. In the same research, it is also mentioned that females have lower acceptance rates for COVID-19 booster vaccination compared to males. Based on the observation, it is perceived that males received less information about the vaccine compared to females so they have less risk of misinformation about the vaccination [19].

In another study, it is known that people with high comorbidities have poor attitudes toward the vaccination due to false rumours and misinformation about the COVID-19 booster vaccine[20]. This is worrying because they are the group with a higher risk of getting serious complications from COVID-19 infection compared to other groups. In the same research, it is also obtained that people with a higher risk of getting COVID-19 infections like frontliners who are working in the health field, police, military, and people who have frequent contact with the public like the food delivery man have better acceptance rates on COVID-19 booster vaccination because of their integrity and conscience to protect people around themselves and people around them from getting infected by the COVID-19 virus [21].

Most of the participants have moderate practice regarding COVID-19 booster vaccination (86.1%). There is no difference in the distribution of total practice across categories of religions [22]. Our previous study on the willingness to receive primary COVID-19 vaccination in Malaysia that uses a similar intention scale found 48.2% indicated a definite intent followed by 46.1% reporting a probable intent. Our results indicate that the Malaysian public reported a near similar intention to receive the COVID-19 vaccine booster dose as for receiving the primary COVID-19 vaccine [23]. Achieving very high vaccination coverage for primary vaccination and booster doses represents the most important public health strategy to control the pandemic. Efforts are still needed to address hesitancy toward receiving a booster dose, particularly among those who expressed definite and partial unwillingness and those who remain undecided, as these groups comprise 18.7% of the overall participants.

Although our study found a high willingness to receive

a COVID-19 vaccine booster, there were noticeable demographic and geographical disparities in acceptance. In this study, as average monthly household income increases, so does the willingness to receive the COVID-19 vaccine booster [24]. Acceptance is also relatively high in the central region, the most populous and urbanized in the country. These findings demonstrate that lower-income people living in rural and remote areas, which are disproportionately impacted by COVID-19, may be disproportionately impacted by the pandemic due to a lack of willingness to receive the vaccine, even if the COVID-19 vaccine is widely available for everyone in the country [25].

CONCLUSION

Most of the participants have good knowledge regarding COVID-19 booster vaccination (92.9%). Most of the participants have a good attitude regarding COVID-19 booster vaccination (70.0%). Most of the participants have moderate practice regarding COVID-19 booster vaccination (86.1%). There is no difference in the distribution of total practice across categories of religions. There is no difference between the area of residency and their total knowledge of booster doses of COVID-19 Vaccination. There is a significant difference in gender and attitude of COVID-19 vaccination by the participants. Knowledge, attitude and practice themselves have weak relationships with each other.

The good knowledge, attitude and practice of Malaysians on COVID-19 booster vaccination proved the success of recent policies showing that it should be maintained. Other new effective policies also can be established to increase the percentage of good knowledge, attitude and practice levels among Malaysians. This study has its limitations which might make the result not conclusive and need significant improvements in future studies. Due to unequal questionnaire distribution, this result may not represent each class of Malaysians. In this study, mainly Malays, Muslims, females and adults dominate the results with age between 18-27. This inequality could cause biases in this study. In future studies, we could do large-scale studies with an equal distribution of questionnaires which will give us a clearer picture of the booster dose of COVID-19.

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Original Article

KNOWLEDGE AND ATTITUDE REGARDING THALASSEMIA AMONG THE COMMUNITY IN ALOR SETAR

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ABSTRACT

Thalassemia, which is an autosomal recessive disease, is a significant public health issue in Malaysia as it is one of the most common genetic diseases in our country. Between 4.5 and 5.0% of the Malaysian population were reported to be the carriers of this disease and 3.0 - 40.0% were HbE (c.79G>A) carriers. Although thalassemia is incurable, it is controllable with effective prevention strategies that could decrease the percentage of affected births by approximately 95%. Thus, this study aimed to determine the knowledge and attitude of a selected community which is Alor Setar, regarding Thalassemia. Respondents living in Alor Setar with a variety of demographic backgrounds were evaluated in terms of knowledge and attitude regarding Thalassemia. The determination of the sample size was derived from a formula that utilised the current population number of 133,000 in Alor Setar and the prevalence of Thalassemia at 5.0 percent. The results were analysed using IBM Statistical package for Social Studies (SPSS) version 29 software. Descriptive statistics were employed to illustrate the socio-demographic features of the subjects. Using the One-Way ANOVA test, the degree of knowledge and attitude were analysed, and the Chi-Square test was employed to examine the relationship between the factors. The significance level was set at 0.05. The results indicated that 98.6% of the population of Alor Setar has a good knowledge of thalassemia, while the remaining percentage has a mediocre understanding. A significant proportion of the population of Alor Setar (86.1%) holds a good attitude towards thalassemia, and the remainder individuals hold a moderate stance on the matter. In conclusion, the research undertaken in Alor Setar unveiled a commendable degree of community awareness and perspectives regarding thalassemia. Significantly, the research demonstrated a correlation between residential location and attitudes towards thalassemia, underscoring the influence of geographical location on attitudes towards the illness. These results support the alternative hypothesis that there is a substantial association between factors associated with thalassemia and that knowledge and attitude regarding thalassemia are both favourable.

INTRODUCTION

Thalassemia is one of the most common genetic blood disorders in the world. It is a genetic disorder that involves the absence of or errors in genes that affect the body's ability to produce a protein (haemoglobin) in the red blood cells. It is autosomal recessive, which means both the parents must be affected with or carriers for the disease to transfer it to the next generation. The two main types of thalassemia are alpha and beta which are further classified based on the severity: trait, minor, intermedia, and major.

Approximately 200,000 individuals are born with β-Thalassemia, with an estimated 240 million heterozygotes globally [1]. Generally, these groups of single gene disorders have an estimated 5 percent prevalence as carriers. Alpha thalassemia is prevalent in Asian and African populations while beta-thalassemia is more prevalent in the Mediterranean population, although it is relatively common in Southeast Asia and Africa too. In Malaysia, as in many other nations, thalassemia is a significant public health issue. About 4.5 percent of Malaysians are carriers of ß-Thalassemia, and the country is thought to have 5,600 patients with transfusion-dependent ß-Thalassemia each year, or 2.1 afflicted births out of every 1,000 [2]. Thalassemia has also affected individuals, and marriages, including their future babies physically, emotionally, and financially. Due to the disorder's inheritance, the Ministry of Health Malaysia (MOH) started the school thalassemia screening programme in 2016 which involves fourth-form students and premarital screenings [3].

The level of knowledge on thalassemia varies

among Malaysians. In a study among the community of Besut [3], the mean thalassemia knowledge scores among parents are still unsatisfactory with a score among the subjects was 11.8 out of a maximum score of 21. This result is similar to that of another study, which used the same questionnaire and was conducted nearly 10 years ago [4]. Among the findings was a quarter of them wrongly thought that carriers would develop thalassemia major.

The treatment options for thalassemia patients include bone marrow transplants and blood transfusion therapy. Other than that, medication to improve iron overload from blood transfusions is a chelation agent, subcutaneous deferoxamine. Less than half (48.7%) were aware that thalassemia major patients require lifelong blood transfusions and that a bone marrow transplant is a treatment option for the disease (34.4%) [3]. In Malaysia, the treatment options for thalassemia patients include bone marrow transplants and blood transfusion therapy, which put a huge economic burden on the Malaysian health system. The Malaysian government funds the cost of the therapy, including the provision of the chelation agent, and subcutaneous deferoxamine [5]. In order to reduce the burdens on patients and the government, the screening programme must be strengthened. Redistributing funds to treat current thalassemia patients with the best care possible and lessen their lifetime socioeconomic burden would be made possible by preventing the birth of newborns with thalassemia major. Therefore, it is crucial to assess the community's knowledge of thalassemia.

The prognosis for thalassemia minor is generally good and it is asymptomatic. Usually, neither morbidity nor mortality are increased by it. The long-term prognosis for thalassemia major, a serious illness, is dependent on treatment compliance with iron chelation and transfusion regimens. Repetitive blood transfusions of 2 units per month result in 400–500 mg of iron per transfusion or about 20 g in 4 years, which is 10-fold more than the normal iron content of the body for adults. Continuous accumulation of iron in the body promotes liver and heart damage due to iron toxicity [6].

In terms of knowledge regarding thalassemia major, the majority (71.4%) knew that these individuals could lead normal and healthy lives with appropriate treatment and have longer life expectancies (61.2%). One-fifth of the parents wrongly believed that the life expectancy of thalassemia carriers is short [3]. There were statistically significant differences ($p<0.005$) between the groups of medical and non-medical students on the awareness and knowledge of whether thalassaemic individuals lead normal lives with appropriate treatment [7].

A person with thalassemia especially beta thalassemia major type usually unable to lead a normal life like other healthy individuals as they are always anaemic and require mandatory blood transfusion thus a study states that half of the respondents state that diagnosis of thalassemia renders the person's daily life, but some patient may live a normal life if they only have thalassemia minors [8]. A person with thalassemia has presentations along a spectrum which ranges from asymptomatic to severe anaemia which requires lifelong blood transfusions. Besides, they may also develop complications from the disease, or it can also develop complications from its treatment which include stunted growth, bone changes, heart failure, delayed puberty and iron overload.

Thalassemia patients will have hyperbilirubinemia secondary to ongoing haemolysis and ineffective erythropoiesis. Bone changes here refer to osteoporosis which is common in thalassemia individuals and is potentially secondary to hypogonadism and other endocrine abnormalities which cause the stunted growth and expansion of marrow cavities [9]. Regular transfusions for these patients with thalassemia major to prevent complications from anaemia will cause iron overload as the iron from the transfusion will accumulate and deposit in the myocardium which will cause cardiac problems which may include arrhythmias and congestive heart failure. They also will have increased susceptibility to infection as this is characteristic of the severe forms of beta thalassemia. Thalassemia patients with severe forms of beta thalassemia both intermedia and major type will have increased tissue deposition of iron which includes due to mandatory blood transfusion that causes this iron deposition [9].

Thalassemia is a group of inherited genetic diseases which are characterized by the decrease in or in the absence of the synthesis of alpha or beta polypeptide chains that are in the normal haemoglobin molecule [10]. Thus, it is an inherited disease which has to do with family history. If a parent has a thalassemia trait and the other is normal, for each child there should be a 50% chance of inheriting the thalassemia gene which makes them a carrier while both parents with thalassemia traits mean they have a 25% chance in each pregnancy of having a child with thalassemia major and a 50% chance of the child becoming a thalassemia carrier. According to the research, most parents did have the general knowledge regarding thalassemia as an inherited disease and multiple studies have already been conducted regarding knowledge of thalassemia however there is still not much improvement in knowledge in thalassemia according to the studies conducted by Wong LP [4].

Thalassemia screening programmes have been implemented in multiple countries including Malaysia. However, the screening differs in terms of mandatory or voluntary screening, and the timing also differs in each country. The screenings are available for 15 to 16 years old school students, pre-marital screenings and screenings for the relatives of known carriers which can help to efficiently identify the beta thalassemia trait and to control the disease from increasing in the future [4]. In Malaysia, there is a school thalassemia screening programme that started in 2016 which involves form 4 students they also were being educated on

thalassemia disease and how it spreads which aims for the reduction of the prevalence of thalassemia in the future.

The World Health Organization has advised countries with a high prevalence of thalassemia to make national guidelines to manage and control the disease and WHO also advocated that focus be placed on public education to educate the public regarding this condition, detection of genetic risks in the community and premarital genetic counselling as thalassemia is an inherited genetic disease [11]. Thus, Malaysia established a programme called the National Thalassemia Prevention and Control Programme in 2004 which has outlined that one of the main activities is health education and promotion. A guideline on the programme was published in 2009 and the government currently has voluntary screening for all citizens who want to be screened and has developed prenatal diagnostic services and protocol to thoroughly investigate the family of an index case. According to Wong L.P [4], it has been reported that community health education and several outreach programmes have helped in controlling the prevalence of the disease and can reduce its health consequences.

Premarital screening can prevent the birth of beta thalassemia major. For now, several studies conducted in Malaysia among premarital couples are positive regarding screening promotions [4]. Premarital screening is the most advantageous, cost-effective, and ethically acceptable in several countries that make premarital screening a standard practice like Greece, Cyprus, and Iran. however, in Malaysia, there is no premarital screening for thalassemia but there is HIV despite the high prevalence of thalassemia compared to HIV [11].

A study was conducted to assess the level of knowledge and attitude regarding Thalassemia among the community in Alor Setar, Kedah, Malaysia.

METHODOLOGY

This study gathered data from 280 participants, consisting of 193 girls and 87 males ranging in age from 18 to 80 years. A cross-sectional study was undertaken in the community of Alor Setar using a convenience sampling method. The questionnaire is distributed via social media platforms and through in-person interviews. In conjunction with this sampling technique, participants are selected for the study based on their attendance at convenient times and places, which enables rapid, effective, and efficient data gathering from a significant number of individuals. The questionnaire is categorized into three sections; Section A pertains to social demographics; Section B concerns the level of knowledge regarding Thalassemia within the community of Alor Setar; and Section C investigates the attitude of the population of Alor Setar towards Thalassemia. In order to maintain anonymity, personal respondent information like complete name, identifying data number, and actual address is not documented. Respondents are obliged to provide a single response and are reliant on the Google form via their Google account. The research was carried out between November 8th and November 30th, 2023. The Google form questionnaire was disseminated electronically through social media platforms, specifically Facebook and WhatsApp groups associated with the Alor Setar community. We distribute the QR code and link to the questionnaire to multiple WhatsApp groups within the Alor Setar community, as each group is limited to a maximum of 1024 members. Physical copies of the questionnaire were distributed to members of the community in Hospital Sultanah Bahiyyah, Klinik Bandar Alor Setar, Pusat Kesihatan Daerah Alor Setar, Aman Central, Souq TF Mart, and Pekan Rabu, in addition to conducting in-person interviews.

The gathered data were refined and subjected to analysis utilising IBM Statistical package for Social Studies (SPSS) version 29 software. The difference between the degree of knowledge and attitude toward thalassemia in the community of Alor Setar was determined using the One-Way ANOVA test, whereas the association between two factors was examined using the Chi-Square test. The assessment of knowledge and attitude towards thalassemia is determined through the multiplication of the total number of questions and the maximum score obtained for each response, as illustrated in Table 1.

RESULTS

Demographic data were tabulated in Table 2. As shown in Table 3, 79 (28.2%) of respondents possess a moderate level of understanding of thalassemia. In contrast, 201(71.8%) are with good knowledge, consisting of 52 respondents from the B40, 50 from the M40, 28 from the T20, and 71 from the non-working respondents. One-way ANOVA test revealed a statistically significant difference ($p<0.05$) in the level of knowledge pertaining to thalassemia across the various groups of respondents based on their financial status. The post hoc analysis reveals that the distinction

Table 1: The scoring for the level of knowledge and attitude regarding Thalassemia among the community in Kota Setar District

Score	Poor	Moderate	Good
Knowledge (15 questions x 5 marks)	1 – 25	25 – 50	51 – 75
Attitude (13 questions x 5 marks)	1 – 22	23 – 44	45 – 65

Table 2: Demographic characteristics of study population regarding Thalassemia among the community in Alor Setar

	Qualitative Variables	Frequency (%)
1.	Age	
	18 - 25	124 (44.3)
	26 - 35	24 (8.6)
	36 - 45	45 (16.1)
	46 - 55	74 (26.4)
	56 - 65	9 (3.2)
	>65	4 (1.4)
2.	Gender	
	Male	87 (31.1)
	Female	193 (68.9)
3.	Ethnicity	
	Malay	261 (93.2)
	Chinese	8 (2.9)
	Indian	8 (2.9)
	Others	3 (1.1)
4.	Religion	
	Islam	265 (94.6)
	Christian	4 (1.4)
	Hindu	6 (2.1)
	Buddha	5 (1.8)
5.	Level of Education	
	Primary school	3 (1.1)
	SPM	28 (8.6)
	Foundation / Matriculation	22 (7.9)
	Diploma	97 (34.6)
	Bachelor's degree	112 (40.0)
	Master	16 (5.7)
	PhD	2 (7.0)
6.	Marital Status	
	Single	139 (49.6)
	Married	135 (48.2)
	Divorced / separated / widowed	6 (2.1)
7.	Financial status	
	B40	85 (30.4)
	M40	60 (21.4)
	T20	36 (12.9)
	Not working	99 (35.4)
8.	Place of Residence	
	Rural	62 (22.1)
	Urban	218 (77.9)
9.	Thalassemia Status in Family	
	Yes	31 (11.1)
	No	249 (88.9)

Table 3: The level of knowledge regarding Thalassemia among the community in Alor Setar according to respondents' financial status (n=280)

		Poor	Moderate	Good	Total
Financial Status	B40	0	33	52	85
	M40	0	10	50	60
	T20	0	8	28	36
	Not working	0	28	71	99
	Total	0	79 (28.2%)	201(71.8%)	280

between the B40 and T20 groups is statistically significant ($p < 0.05$).

Table 4 demonstrates that among respondents with thalassemia-afflicted family members, just three possess a moderate level of knowledge of the disease, whereas 28 respondents have good knowledge. Among the participants who do not have any family members affected by thalassemia, 76 possess a moderate degree of knowledge pertaining to the disease, whereas 173 demonstrate a high level of knowledge regarding thalassemia. A statistically significant difference in knowledge of thalassemia was found between respondents with and without thalassemia-afflicted family members as determined by a one-way ANOVA test ($p < 0.05$).

Table 5 demonstrates that among respondents residing in rural areas, 21 possess a moderate level of knowledge concerning Thalassemia, whereas 41 exhibit good knowledge in this regard. A total of 160 respondents in rural areas possess good knowledge, whereas 79 respondents have a moderate level of knowledge. A significant association was seen between the residential location of the respondents and their knowledge of thalassemia in Alor Setar, as indicated by a Chi-square test ($p<0.05$). There is no significant difference in knowledge regarding thalassemia between the age group, gender, ethnicity, religion, level of education, marital status, and place of living of the respondents. In addition, there is no significant relationship between knowledge regarding thalassemia with the age group, gender, ethnicity, religion, level of education, marital status, financial status, and family history of thalassemia ($p>0.05$).

According to the data shown in Table 6, 65 male respondents hold a positive attitude towards thalassemia, while the remaining 22 hold a moderate attitude. A total of 176 female participants possessed a positive attitude, whereas an additional 17 expressed a moderate attitude. The results of the one-way ANOVA test indicate that there is a statistically significant difference in gender-specific attitudes toward thalassemia ($p < 0.05$).

According to Table 7, individuals holding bachelor's degrees exhibit the most favourable attitude towards thalassemia (35.4 %) with certificate holders following suit (30.7 %). A mere 5.7 % of responders holding a master's degree have a positive attitude towards thalassemia, whereas only two PhD candidates do. The results of the one-way ANOVA test indicate that there is a statistically significant difference in the attitudes of the respondents about thalassemia based on their degree of education ($p < 0.05$). The results of the

Table 4: The level of knowledge regarding Thalassemia among respondents with or without family members of Thalassemia in Alor Setar (n=280)

		Poor	Moderate	Good	Total
Family Members of Thalassemia	Yes	0	3	28	31
	No	0	76	173	249
	Total	0	79	201	280

Table 5: The level of knowledge regarding Thalassemia among the community in Alor Setar according to place of living (n=280)

		Poor	Moderate	Good	Total
Place of Living	Rural	0	21	41	62
	Urban	0	58	160	218
	Total	0	79	201	280

Table 6: The attitude regarding Thalassemia according to gender among the respondents in Alor Setar

		Poor	Moderate	Good	Total
Gender	Male	0	22	65	87
	Female	0	17	176	193
	Total	0	39	241	280

Table 7: The attitude regarding thalassemia according to the level of education among the respondents in Alor Setar (n=280)

Level of education		Poor	Moderate	Good	Total
	Primary school	0	0	3	3
	SPM	0	12	16	28
	Foundation/ Matriculation	0	3	19	22
	Diploma	0	11	86 (30.7%)	97
	Bachelor's Degree	0	13	99 (35.4%)	112
	Master	0	0	16 (5.7%)	16
	PhD	0	0	2	2
	Total	0	39	241	280

Table 8: The level of attitude among respondents with or without family members of Thalassemia in Alor Setar (n=280)

		Poor	Moderate	Good	Total
Family History of Thalassemia	Yes	0	1	30 (10.7%)	31
	No	0	38	211 (75.3%)	249
	Total	0	39	241	280

post hoc analysis indicate that there is a statistically significant difference in attitude between the foundation level and the SPM level ($p<0.05$).

Table 8 reveals that only 10.7% of those with a family history of thalassemia have a positive attitude about the disease as compared with those without a family history of thalassemia (75.3%). The results of the one-way ANOVA test indicate that there is a statistically significant difference in attitudes between respondents with and without a family history of thalassemia towards the disease ($p < 0.05$). There is no significant difference in attitude regarding thalassemia between the age group, ethnicity, religion, marital status, financial status and place of living of the respondents. In addition, there is no significant relationship between attitude regarding thalassemia with the age group, gender, ethnicity, religion, level of education, marital status, financial status, place of living and family history of thalassemia ($p>0.05$).

DISCUSSIONS

Thalassemia is a common preventable haemolytic disease that is a common public health problem in Malaysia, and this places a great burden on the patient and the healthcare system in Malaysia. It is important to assess the level of knowledge and attitude towards thalassemia in order to know if the health education and promotion efforts by the Ministry of Health reach the public effectively.

In this study, a total of 280 participants responded to the questionnaires. Most of the participants who responded are Malay (93%) which is then followed by other ethnicities thus, the study is unable to analyse if there are any disparities across the ethnic groups in the aspect of knowledge and attitude. The majority of the respondents know that thalassemia is a hereditary disease (86%) and a person (85%). Most of them also know there are two types of thalassemia which are thalassemia alpha and beta (61%). Almost all of the respondents (96%) know that a blood test is a screening for thalassemia, however, there are some of the respondents who thought that imaging tests and urine tests can also determine if a person has thalassemia. 63% of the respondents were aware that thalassemia cannot be treated with antibiotics. There are mixed reactions toward the question of whether thalassemia can be treated and fully cured as 38% of the respondents disagree with the statement, 35% of them agree with the statement, and 27% of them were unsure of this. This shows that the public knows about the general knowledge about thalassemia but is unaware about the prognosis of the thalassemia and this knowledge is important for

the public to know as this could create unnecessary anxiety among the public about the disease.

In this study, people are aware about the symptoms of thalassemia as 60% of the respondents aware of the symptoms of thalassemia carrier however, when asked about the lifespan of the thalassemia carrier is shortened 30% of the respondents were unsure while 33% of the respondents agreed with the statements. They also wrongly believed or were unsure that children born to couples where either parent is a thalassemia carrier are at risk of having thalassemia major (74%). Understanding the difference between thalassemia major and thalassemia carrier state may be difficult for the public particularly for individuals with lower economic status as they have significant differences between the knowledge and the financial status of the respondent. Most of the respondents were aware of thalassemia major and how these individuals require regular blood transfusions throughout life (61%) however, half of the respondents (52%) falsely believed or were unsure that thalassemia major individuals are mentally handicapped hence this shows that the knowledge of thalassemia regarding the management of the disease satisfactory but there is some misconception that may be going around the public.

The result of this study showed that the knowledge of thalassemia among the community in Alor Setar is associated with financial status and family members with thalassemia. There is a significant difference between the B40 group and the T20 group which may suggest that awareness of thalassemia was higher in high-income categories which can be due to T20 groups who may have professional occupations as it corresponds to having higher education levels and having better access to sources of knowledge. However, more than half of the B40 respondents have a good knowledge regarding thalassemia. It is proven in this study that respondents who have family members with thalassemia have more knowledge regarding thalassemia.

In relation to the level of knowledge on thalassemia varies among Malaysians, C.R. Vasudeva et al. (2015) study among the community of Shah Alam, comparatively, 72.8 percent of non-medical students were unaware that thalassemia was linked to a decrease in red blood cells, whereas 65.7% of medical students were aware of this connection. While 82.7 percent of non-medical students were unaware that thalassemia is linked to low iron levels, 78.5 percent of medical students were aware of this connection. The prevalence of thalassemia among Malaysians was unknown to about 35 percent of medical students and 64.1% of non-medical students. According to the study, medical students are more knowledgeable**.**

Respondents were asked about their attitude towards thalassemia and 86.1% of the respondents showed a good attitude towards thalassemia while 13.9% of the respondents showed a moderate level of attitude regarding thalassemia Majority of the respondents agreed that the thalassemia screening program for form 4 student is required (73%) and for premarital thalassemia screening (82%). This reflects the positive attitude of the community in Alor Setar towards thalassemia screening In this study, 60% of the respondents agreed that individuals who are carriers of thalassemia should avoid marrying other carriers whereas the studies conducted in Kelantan, 31.7% of the respondents agreed that thalassemia carriers should not married each other. The majority of the respondents did not agree with the termination of pregnancy with thalassemia regardless of type (56%) while only a few (9%) agreed whereas others were unsure. These findings may imply that most of our respondents are practicing Islam hence they were not accepting pregnancy termination even though Islamic regulations allow termination of pregnancy for thalassemia major cases before 120 days of gestation based on National Malaysian Fatwa.

STUDY LIMITATION AND RECOMMENDATIONS

In the course of conducting this research study, several limitations emerged, impacting the accuracy of the investigation. One significant limitation was the time constraint. This study took place within a brief 6 weeks which allowed only 2 weeks for data collection. This constraint impacted the depth of our findings. Participants may not have had enough time to respond thoroughly and at the same time, we were not able to collect an adequate amount of sample size. As a result, it impacts the quality and accuracy of our study.

Moreover, we encountered issues related to limited sample representativeness. Despite targeting 300 respondents, certain groups within the Alor Setar were underrepresented or excluded, leading to potential biases in the findings. Notably, ethnic disparities were observed, with Malay ethnicity significantly dominating other ethnic groups. Additionally, there was an age bias as older individuals with limited technological access might have been excluded. These discrepancies compromised the diversity of perspectives and potentially skewed the outcomes.

Lastly, a social bias was evident in the study regarding the exposure to Thalassemia based on educational levels. Those with higher education are more likely exposed and familiar with the topic, whereas individuals with lower levels of education showed minimal to no exposure. This imbalance created an inherent bias in assessing knowledge and attitudes towards Thalassemia, as one group lacked adequate information, impacting the fairness of the assessment.

In response to these limitations, several recommendations could improve future research endeavours. One recommendation is extending the data collection period. Allowing participants more time to consider and respond thoughtfully would likely enhance the quality of responses. Additionally, widening the pool of respondents by extending the data collection duration would yield a more

comprehensive dataset. Furthermore, using diverse sampling techniques becomes crucial. Techniques like systematic sampling, stratified sampling, or snowball sampling could help reach underrepresented groups within Kota Setar, ensuring a more inclusive and diverse representation in future studies. Additionally, educational programmes aimed at increasing awareness about Thalassemia among less-informed demographics within Kota Setar allow equal exposure to information regarding Thalassemia and would contribute to a more accurate research result.

Implementing these recommendations would address the identified limitations, enhancing the depth, representativeness, and accuracy of future research studies on Thalassemia within the Kota Setar community.

CONCLUSION

The study showed positive results regarding Thalassemia knowledge and attitude. With 280 respondents in Kota Setar, the findings revealed that 98.6% of individuals have high knowledge and 86.1% have positive attitudes towards Thalassemia. There is also a significant relationship between attitude towards Thalassemia and the place of living, highlighting the impact of locality on attitudes towards the condition.

Improvement can be made for future research studies by extending the data collection period, employing diverse sampling techniques, enhancing inclusivity and reaching underrepresented groups within Kota Setar. Furthermore, implementing educational programs targeted at less-informed demographics would ensure equal exposure to Thalassemia information.

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Case Report

RISPERIDONE-INDUCED DIABETES INSIPIDUS IN SCHIZOPHRENIA

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ABSTRACT

Miss M, a 46-year-old Malay woman diagnosed with Schizophrenia, exhibited complex psychiatric symptoms, including persecutory delusions and auditory hallucinations. A recent switch to risperidone resulted in distressing symptoms, including polyuria and polydipsia, raising concerns about possible Risperidone-induced Diabetes Insipidus. Laboratory findings indicated electrolyte imbalances, prompting referral to an Endocrinologist for further investigation. Mrs. M's case highlights the need for comprehensive assessments in patients experiencing adverse effects related to Risperidone.. These include gradual dose reduction or discontinuation of Risperidone, monitoring of hydration and electrolyte balance. Psychoeducation on potential adverse effects is essential to detect early adverse events.

INTRODUCTION

Risperidone, a second-generation antipsychotic medication widely prescribed for conditions such as Schizophrenia and Bipolar disorder, has demonstrated efficacy in managing psychiatric symptoms. However, its use has been associated with various side effects, one of which is the development of diabetes insipidus. Diabetes Insipidus is a rare but noteworthy adverse event characterized by excessive thirst and polyuria, stemming from the impaired regulation of water balance in the body. While the precise mechanisms through which Risperidone induces Diabetes Insipidus remain under investigation, emerging evidence suggests a connection between the drug and disruptions in antidiuretic hormone function. This article aims to provide an overview of the potential link between Risperidone use and the development of Diabetes Insipidus, exploring the current understanding of its pathophysiology and implications for clinical practice.

CASE PRESENTATION

Miss M, a 46-year-old Malay woman residing in Yan, Kedah was diagnosed with Schizophrenia when she was 18. Miss M presents with a complex psychiatric condition characterized by persecutory delusions, specifically involving a belief that she possesses sensitive information about the Malaysian government. In addition to the delusions, the patient reports experiencing auditory hallucinations, including whispers and voices that reinforce her paranoid beliefs. This combination of symptoms has significantly impacted her daily functioning, leading to heightened anxiety, social withdrawal, and distorted perceptions of reality.

Miss M's belief in a government conspiracy has intensified due to the auditory hallucinations, further fuelling her fears of being monitored and targeted by government agents. The patient describes the voices as accusatory and threatening, contributing to her overall distress. Ms M reports persistent feelings of being surveilled and targeted by government agents, whom she believes are monitoring her every move. She describes experiencing intense fear and suspicion towards strangers, convinced that they are part of a plot to harm her due to her knowledge. The patient has altered her daily routines and habits to avoid perceived threats.

Miss M is the eldest of four siblings, living with her mother in a single terrace house in Yan, Kedah and her father has passed away due to old age. There is no notable family history of medical or psychiatric conditions. Considering the family dynamics and support system becomes crucial in addressing Miss M's overall well-being. Currently single and not employed, Miss M maintains independence in activities of daily living but requires supervision from her mother.

For her current complaint, she underwent a

psychiatric admission from 30 October 2023 to 9 November 2023 at Hospital Alor Star due to reporting symptoms of neglecting personal hygiene, insomnia, nocturnal wandering, and causing distress to her mother. Before admission, the patient was prescribed intramuscular Fluanxol (flupentixol) 40 mg, oral olanzapine 20 mg once nightly, oral Artane (trihexyphenidyl) 2 mg once daily in the morning, and clonazepam 0.5 mg. On her discharge, the doctors changed the antipsychotics from Olanzapine 20 mg once nightly to Risperidone 2 mg once morning and 4 mg once at night. The patient was then given a follow-up on 15 November 2023.

Miss M attended the Psychiatric clinic follow-up on 15 November 2023 and suddenly presented with distressing symptoms including akathisia, polyuria, polydipsia, extreme thirst, and increased urine frequency. Miss M however, denies any dysuria, hallucinations, delusions, or nocturnal wandering. Her living conditions are stable, with reliable access to utilities, and there are no apparent significant social stressors.

Laboratory examination results reveal a sodium level of 124 and potassium of 3, indicating electrolyte imbalances. CT brain was uneventful. Full blood count, urinalysis, and capillary blood glucose were normal. Serum osmolality was 356 mmol/kg. These results might indicate possible Diabetes Insipidus. Thus, the patient was then referred to an endocrinologist for further investigations.

The clinical presentation and temporal relationship between Miss M's recent switch to risperidone and the onset of symptoms raise concerns about possible Risperidone-induced Diabetes Insipidus. Comprehensive investigations are crucial for a more thorough understanding. The combination of Miss M's recent medication change to risperidone and the onset of polyuria, polydipsia, and extreme thirst permits a thorough investigation into the possibility of Risperidone-induced Diabetes Insipidus.

DISCUSSIONS

Risperidone, an atypical antipsychotic widely used in the treatment of various psychiatric disorders, has been associated with several metabolic side effects, including the rare occurrence of Diabetes Insipidus [1]. Understanding and addressing this potential complication is crucial for clinicians managing patients on Risperidone therapy.

Risperidone exerts its antipsychotic effects primarily through dopamine and serotonin receptor blockade. However, its impact on metabolic parameters has raised concerns. Diabetes Insipidus is thought to be related to the drug's antagonistic effect on vasopressin receptors, specifically the V2 receptors in the renal collecting ducts. This interference can lead to impaired water reabsorption, resulting in the characteristic symptoms of polyuria and polydipsia.

In Miss M's case, the temporal relationship between her recent switch to risperidone and the onset of polyuria, polydipsia, and extreme thirst raises suspicions of Risperidone-induced Diabetes Insipidus. Clinicians should be vigilant for such symptoms, especially following changes in antipsychotic medications, to promptly identify and address potential adverse effects.

Laboratory examination revealing electrolyte imbalances, such as low sodium and potassium levels, alongside elevated serum osmolality, supports the suspicion of diabetes insipidus. However, it's essential to rule out other potential causes, and collaboration with an endocrinologist is crucial for a comprehensive evaluation.

In Risperidone-induced Diabetes Insipidus, management strategies may involve discontinuation or dose reduction of Risperidone and consideration of alternative antipsychotic medications with a lower risk of metabolic side effects. Hydration and electrolyte balance should be closely monitored during this transition.

The occurrence of Diabetes Insipidus should be weighed against the overall benefits of Risperidone in managing psychiatric symptoms. Clinicians must perform a careful risk-benefit analysis, considering the patient's psychiatric condition, treatment response, and potential alternative medications. Alternative medication like Olanzapine in large doses has been shown to cause transient Diabetes Insipidus [2].

Patients on Risperidone therapy should be educated about the potential side effects, including Diabetes Insipidus, and instructed to report any unusual symptoms promptly. Regular monitoring of metabolic parameters, including serum sodium and osmolality, is essential during treatment.

CONCLUSION

Risperidone-induced diabetes insipidus is a rare but important consideration in the management of psychiatric patients. Clinicians should maintain a high index of suspicion for this adverse effect, especially in the context of new-onset polyuria and polydipsia. Collaborative care involving psychiatrists and endocrinologists is essential for accurate diagnosis, appropriate management, and ensuring the patient's overall well-being. This discussion emphasizes the need for ongoing research and caution in monitoring the metabolic effects of antipsychotic medications to improve patient outcomes.

CONFLICTS OF INTEREST

No conflicts of interest.

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Original Article

SCREENING ON THE IMPACT OF COVID-19 ON THE MENTAL WELLBEING OF STUDENTS AND STAFF AT UNISHAMS, KEDAH

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ABSTRACT

The study determines the level of anxiety, depression and stress among students and staff of UniSHAMS during COVID-19. It is based on their mental wellbeing during COVID-19 and distress that affect people based on few events. The study design is cross sectional, analytical study and prospective descriptive. The respondents are anonymous but focusing on age group, gender as well as education level only. For inclusion, respondents from UniSHAMS and for exclusion, respondents from non-Malaysian studying at UniSHAMS. The questionnaire's developed with the help of expert and Cronbach's Alpha (.898). Results have revealed that there is significant relationship between depression and gender (1, N = 383) = 21.127, p = .000. Besides that, there is significant relationship between depression level and age group (4, N = 383) = 32.068, p = .000. Next, there is significant relationship between anxiety level and gender (1, N = 383) = 9.558, p = .002. There is also a significant relationship between anxiety level and age group (4, N = 383) = 29.026, p = .000. For stress level, there is a significant relationship between stress level and gender (1, N = 383) = 8.941, p = .003. Finally, there is a significant relationship between stress level and age group (4, N = 383) = 48.473, p = .000. This clearly showed that students and staff of UniSHAMS are having some issues with their mental wellbeing during COVID-19, thus screening and preventive measures should be taken to help defeat these. Generally, students and staff of UniSHAMS have poor mental wellbeing and a collaborative effort between authorities/the government and other stakeholders is necessary to effectively provide help to these groups.

INTRODUCTION

Malaysia's mental health landscape is concerning, with nearly 30% of adults experiencing some form of mental health problem. Factors like workplace stress and student mental health contribute to this trend. The government and healthcare professionals are working towards improving access to care and reducing stigma. Openly discussing mental health challenges can break down stigma and encourage individuals to seek help. Building a supportive network and providing access to resources can empower individuals to manage their mental health. Creating a culture of understanding and acceptance is essential for promoting mental well-being for all. Untreated mental disorders can significantly affect quality of life and overall wellbeing, contributing to a substantial burden of disability and health loss in Malaysia.

The rise in mental illness calls for immediate attention and comprehensive action to support individuals and communities. Investing in mental healthcare is crucial for building a healthier and more resilient society where everyone can thrive. Statistics show that mental health has emerged as a major public health issue in Malaysia, impacting nearly one in three adults within the last five years. A Ministry of Health report highlights the concerning rise of mental health risks, affecting roughly one-third of Malaysian adults over the past five years [1]. Mental health conditions are projected to significantly impact public health in the coming years, comparable to the burden of heart disease. The prevalence of mental health challenges is expected to continue rising, demanding proactive measures to ensure comprehensive healthcare and support [2]. Data from the 2015 National Health and Morbidity Survey in Malaysia revealed that conditions like depression, anxiety, and stress are common experiences, emphasizing the need for accessible mental health support [3].

Data suggests that mental health concerns are rising in Malaysia, affecting nearly 30% of adults aged 16 and above. Investing in workplace mental health initiatives is critical, as data shows a growing connection between working conditions and mental well-being, according to the Health Ministry. Student

mental health is another growing concern, with research indicating a consistent increase in challenges faced by young people [4-5]. The past ten years have seen a rise in the awareness and understanding of mental health challenges in Malaysia [6]. This study mainly focus on screening the depression, stress and anxiety level among students and staff of Universiti Islam Antarabangsa Sultan Abdul Halim Mua'dzam Shah (UniSHAMS), Kedah.

METHODOLOGY

For inclusion, the study have included respondents from UniSHAMS aged 18 years old and above. Study have excluded respondents who are non-Malaysians studying in UniSHAMS, Kedah. Questionnaires are developed with the help of an expert in Psychiatry and used Cronbach's Alpha (.898) to test for reliability and validity of the questions used. The questionnaire has been randomly spread and each respondents will remain anonymous. The data mostly focused on their age group, gender, staff or student and education level. The sample size has been calculated by using formulas and Raosoft® sample size calculator. The sample size is 383 and the responses that have been recorded are divided into groups for further analyses.

RESULT

The result has been analyzed using IBM SPSS V27 and the frequency for each variable is noted as such socio-demographic characteristics i.e. age group, gender, highest education, staff or students of UniSHAMS as well as the distribution of the mental health status of the sample for each socio-demographic characteristic.

Results have revealed that there is a significant relationship between depression and gender (1, N = 383) = 21.127, p = .000. This shows female participants (72.1%) are more likely to have abnormal mental wellbeing in comparison to male (27.9%). Besides that, there is a significant relationship between depression level and age group (4, N = 383) = 32.068, p = .000. The age group between 18-25 is more likely to have abnormal depression level (78.8%) in comparison to other age groups.

Next, there is a significant relationship between anxiety level and gender (1, N = 383) = 9.558, p = .002. Females are more likely to have abnormal anxiety level (69.8%) in comparison to male (30.2%). There is also a significant relationship between anxiety level and age group (4, N = 383) = 29.026, p = .000. The age group between 18-25 is more likely to have abnormal anxiety level (77.9%) in comparison to other age groups. For stress level, there is a significant relationship between stress level and gender (1, N = 383) = 8.941, p = .003. Females are more likely to have abnormal stress level (71.2%) in comparison to male (28.8%). Finally, there is a significant relationship between stress level and age group (4, N = 383) = 48.473, p = .000 as age group between 18-25 is more likely to have abnormal anxiety level (80.4%) in comparison to other age groups.

DISCUSSION

This study aims to identify the mental health issues among students and staff of UniSHAMS during COVID-19. Thus, it mainly targets all UniSHAMS residents including staff and students. The study findings reveal that students and staff of UniSHAMS are facing some mental health issues during the COVID-19 pandemic. The result has assessed them based on their stress, anxiety, and depression level.

Generally, students and staff of UniSHAMS were experiencing some mental health issues in all three aspects i.e. depression, anxiety, and stress, but students tend to have the worst result in all those aspects while staff review a better result in those aspects. For example, in depression, only 27.84% of the staff has a severe level of depression, 38.14% have a normal level of depression, 11.34% have a mild level of depression while 22.68 % of them have a moderate level of depression. In contrast, more than half of students are 68.53% facing a severe level of depression, 11.89% reportedly do not have depression, the other 6.99% and 12.59% of students experienced a mild and moderate level of depression respectively. For anxiety, most staff have a severe level of anxiety with about 41.24% of them while normal, mild, and moderate groups are about the same with 30.93%, 15.46%, and 12.37% respectively. Despite the percentage of staff, having a severe level of anxiety is quite high, the percentage of students facing them can't be ignore too as 77.27% of them are struggling with a severe level of anxiety. While the normal, mild, and moderate groups are almost the same with 7.69%, 6.99%, and 8.04% respectively. Lastly for stress, merely half of the staff has a normal level of stress with 49.48 % of them while mild, moderate, and severe groups are about the same with 14.43%, 24.74%, and 11.34% respectively. Unfortunately, the number of students having severe levels of stress contradicts with the number of staff having severe levels of stress which is about 46.85% but for normal, mild, and moderate are about the same with 18.88%, 7.69%, is and 26.57% respectively.

CONCLUSION

In conclusion, there are ways for prevention to be taken as such exercise regularly, study as well as practice relaxation techniques and keep healthy relationship with others. Some other recommendation is to measure the mental health wellbeing among students and staff in a better platform such as collecting data using the official DASS questionnaire which will include more factors that will contribute to data accuracy hence, a better preventive measure can be taken. Most importantly, the need for further and larger trials to obtain an accurate conclusion is critical as larger sample sizes are needed to obtain reliable results that can be compared to smaller studies like this. Based on the results obtained, the data may have a bias and limitation that cause the data to show students in UniSHAMS are more prone to have abnormal mental health as compared to the staff.

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Case Report

MULTILEVEL LUMBAR SPONDYLOSIS WITH SPINAL STENOSIS

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ABSTRACT

Narrowing of the spinal canal or foramina is a common finding in spine imaging of the elderly. We present a case of multilevel lumbar spondylosis with spinal stenosis. Mr X, 79-year-old male with underlying Diabetes Mellitus, hypertension and minor coronary artery disease presented to the hospital with low back pain radiating to lower limb for 4 years, progressively worsening, affecting the ability to walk steadily for prolonged period, and the worst pain score is 9/10, and the least pain score is 4/10. It was associated with intermittent neuropathic symptoms like numbness from waist downwards, nocturnal claudication, and weakness. Otherwise, he had no fever, no vomiting, no headache, no chest and abdominal pain, no respiratory distress, palpitations, and no urinary incontinence. Management includes continue insulin as patient has diabetes mellitus, nonsteroidal anti-inflammatory drugs (NSAIDs), antidepressants, anti-seizure drugs, opioids, and start physical therapy. Most patients have a progressive presentation and are offered non operative management as first treatment strategy.

INTRODUCTION

Spinal stenosis is one of the most common neurosurgical diseases and a leading cause of pain and walking disability [1]. In elderly, with lumbar stenosis afflicting 103 million people worldwide generally [2]. Epidemiological data showed an incidence of 1 case per 100 000 for cervical spine stenosis and 5 cases per 100 000 for lumbar spine stenosis [1]. Symptomatic spinal narrowing can be congenital, or, more frequently, acquired. Acquired spinal narrowing may be the result of systemic illnesses, such as endocrinopathies (example Cushing disease or acromegaly), calcium metabolism disorders (including hyporarthyroidism and Paget disease), inflammatory diseases (such as rheumathoid arthritis) and infectious diseases. Physical examination is more often abnormal in cervical spondylotic myeloptahy whereas in lumbar spinal stenosis it is typically normal. Therefore, spinal stenosis diagnosis relies on the clinical picture corresponding to conspicuous causative changes identified by imaging techniques, most importantly CT and MRI.

CASE PRESENTATION

Patient experience long standing radicular low back pain which affecting his both lower limb especially the right lower limb. It is progressively worsening, affecting his ability to walk steadily for prolonged period. For pain score, the worst pain is 9/10, and the least pain is 4/10. It was associated with intermittent neuropathic symptoms like numbness from waist downwards, nocturnal claudication, and weakness. The pain aggravated by prolonged posture and activities, and patient will rest in supine position to relieve it. In 2018, he done spine MRI due to the same problem, and found there is lumbar stenosis with ligamentum flavum thickening at L4/L5. Otherwise, he had no fever, no vomiting, no headache, no chest and abdominal pain, no respiratory distress, palpitations, and no urinary incontinence.

He had no chest pain, palpitations, ankle swelling, paroxysmal nocturnal dyspnoea (PND), orthopnoea and reduced effort tolerance. He also had no cough, haemoptysis and shortness of breath. For gastrointestinal, he had no dysphagia and rectal bleeding. He had no problem with urinary system such as urinary urgency, incontinence, increased urinary frequency, haematuria and dysuria. He had no joint pain, muscle pain and problem during walking.

He has Diabetes Mellitus, hypertension and minor coronary artery disease. Currently is on Gabapentin 600mg AM and 900mg ON. He is compliant to his medications. Furthermore, patient know type of drug, dosage and indication of medication prescribed. He underwent surgery (TURP) and radiotherapy in 2004 for CA prostate. Currently in

remission. He has allergy to erythromycin and penicillin based drug (developed itching). Otherwise no allergies on seafood or other food. There is no family history of malignancy or similar medical illness. He is non-smoker, not a drug abuser and does not drink alcohol.

His blood pressure (BP) is 142/71 mmHg, pulse rate 92 beats per minute, regular rhythm, and good volume, SpO2 99% under room air and afebrile with temperature 36.9 ˚C. For neurological examination, patient is alert and conscious. There is numbness from waist downwards. Power, tone, and reflexes are normal on upper and lower limbs bilaterally.

MRI Lumbosacral Spine findings were normal vertebral bodies heights and marrow signal intensity. There was a loss of normal signal intensity involving L2/L3 till L5/ S1 intervertebral discs. Disc space is still maintained. Posterior disc bulge involving L4/L5 intervertebral disc. There was no fracture noted, posterior elements and facet joints are intact. Spinal cord ends at L1 level. No abnormal cord signal intensity (Figure 1).

Specifically at level L1/L2 – L4/L5: Mild circumferential disc bulge (level L1/L2 – L3/L4). Diffuse circumferential disc bulge with central protrusion compressing the spinal canal (L4/L5). Spinal canal is completely obliterated. Both lateral recesses and neural formina are also completely obliterated. Bilateral traversing nerve roots are compressed. Bilateral exiting nerve roots escape well. Bilateral ligamentum flavum hypertrophy. No facet joint arthropathy. All findings suggest multilevel lumbar spondylosis with spinal stenosis.

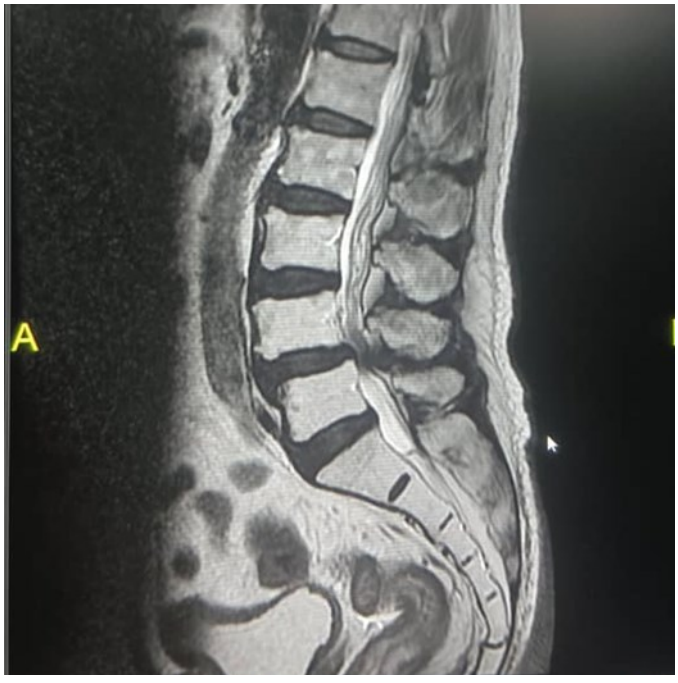

Figure 1: MRI Spine - Sagital T2 Lumbar Sacral: L1/ L2 - L4/ L5 : circumferential disc bulge

DISCUSSION

Spinal stenosis is a condition where spaces between the vertebrae is narrow. The compression of these spaces puts pressure on the spine and nerves, resulting in numbness, weakness, and pain in the neck, arms, and legs [3]. While the definition for spondylosis is spine osteoarthritis. The degeneration of the bones in the spinal region is referred to as spondylosis. It can affect any part of the spine, including the cervical-neck, thoracic-mid back, and lumbar-lower back. Despite the fact that it can be excruciatingly painful and worsens with age, most people with spondylosis do not require spinal surgery.

While the two conditions are caused by different factors, the one factor that links both conditions is the cause. Age and genetics are important factors in the development of bone degeneration. And spondylosis is a type of spine arthritis. Arthritis can affect any part of the body, but the spine is the most frequently affected. Osteoarthritis is one of the most common causes of spinal stenosis. However, other potential causes of spinal stenosis include accident, fall, wear and tear of the bones and joints in the spine.

Magnetic resonance imaging is the preferred modality for evaluating stenosis and disc pathology. MRI has numerous advantages, including the fact that it is non-invasive, does not use ionising radiation, has high sensitivity in diagnosing stenosis, has high soft tissue contrast, and best depicts cord, nerve roots, and bone marrow abnormalities [4]. Sagittal T1-weighted, T2-weighted, STIR, and proton density-weighted MRI sequences, as well as axial T1- and T2-weighted sequences, may be used in the lumbar spine. Furthermore, contrast enhanced MRI may be required for indications such as infection, tumour, and post-operative evaluation. It is important to note that the T2-weighted GRE sequence, which is commonly used in cervical spine imaging, may overestimate stenosis and should be correlated with other sequences. MRI was performed on a patient who had a history and physical examination findings consistent with degenerative lumbar spinal stenosis. In this patient, who had a history and physical exam findings consistent with degenerative lumbar spinal stenosis, MRI is recommended as the most appropriate, non-invasive test to confirm the presence of anatomic spinal canal narrowing or nerve root impingement.

Management includes continue insulin as patient has diabetes mellitus, nonsteroidal anti-inflammatory drugs (NSAIDs), antidepressants, anti-seizure drugs, opioids, and start physical therapy. Surgery is typically considered when all other treat-ment options have failed due to the complexity of spinal stenosis and the delicate nature of the spine.

Fortunately, surgery is not necessary for the majority of people with spinal stenosis. Treatment for symptomatic lumbar stenosis is usually surgical decompression. Medical treatment alternatives, such as bed rest, pain management and physical therapy, should be reserved for use in debilitated patients or patients whose surgical risk is prohibitive as a result of concomitant medical conditions [5,6].

CONCLUSION

Narrowing of the spinal canal or foramina is a common finding in spine imaging of the elderly. Only when symptoms of neurogenic claudication and/or cervical myelopathy are present is a spinal stenosis diagnosis made, either of the lumbar spine, cervical spine or both (only very rarely is the thoracic spine involved) [1]. Most patients have a progressive presentation and are offered non operative management as first treatment strategy. Surgery is indicated for progressive intolerable symptoms or, more rarely, for the neurologically catastrophic initial presentations. Surgical strategy consists mainly of decompression (depending on the anatomical level and type of narrowing: laminectomy, foraminotomy, discectomy, corporectomy) with additional instrumentation should spinal stability and sagittal balance be at risk.

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Case Report

BORDERLINE PERSONALITY DISORDER

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ABSTRACT

This case report describes a 24-year-old Malay female patient with a history of prolapsed intervertebral disc (PID) who presented with persistent low mood, self-harm ideation, and other depressive symptoms. These symptoms were triggered by a complicated and unstable relationship with her partner, who exhibited controlling and critical behavior. Following the termination of the relationship, the patient experienced profound emotional distress, leading to symptoms such as insomnia, appetite loss, panic attacks, self-harm, and auditory hallucinations. The patient also had a history of suicidal thoughts and postpartum depression. The mental status examination revealed no perceptual disturbances or cognitive impairments. A diagnosis of Major Depressive Disorder with Psychotic Features associated with an underlying Borderline Personality Disorder was made. Biological investigations showed no abnormalities, and treatment included medication (selective serotonin reuptake inhibitors, benzodiazepine, and antipsychotic) and supportive psychotherapy. The prognosis is variable but can be improved with prompt and thorough medical intervention, regular monitoring, and a strong support system .

INTRODUCTION

A personality disorder entails a maladaptive and inflexible pattern of thinking. BPD is characterizedby heightened sensitivity to rejection, leading to instability in interpersonal relationships, self-image, emotions, and behavior [1]. This disorder significantly impairs functioning, causing distress and is often linked to various medical and psychiatric coexisting conditions. Surveys indicate that approximately 1.6% of the general population and 20% of psychiatric inpatients may experience Borderline Personality Disorder [2].

The objective of this case report is (i) to discuss Borderline Personality Disorder, particularly how the rejection sensitivity linked to her symptoms, from a psychodynamic perspective and (ii) to describe types of intervention used in the management of Borderline Personality Disorder.

CASE PRESENTATION

A 24-year-old Malay female patient, with a pre-existing prolapsed intervertebral disc (PID), presented to the psychiatric clinic reporting a persistent low mood over the course of the past year. The patient's depressive state was accompanied by ideation of self-harm, self-reproach, internalised anger, feelings of guilt, and a profound sense of burden on others. All of these emotions originated during a time when her relationship with her partner was complicated and unstable.

Over the course of the past year, she has been experiencing recurrent emotional distress as a result of her boyfriend's demeanour, which has been characterized as exhibiting traits of control, criticism, and excessive demands. She remains and puts up with his behaviour because she feels sorry for him given his turbulent family and upbringing. After a year, she had expressed her emotional and psychological distress to her partner, but instead of offering an apology, the partner stated that he was unable to tolerate her and subsequently ended the relationship.

She experienced profound emotional distress following the termination of her love life, as it appears that this particular partner was the sole individual with whom she opened up about her innermost thoughts and emotions, surpassing even the level of disclosure she shared with her own parents. She felt as though she was being discarded and was worthless. She felt bad for upsetting her ex-boyfriend and was filled with rage, loneliness, and hopelessness. She also regretted ever opening up to the boyfriend, who ended up causing her a great deal of pain.

Subsequent to that, she developed symptoms including insomnia, appetite loss, recurrent panic attacks, self-harm, and auditory hallucinations in the second person. She is being condescendingly addressed by the voices, which also condemn her as pointless and order her to commit self-harm. She

would frequently inflict lacerations on her forearm with a cutter or strike herself with a wooden ruler. Aside from that, she had no history of illicit substance abuse or manic symptoms.

After successfully completing her Sijil Tinggi Agama Malaysia (STAM), she proceeded to pursue studies in Shariah in Egypt. Unfortunately, the COVID-19 lock-down stopped her studies, preventing her from completing her degree there. During her time in Egypt, she had suicidal thoughts and even attempted to jump over the home roof. Fortunately, her acquaintances intervened and rescued her. These difficulties arose as a result of the stressconnected with managing her PID, which impacted her education and put a strain on her relationships with friends in Egypt.

Currently, she has established herself in a private university in Malaysia permanently. The patient expressed a preference for independent work and limited social interaction with her peers, particularly male individuals. This is a result of her previous relationship with her lover, which caused her to develop a degree of fear and skepticism about boys.

Her father is 57 years old, and her mother is 50 years old. She does not have a good relationship with her father because he is verbally abusive. She was constantly criticized and shouted at for unjustified reasons. She is currently married to a 43-year-old man who used to be her secondary school teacher. She strongly relies on her husband, who continuously gives substantial aid and unwavering support. They have been married for a total of one year and five months. They were blessed with a baby girl, who is now 10 months old. She developed postpartum depression following the birth of her daughter, which required hospitalization due to depressive symptoms and suicidal thoughts.

The mental status examination reveals a femalepatient of Malay ethnicity with average height, dressed appropriately, exhibiting a calm attitude, and maintaining good eye contact. The patient is cooperative and communicates in Malay with normal volume, speech, and tone. Her speech is rational, relevant, and coherent. The patient's mood is euthymic and her affect is appropriate. She denied any active suicidal ideation or any perceptual disturbances. There is no thought of idea, thought insertion, withdrawal or broadcast. The patient demonstrates appropriate orientation and shows excellent attention. She does not display any psychotic symptoms. Her cognitive functions remain unimpaired. She exhibits excellent cognitive abilities and demonstrates a keen understanding of her circumstances. The results of the physical examinations are within normal limits.

A definitive diagnosis has been established, which is Major Depressive Disorder with Psychotic Features associated with an underlying Borderline Personality Disorder, both of which were precipitated by the distressing breakup experienced emotionally. A previous history of traumatic life events, specifically an adverse relationship with her verbally abusive father, is indicative of predisposing factors. As a result of this stressful psychological condition, she has been driven to predominantly pursue recognition and affection via romantic relationships. A persistent stress response has been induced by the abandonment of her former romantic partner, manifesting as increased anxiety, fear, and extreme sadness. The lack of supportive therapy and the absence of a dependable confidant whom she trusts further intensify this psychological distress.

Biological investigations such as a complete full blood count, renal profile, liver function test, thyroid function test, fasting blood glucose, and lipid profile show no abnormalities. The psychosocial investigation done (BDI Test) shows a result of 43 which is considered as severe.

Treatment includes prescription of selective serotonin reuptake inhibitors, fluoxetine 20 mg ON, benzodiazepine, alprazolam 0.5 mg ON/PRN, anti-psychotics, olanzapine 10 mg ON, and supportive psychotherapy. The prognosis for this is subject to variation, but prompt and thorough medical intervention, encompassing therapy and medication, has the potential to greatly enhance long-term outcomes. The prognosis and long-term health can be improved through regular monitoring, having a solid support system, and working together with mental health experts.

DISCUSSION

Borderline personality disorder is marked by sudden changes in identity, relationships, and mood, as well as acting without thinking, feeling empty, acting suicidal, cutting oneself, having stress-related paranoid thoughts, and severe dissociative symptoms like imagining that oneself or their surroundings are not real. This disorder creates a lot of problems, ranging from controlling feelings and impulses to getting along with others and feeling good about yourself. Emotional instability, impulsive aggression, repeated self-harm, and persistent suicidal thoughts are all signs of the disorder. Some of the exact causes of this disorder are still not fully understood, but genetic predisposi-tions and bad childhood experiences, like physical and sexual abuse, play a big role in how it develops.

Examining the case's complexities reveals that the patient's experience encapsulates the difficult ground of Borderline Personality Disorder (BPD). The distressing breakup she experienced vividly illustrates the profound impact of abandonment, a common trigger for exacerbated symptoms in individuals with BPD. The fear of abandonment, which is a characteristic of BPD, not only intensified her emotional responses but also resulted in the emergence of suicidal thoughts, highlighting the disorder's interconnectedness of emotional dysregulation and self-harm tendencies. The tendency to perceive situations, relationships, and oneself in extremes is a hallmark feature of BPD.

Dichotomous thinking refers to an individual's inclination to engage in cognitive processes characterized by binary oppositions, such as "black or white," "good or bad," and "all or nothing." This cognitive approach may be beneficial for expeditious decision-making. Nevertheless,

dichotomous cognition is associated with an increased risk of suicide attempts [3] and is recognized as a cognitive impairment observed in individuals with borderline personality disorder [4]. This dichotomous perception is exemplified by the patient's post-breakup feelings of being discarded and worthless. The inability to find a happy medium is a factor that contributes to the intense feelingsthat are experienced, which in turn fuels the emotional roller coaster that is characteristic of borderline personality disorder. This cognitive distortion has a significant impact on how people with BPD interpret and respond to their surroundings, contributing to the disorder's emotional volatility.

Psychotherapy offers many therapeutic techniques for addressing non-suicidal self-injurious behaviour. Self-harming behaviours can be categorized as either suicidal or non-suicidal and both forms are commonly observed in individuals with Borderline Personality Disorder (BPD). The selection of psychotherapy modality is crucial for the patient's achievement. Psychodynamic psychotherapy is suitable for patients who possess the cognitive ability to gain self-awareness, the skill to manage emotional regression, and are situated in a stable setting. It may be necessary to modify the therapy approach periodically during treatment if the patient's immediate needs change (Table 1) [5].

There are currently no pharmacological therapies that have been identified as specifically effective for treating self-harm. Psychotherapy continues to be the preferred treatment for BPD, and there is now substantial data supporting the effectiveness of dialectical behavioural therapy (DBT) in particular.

Dialectical Behaviour Therapy (DBT) emerges as a structured outpatient treatment that was methodically created by Dr. Marsha Linehan in the early 1990s to particularly target Borderline Personality Disorder (BPD) [6]. Based on cognitive- behavioral principles, Dialectical Behaviour Therapy (DBT) emerges as the only treatment with empirical support for Borderline Personality Disorder (BPD), indicating its effectiveness within the therapeutic field. "Dialectical" refers to the way that different ideas connect with each other. Using both acceptance and change as necessary for improvement is what "dialectical" means in DBT. The goal of dialectical behaviour therapy is to treat the symptoms of BPD by replacing negative behaviours with better ways to deal with stress, such as mindfulness, interpersonal effectiveness, mood control, and distress tolerance.

Dialectical Behaviour Therapy (DBT) is a flexible approach that may be adapted to the patient's initial level of problem. When a patient comes to Dialectical Behaviour Therapy (DBT) with issues that involve severe behavioural dyscontrol, such as suicidal behaviours, the patient is considered to bein the initial stage of treatment. At the beginning of the therapeutic process, the objective is to eradicate harmful behaviours that either pose an immediate risk to the patient or result in a significant degree of handicap. Additionally, it is the goal of the first stage of work to improve abilities such as mindfulness, interpersonal effectiveness, emotion control, and the ability to tolerate distress. The second stage of treatment, which focuses on transitioning from quiet desperation to emotional experience, is for patients who have behavioural

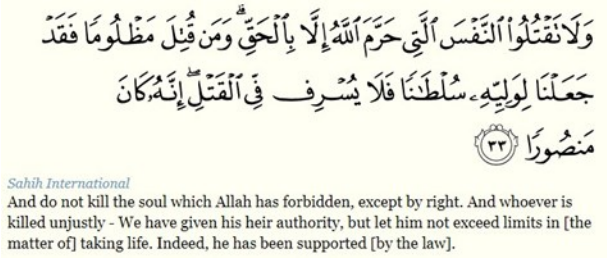
Table 1: Patient selection for four therapies

TYPE OF THERAPY	SELECTIVE PATIENT VARIABLES
Psychodynamic	• Chronic sense of emptiness and underestimation of self-worth • Loss or long separation in childhood • Conflicts in past relationships • Capacity for insight • Ability to modulate regression • Access to dreams and fantasy • Little need for direction and guidance • Stable environment
Cognitive	• Obvious distorted thoughts about self, world, and future • Pragmatic (logical) thinking • Real inadequacies (including poor responses to other psychotherapies) • Moderate to high need for direction and guidance • Responsiveness to behavioral training and self-help (high degree of self control)
Interpersonal	• Recent, focused dispute with spouse or significant other • Social or communication problems • Recent role transition or life change • Abnormal grief reaction • Modest to moderate need for direction and guidance • Responsiveness to environmental manipulation
Supportive	• Failure to progress in other types of therapy • Suicidal • Cognitively impaired and illogical • Acute or chronic medical illness • Presence of somatization or denial of illness • Requiring high levels of guidance or responsive to behavioral methods

dysfunction under control andhave moved on to the second stage. For example, uncomplicated Axis I illnesses, work issues, and marital issues are all addressed in Stage 3, which focuses on living concerns. As a final step, the fourth stage entails assisting the patient in diminishing feelings of incompleteness and cultivating the ability to experience freedom and joy. Emptiness and loneliness may be addressed as treatment targets during the fourth stage [7].

In Islam, self-harm is generally discouraged, as it goes against the principles of preserving one's physical and mental well-being. The body is considered a trust from Allah, and Muslims are encouraged to take care of their bodies and avoid causing harm to themselves. The Quran emphasizes the sanctity of life, stating:

Self-harm, including cutting or any form of intentional injury to oneself, is not aligned with the teachings of Islam. Islam encourages seeking help and support from others, including mental health professionals, when facing challenges or distress. Muslims are urged to turn to prayer, patience, and reliance on Allah during difficult times (Figure 1).


وَلَا تَقْتُلُوا النَّفْسَ الَّتِي حَرَّمَ اللَّهُ إِلَّا بِالْحَقِّ ۗ وَمَن قُتِلَ مَظْلُومًا فَقَدْ
جَعَلْنَا لِوَلِيِّهِ سُلْطَانًا فَلَا يُسْرِف فِّي الْقَتْلِ ۖ إِنَّهُ كَانَ
مَنصُورًا ﴿٣٣﴾

Sahih International
And do not kill the soul which Allah has forbidden, except by right. And whoever is killed unjustly - We have given his heir authority, but let him not exceed limits in [the matter of] taking life. Indeed, he has been supported [by the law].

Figure 1: Demographic of study participants and attitude score

Islamic teachings also emphasize compassion, empathy, and support for those going through hardships. Individuals struggling with self-harm or mental health issues are encouraged to seek understanding, empathy, and professional help, andthe community is encouraged to offer support and compassion without judgment.

CONCLUSION

The case report concludes that Borderline Personality Disorder is complex and difficult. The patient's experience shows how emotional dysregulation, self-harm, and dichotomy are linked. BPD is best treated with psychotherapy, especially Dialectical Behaviour Therapy (DBT), which addresses non-suicidal self-harm.

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Case Report

DIPLOPIA POST GLAUCOMA DRAINAGE DEVICE (GDD): A CASE SERIES

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ABSTRACT

Diplopia is one of complications of glaucoma treatment especially patient treated with glaucoma drainage device (GDD) due to restrictions of the ocular motility. We reported a series of three cases who developed diplopia following GDD surgery. Case 1, a 46-year-old man who had right eye Baerveldt done in February 2021 after previous 2 trabeculectomies failed. Case 2, a 38-year-old man, a case of bilateral pseudophakic glaucoma. who had bilateral Ahmad glaucoma valve implant 19 years prior. Case 3, a 34-year-old lady who underwent right eye Ahmed glaucoma valve implant in 2004 for congenital glaucoma. All cases developed ocular motility problem and diplopia post operatively. Diplopia is an important complications of glaucoma drainage device which affect the patients with existing restricted visual function. It is important to counsel patients on the occurrence of diplopia associated with GDD surgery.

INTRODUCTION

Glaucoma that is refractory to medical therapy or secondary glaucoma are treated with glaucoma drainage device (GDD) such as Baerveldt Glaucoma Implant (BGI) and Ahmed Glaucoma valve (AGV) [1]. Strabimus, motility disturbance and diplopia have been reported after GDD implantation [2]. The development of diplopia after surgery is significant particularly in patient with good binocular visual acuity, affecting the patient's daily activity and health-related quality of life and [3].

CASE PRESENTATION

Case 1

A 45-year-old gentleman has bilateral secondary chronic angle closure glaucoma (CACG), following an acute episode of bilateral anterior uveitis when he was young. Left Baerveldt GDD implantation was done in February 2021 after previous failed Xen glaucoma stent and 2 augmented trabeculectomies. His left trabeculectomy done in 2006 however is draining well but with a large cystic bleb superiorly. Patient complained of diplopia 2 months after the GDD surgery. He has limited up gaze and diplopia in primary and up gaze. He has good central vision in both eyes with visual acuity of 6/24 and 6/6 in the right and left eye respectively. The Baerveldt GDD is functioning well however the diplopia affects his daily activity and give him headache and dizziness.

Orthoptic assessment revealed right hypertropia of 25 prism diopters, too high for correction with prism. Surgical correction is not recommended due to unstable fusion as well as too challenging. Patient only has limited binocular single vision inferiorly and has to move about cautiously.

Case 2

A 38-year-old gentleman has bilateral developmental cataract, bilateral lens aspiration with intraocular lens implantation was done when he was 10 years old. Six years post operatively he developed pseudo-phakic glaucoma. He had Ahmed GDD implantation done as a primary surgery in both eyes. The GDD was placed superior nasally in both eyes, the recommended location of the reservoir then. Within 2 months after the surgery the patient developed convergence insufficiency with symptoms of headache, blurring of vision and occasional diplopia. Later he had vertical binocular diplopia. He has right hypotropia at primary gaze and right restriction to up gaze and in adduction (Figure 2). Orthoptic assessment revealed right eye hypotropia measuring 35 prism diopter, too high for surgical and prism correction.

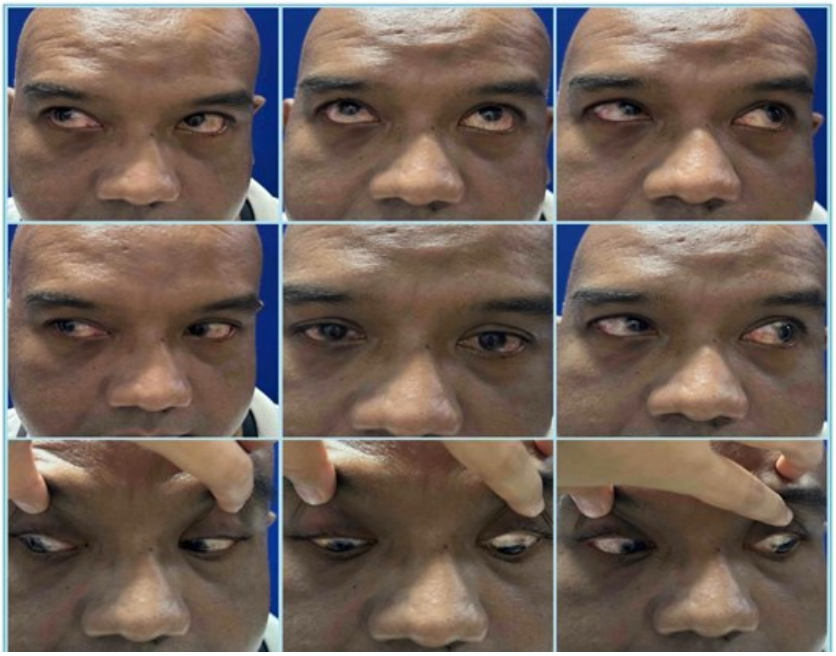

Figure 1: 9 directions of gaze showing right hypertropia.

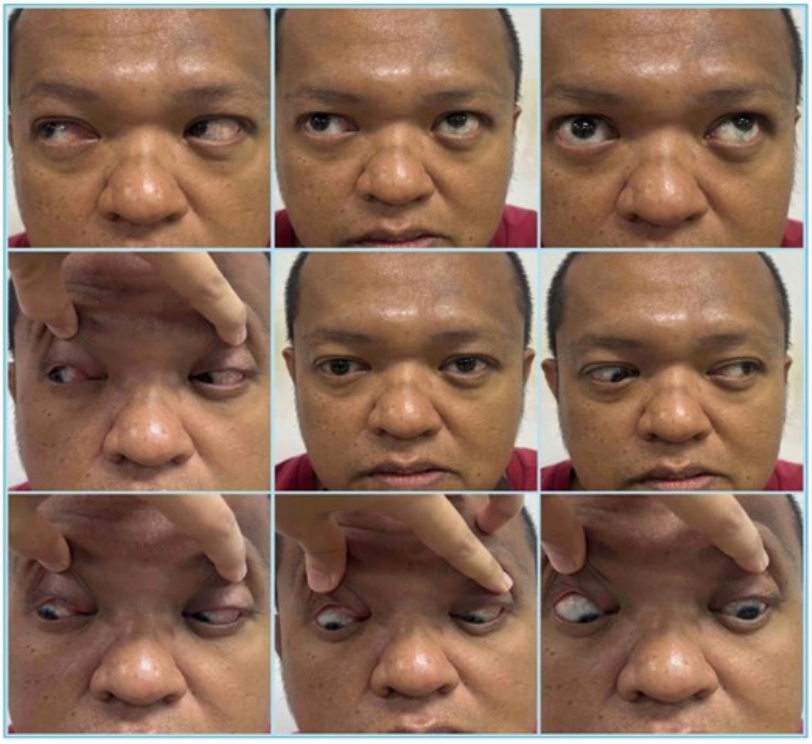

Figure 2: Case 2 : 9 direction of gaze photo showing right hypotropia in primary gaze, and restriction in up gaze and adduction.

Case 3

A 34-year-old lady, with underlying bronchial asthma and spina bifida, she has bilateral congenital glaucoma. The right trabeculectomy and left eye goniotomy were done when she was just 4 weeks Subsequently, right repeat trabeculectomy was done to her right eye when she was 14 years old. Four years later when the trabeculectomy failed, Ahmad GDD was implanted at superior nasal area. The left eye has good intraocular pressure however the cornea is opaque, the vision is hand movement. Hence, patient has no complaint of diplopia. However, 4 years later when she was studying for her degree she developed ocular motility problem. She had severe eye strain, headache and blurring of vision when doing near work. She was not able to converge. Ocular examination revealed that she had convergence insufficiency. Orthoptic exercise was prescribed.

DISCUSSION

Diplopia that develops postoperatively following GDD implantation is suggestive of restrictive mechanism that take place due to different GDD plate size, type of bleb formed and the scar tissue surrounding the plate [4]. In most cases it is combination of these factor [4]. Glaucoma drainage device with larger plate area (Baerveldt 350) result in higher frequency of diplopia as compared to GDD with smaller plate area (Ahmad valve) [4]. However, in The Ahmed Baerveldt Comparison (ABC) Study, similar presentation of diplopia is described for larger plate Baerveldt 350 (11%) and small plate Ahmad valve (12%) [5]. This similar occurence between these 2 types of GDD could be the result of the non-standardized baseline as well as post operative motility assessment [4]. The GDD plate size is directly proportional to the surface area of encapsulation. Hence the rate of IOP reduction is directly proportional to end plate size as well (6). The common factor seen in case 1, 2 and 3 regardless of the type of GDD is the scarring from multiple previous ocular surgery, either glaucoma or non-glaucoma surgery. The development of scarring post surgical intervention is compounded by their young age factor at the time of the surgery [4].

The location of the plate may suggest the direction of diplopia due to mass effect of fibrous tissue with the plate or bleb resulting in restrictive strabismus. Patient with superotemporal GDD increase the risk hypertropia, whereas GDD located on the superonasal quadrand prone to get hypotropia as observed in Case 2 and Case 3. However, true incidence of diplopia was probably underrated due to lack of complaint from monocular patients or patient with poor visual field defect and low vision [7].

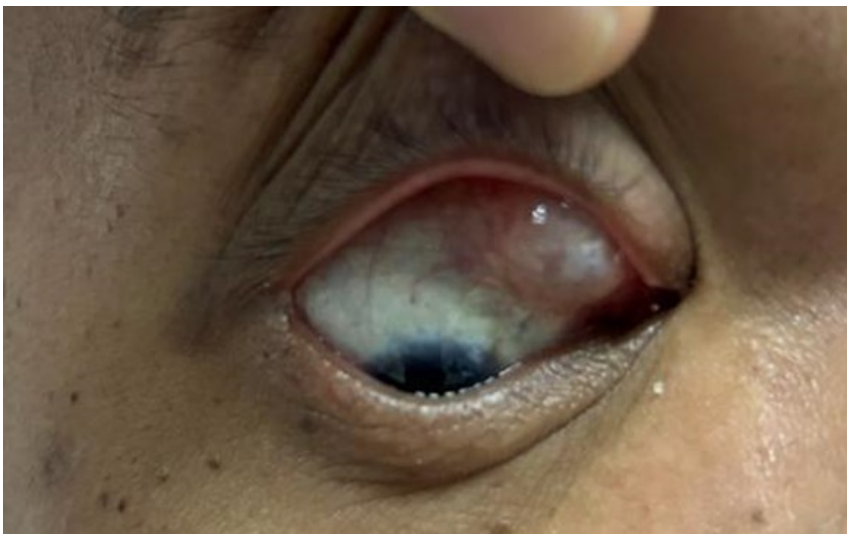

Figure 3: Case 3: High filtering bleb over the reservoir in the superonasal quadrant affecting the medial rectus muscle contraction and thus limiting the convergence.

Table 1: Details of Case 1,2,3

Case	eye	VA	Glaucoma surgery	Non Glaucoma surgery	GDD type	GDD site	Type of bleb	IOP	No of Surgery/ eye	EOM restriction	Diplopia
1	R	6/ 24	trabec	cataract	BGI	ST	high	12	2	Up + abd	Vertical
	L	6/6	trabec	-			cystic	12	1		Vertical
2	R	6/9	-	cataract	AGV	SN	high	14	2	Up + add	Vertical
	L	6/12	trabec	cataract	AGV	ST	low	16	3	Nil	Vertical
3	R	2/60	trabec	Cataract TPPV	AGV	SN	high	14	6	Unable to converge	-
	L	HM	Goniotomy Trabeculectomy					18	2	-	-

BGI= Baerveldt Glaucoma Implant, AGV= Ahmad Glaucoma Valve, abd = abduction, add= adduction
ST= superotemporal, SN Superonasal

The Ahmed Glaucoma drainage device with a valve mechanism was first introduced in 1993. The initial result was first published by Coleman AL et al in 1995 [8]. In the early days of the implantation most surgeons implanted the device in the superonasal location straddling the superior and middle recti muscles as the space in this location effectively accommodate the large bleb that formed. However this location resulted in convergence insufficiency as seen in Case 2 and 3, as failure of convergence translate to poor accommodation, the patients' complaint was severe headache and blurring of vision.

Large bleb over the GDD plate as seen in Case 2 and 3 displaced the muscle away from the sclera causing muscle to stretch to a higher length of the curve tension thus affect the muscle motility. Furthermore large bleb surrounding the GDD leads to formation of a crowding effect with restricted extraocular movement which induces constant diplopia [6]. Treating diplopia is challenging because of formation of large and dense fibrous tissue capsule surrounding the implant which blended to the adjacent extraocular muscle, which treating the strabismus has high risk of damaging the functioning GDD [9].

CONCLUSION

Diplopia is an important complications of glaucoma drainage device, affecting patients with existing restricted visual function. It is important to counsel the patients prior the surgery as diplopia would significantly interferes with patient's daily activities hence their quality of life.

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Case Report

RUBBER BARK FUNGAL KERATITIS IN A CONTACT LENS WEARER

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ABSTRACT

Fungal keratitis is one of the leading cause of vision threatening ocular morbidity. Due to its slow pathologic progress, it posts a clinical diagnostic challenge. The increasing trend of fungal keratitis is attributed to the use of contact lens, non-judiciary corticosteroid, and corneal trauma by vegetative matter. We report a case of fungal keratitis in a 33-year-old man who has 2 risk factors; a contact lens wearer and corneal trauma by vegetative matter from rubber bark. The initial symptoms mimic bacterial keratitis. A presumptive diagnosis of fungal keratitis was made on 5 days after symptoms started based on the characteristic Slit-lamp biomicroscopic signs and treatment with topical as well as systemic anti-fungal drugs was started. In the absence of fungal elements and a positive culture, recognizing the characteristic appearance enable immediate treatment and minimizing complication, resulting in good outcome.

INTRODUCTION

Fungal keratitis is a severe corneal infection, with more than one million people affected per year worldwide [1]. Inuoe et al (2022) report that in Japan fungal keratitis accounts for 6.3% of the total for infectious keratitis [2]. The causative fungi include species of Candida (43.6%),Fusarium (24.5%), Alternaria (6.4%),and Asper gillus (3.2%). The increasing trend of fungal keratitis is attributed to the use of contact lens, non-judiciary corticosteroid, and corneal trauma by vegetative matter in agriculture sector [2].

CASE PRESENTATION

A 33-year-old man, a contact lens–wearer, experienced severe pain, redness and tearing of the right eye for 2 days prior presentation. Three days prior, an apparent foreign body entered his right eye. According to him he immediately cleaned his contact lens but reapplied and continued using the same extended contact lens throughout the night. He experienced pain on waking up but tolerable. He applied eye ointment which he obtained over the counter.

The next morning his right eye became swollen and painful with excessive tearing. The symptoms persisted even after removing the contact lens. He sought treatment at a primary care clinic, was prescribed with topical antibiotic and referred to the hospital for consultation with an ophthalmologist. He presented to the ophthalmology clinic the next day 3 after the initial symptoms. By then the right eye swelling and pain had become worse. The tearing was excessive associated with foreign body sensation, however there was no discharge. When he forced open his right eye, he realized than his right vision was very blurry. He had been using extended wear contact lens for the past one year. He admitted that he usually sleeps wearing the contact lens and had never experience any problem. He started wearing myopic correction from the age of 12 years. Review of the patient's medical history revealed no significant past medical or surgical history however he is a smoker consuming half a pack daily for the past 10 years.

On ocular examination, his right best corrected visual acuity (BCVA) was only counting finger at 1 foot. His left BCVA was 6/9. The right anterior segment examination revealed upper and lower lid swelling, excessive tearing was noted. There was no discharge.

The right eye appeared severely inflamed, the conjunctiva was hyperaemic and congested, with conjunctival and circumcorneal injection. Corneal ulcer with surrounding stromal edema, measuring 5 x 4 mm, with epithelial defect of 4 x 3 mm (Figure 1) was observed. The margin was hazy, the infiltrate extended inferiorly, encroaching the pupillary area.

The hypopyon was present inferiorly. The right intra-ocular pressure (IOP) was slightly higher, 21 mmHg compared to 14 mmHg in the left eye. The left anterior segment examination was unremarkable.

A diagnosis of right bacterial keratitis was then made. The patient was admitted and started with round the clock topical Ceftazidime 5% and topical fortified Gentamicin (15mg/1ml) hourly as well topical Homatropine 2% three times a day. The congestion was less after 2 days. The slit-lamp examination however showed more dense stromal infiltrate with feathery margin (Figure 2).

The patient was initially treated for presumed bacterial keratitis, however on day 5 the appearance was suggestive of Fungal keratitis. Review of the history the patient revealed that he had been working as a rubber tapper for the last few months and the foreign body that entered his right eye were vegetative matter from the rubber bark.

The patient was additionally prescribed with topical Amphotericin B 0.15% 2-hourly and oral fluconazole 100 mg BD for 2 weeks. The keratitis showed improvement though the gram stain and culture for fungus was negative.

Of note the topical antibiotics was not stopped as the initial presentation was more of a bacterial keratitis though gram stain as well as culture was negative. Negative culture from corneal scrapings is common as sample are very small and in this case patient was partially treated prior his presentation to the ophthalmologist.

Right anterior segment at 3 months showed a quiet but dense corneal scarring involving the visual axis (Figure 4). Right BCVA was counting finger at 2 feet and the right IOP was 16 mm Hg. Patient was planned for penetrating keratoplasty in 3 months.

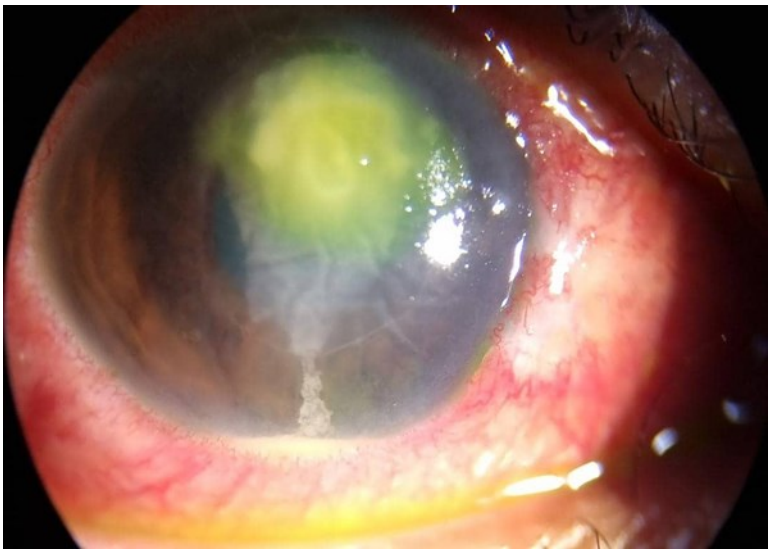

Figure 1: 3 days after initial symptoms: corneal ulcer measuring 5 x 4 mm with epithelial defect, endothelial striae and hypopyon.

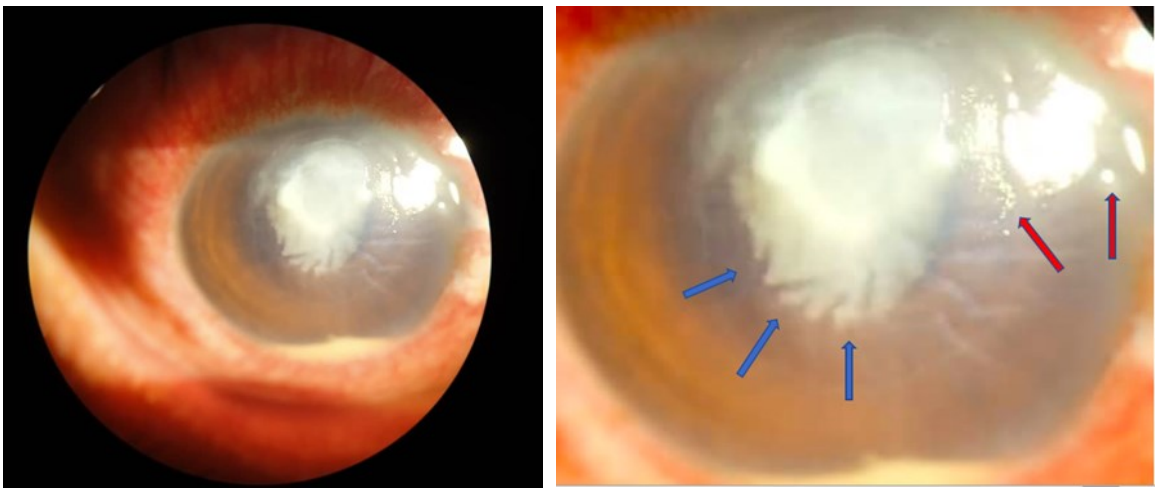

Figure 2: 5 days after initial symptoms and 2 days after treatment with topical antibiotics

2A: Cornea ulcer shows more dense stromal infiltrate with feathery margin, and persistent hypopyon.

2B: Prominent feathery stromal infiltrate (blue arrows) covering the pupillary area,satellite lesions (red arrows), endothelial striae and plaque

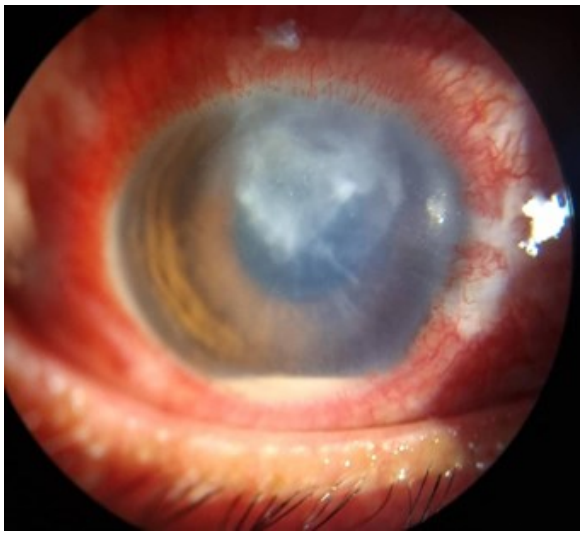

Figure 3 : The appearance 5 days following treatment with topical and systemic antifungal medication. The congestion is less, the margin of the ulcer is more well-defined

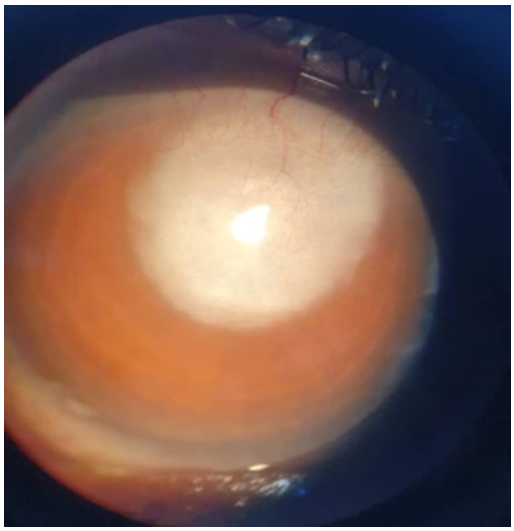

Figure 4 : At 3 months: Dense corneal scarring involving the visual axis.

DISCUSSION

Fungal keratitis has significant public health and socioeconomic implication. Estimates suggest a global incidence of 1 million cases annually [1]. Annual incidence varies widely by region, with the highest rates in developing countries with warm and humid climates. Fungal keratitis disproportionately afflicts working-age adults and the poor living in rural area in the tropics and subtropics. Most cases occur secondary to ocular trauma, from organic or vegetative matter in the farm or plantation. Traumatizing agents come from a variety of plant and animal sources [2]. In Malaysia, a study done in 2021 by Chow Tze Suen et al found that ocular trauma is the main predisposing factor and fungi as causative organism in 9.6% [3]. Other risk factors include contact lens wear, male gender, prior eye surgery, pre-existing eye disease, diabetes mellitus, corticosteroid use, and immunosuppressive states such as HIV/AIDS [4].

Our patient's risk factors include both trauma by vegetative matter and contact lens wear. Contact lens wear is well known to increase the risk of microbial keratitis because of multiple factors, including decreased tear exchange, corneal irritation, corneal epithelial layer thinning, disruption of normal corneal epithelial cell shedding [5]. These factors are compounded by poor hygienic practices.

Direct observation of fungal hyphae by microscopy and culture from corneal scrapings are the gold standards for diagnosing fungal keratitis. Cultures develop in 48-72 hours, although it can take up to 14 to 35 days. Thus, medical therapy is initiated early based on clinical suspicion and microscopic findings of smears. In our patient the corneal scraping showed no fungal element on gram staining, and no fungus or bacteria grew on the culture. The treatment was initiated based on clinical suspicion, the risk factors the patient had, and the development of characteristic feathery stromal infiltrate 3 days after Topical antibiotics was started.

Medical management given include fortified antifungal ophthalmic drops, the topical Amphotericin B 0.15% together with cycloplegic and oral Fluconazole 200mg daily for 2 weeks. Topical antifungals do not penetrate the cornea well, especially through an intact corneal epithelium. The combination of topical, intrastromal injection and oral antifungals administration increase antifungal delivery [6]. Our patient responded well to the treatment given, apart from dense central coreal scarring, no complication such as corneal thinning or perforation occurred. Additional surgical management planned for this patient is a timely penetrating keratoplasty to improve his right vision.

Prevention and early identification of fungal keratitis is a key for farm or industrial workers at risk. Simple interventions such as providing and emphasizing the use of protective eyewear will lower the incidence of corneal trauma by vegetative matter, namely in our case, the rubber bark substance or dust during rubber tapping.

Wearing contact lens is becoming more common with a growing number of indications, including refractive error correction, restorative reasons and cosmetic uses which is becoming very popular as it changes or enhance a person's appearance. Among the various risk factors for contact lens-induced infectious keratitis, the two most frequent are poor hygiene and overnight wear [8]. Extended wear and unskilled wearer increase the risk. Education on proper contact lens hygienic practices by eye care professionals is very crucial. Recognising the symptoms and signs that require immediate medical attention can prevent serious bacterial or fungal infection. Our patient admitted to contact lens overwear and abuse. He sleeps with

his contact lens most of the time and was unable to properly adhere to the correct practice of contact lens care. Out of ignorance, he continued to use the contact lens and delayed in seeking medical help despite the ocular trauma by the vegetative rubber bark.

CONCLUSION

The knowledge of the clinical characteristics of fungal keratitis helps in early diagnosis and overall reduction in complications and subsequent visual morbidity. It is important to recognise the common risk factors which include vegetative trauma, widespread contact lens use, prolonged corticosteroid use, and systemic disease such as diabetes mellitus.

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DECLARATION

Competing interests
The authors have no relevant financial or non-financial interests to disclose.

Consent to Participate
Informed consent was obtained from the patient.

Consent to Publish
Informed consent was obtained from the patient for publication of this case report and any accompanying images.

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Case Report

OCULAR SPOROTRICHOSIS - A CASE SERIES AND LITERATURE REVIEW

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ABSTRACT

We describe three patients with a similar presentation of granulomatous lymphocutaneous infiltration involving the tarsal conjunctiva and eyelid; and a literature review on ocular sporotrichosis in the Asia Pacific region. In this series, all patients had fungal cultures of "Sporothrix Schenckii" isolated from conjunctival biopsies. Oral Itraconazole 200 mg OD was started in all patients for an average period of 12 weeks. All of them recovered well with no ocular sequelae. Isolating the causative organism from a wide spectrum of organisms causing POGS is pertinent to ensure treatment success. A high degree of suspicion from history of exposure to domestic animals such as cats may expedite diagnosis and treatment.

INTRODUCTION

Sporotrichosis is a form of mycosis caused by a dimorphic fungi, *Sporothrix Schencki* resulting in infections localized to the skin, subcutaneous tissue and adjacent lymphatic vessels [1]. It is widely distributed worldwide, with majority of cases reported from the Asia Pasific region, Latin America, South Africa, India and Japan [2]. Lymphocutaneous form is the commonest aside from other forms such as cutaneous, mucosal and extracutaneous forms. It commonly starts as a nodule or ulcer at the site of inoculation before spreading through the regional lymphatics causing ulceration and fistula before it eventually heals [3]. Parinaud's Oculoglandular Syndrome (POGS) is an ocular manifestation of sporotrichosis characterized by granulomatous conjunctivitis associated with preauricular and submandibular lymphadenopathy [4].

CASE PRESENTATION

Case 1

A 38-year-old Malay female with underlying Type II diabetes mellitus and hypertension, presented with swelling on the right upper eyelid for 2 weeks, followed by similar swellings on the ipsilateral cheek. This was preceded by bilateral blurring of vision for a few months prior to the swelling. She has a cat at home but denied any history of cat scratch or bites. She completed a course of antibiotics by a general practitioner one week prior to presentation. The best corrected visual acuity at presentation were 6/36 OD and 6/24 OS. Examination showed an erythematous and tender nodular swelling on the right upper eyelid, with minimal eye discharge (Figure 1A). She also had multiple tender pre-auricular lymph nodes measuring between 0.5cm – 1cm in a track-like arrangement (Figure 1B). Granulomatous nodules were also seen on the lower palpebral conjunctiva (Figure 1C). Fundus examination revealed proliferative diabetic retinopathy changes which were treated. She was initially started on oral Doxycycline 200mg BD and topical Moxifloxacin QID in the right eye. However, because of poor clinical response, a skin and conjunctival biopsy were taken and oral Itraconazole 200mg OD was commenced, with close liver function monitoring. The right eyelid swelling, and conjunctival lesions gradually improved and complete resolution was achieved after 3 months of treatment (Figure 2A-C). The skin and conjunctival tissue cultures were found to be positive for *Sporothrix schenckii*.

Case 2

A 45-year-old Malay lady with underlying hypertension, presented with left eyelid swelling, intermittent redness and a painful swelling on her left

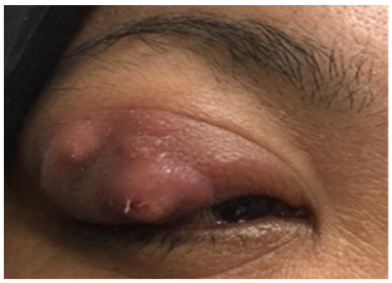


Figure 1A: Upper lid nodular swelling.

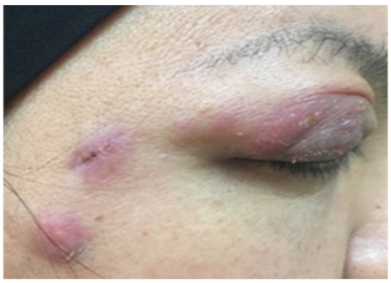


Figure 1B: Pre – auricular lymph nodes in track – like form.

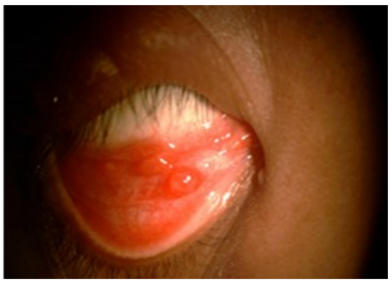


Figure 1C: Lower lid palpebral conjunctival granulomas

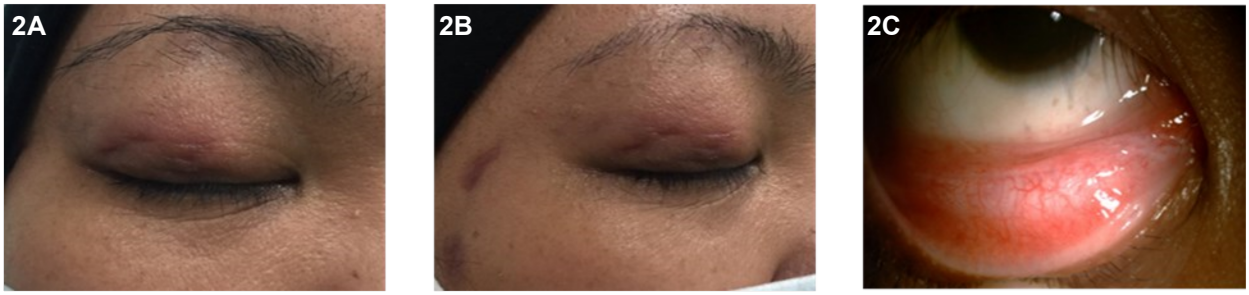


Figure 2A-C (from left to right): Resolution of conjunctival and adnexal lesions after completion of treatment.

cheek for a month. There was no antecedent history of trauma or insect bite. However, her cat was recently ill with sporotrichosis. The patient was treated with oral antibiotics by a general practitioner prior to presentation to the eye clinic. The best corrected visual acuities at presentation were 6/9 OU. The left upper and lower eyelids were swollen and erythematous with multiple granulomas seen on the palpebral conjunctiva (Figure 3A & B). There were multiple palpable, small preauricular lymph nodes and a large submandibular lymph node measuring 3cm x 3cm. The patient was treated with oral Itraconazole 200mg OD for a total duration of 3 months with close liver function monitoring. The lesions progressively improved with complete resolution of all clinical signs after 3 months (Figure 4A & B). Culture of the conjunctival biopsy was positive for *Sporothrix schenckii*.

Case 3

A 64-year-old lady with underlying diabetes mellitus and hypertension, presented with right eye redness and swelling for a month, associated with yellowish ocular discharge. She denied any trauma or insect bite. However, she has four pet cats at home, one of which was recently diagnosed with a skin disease on treatment. Her best corrected visual acuities in both eyes at presentation were 6/9 OU. There was generalized conjunctival injection of the right eye with multiple granulomas seen on the inferior bulbar conjunctiva (Figure 5A). There was also enlarged right preauricular lymph node, measuring approximately 2 cm. The patient was initially treated as POGS secondary to cat scratch disease with oral doxycycline. However, there was no clinical improvement for 2 weeks. Fungal culture of the conjunctival biopsy was

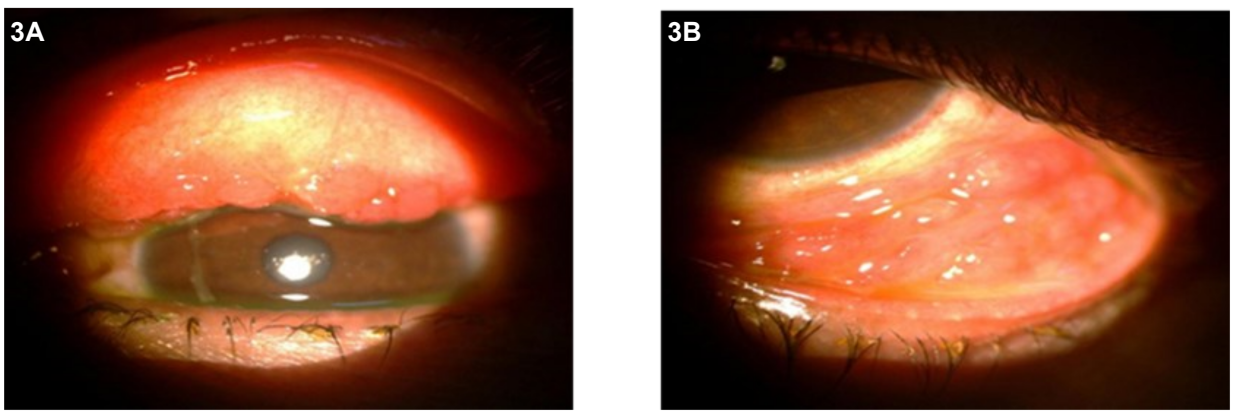


Figure 3A & B: Upper and lower lid palpebral conjunctiva granulomas.

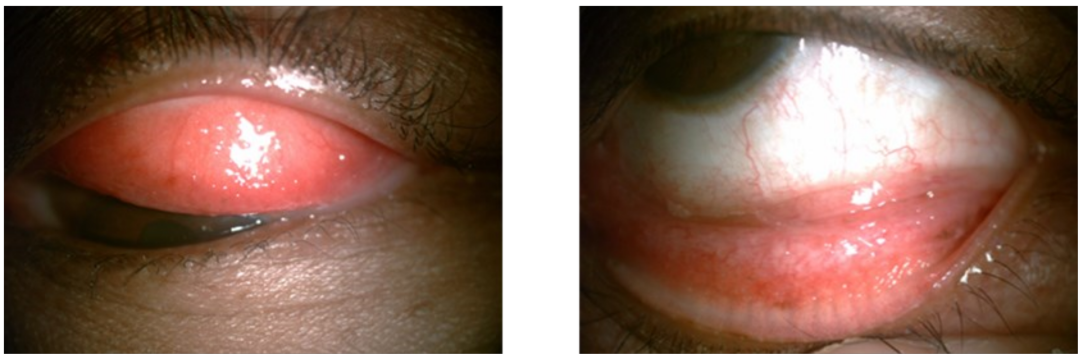


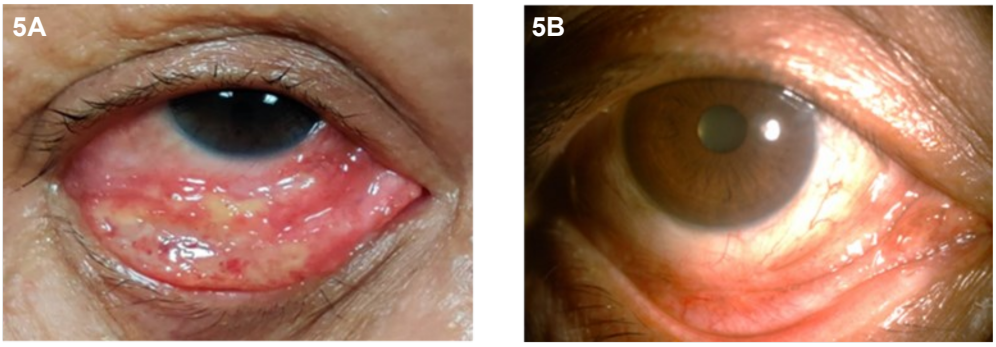
Figure 4A & B: Resolution of conjunctival granulomas after treatment

positive for *Sporothrix schenckii* (Figure 6). The treatment was then changed to oral Itraconazole 200mg OD given for a total of 3 months until total resolution of the signs was seen (Figure 5B).

DISCUSSION

Sporotrichosis generally occurs by traumatic inoculation of soil, plants, and organic matter contaminated with the fungus. Traditionally, activities such as floriculture, agriculture, mining, and wood exploitation are associated with the mycosis. Zoonotic transmission is found to be a major source with more than 2,000 human cases reported via cats' transmission in Brazil since late 1990s [5]. Review of literature revealed most reported cases were associated with feline exposure [7,11-12,15-22] (Table 1), as seen in all our cases.

Cats are a potentially high zoonotic transmitter for sporotrichosis usually occurring via cat scratches or bites (6). However, this may not always be the case as studies found that contact with ailing cats alone is sufficient for human exposure and self-inoculation, due to the high fungal load in these cats [7]. This observation is also seen in our patients as none of them had any history of cat scratches or bites. Additionally, unperceived injuries may have easily occurred especially during animal handling as



Figures 5A (right to left): Lower lid bulbar conjunctiva granulomas, 5B: Resolution after treatment.

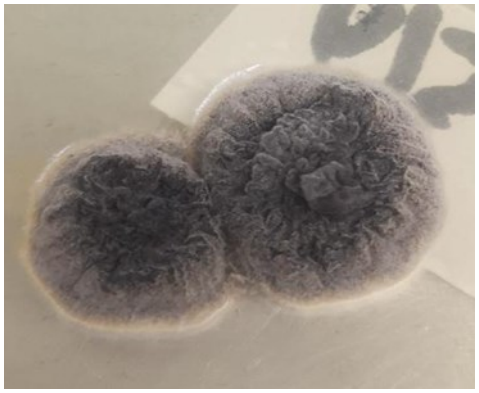


Figure 6: Sporotrichosis colony in Sabaraud's agar from the patient's conjunctival biopsy.

it is a part of cat's behaviour to rub their faces against their handlers, to bite, and to scratch [8]. It could be a coincidence but females, as is the case in all our patients, may naturally be closer to their pet cats that could have led to the auto-inoculation of the fungi [9], agreeing with majority of reported cases of cat associated sporotrichosis involving primarily women.

Sporotrichosis can cause a myriad of ocular presentations, ranging from granulomatous conjunctivitis, dacryocystitis, granulomatous uveitis, choroiditis, endophthalmitis and POGS [7]. In our series, the patients were all diagnosed with POGS based on the clinical presentation of granulomatous conjunctivitis and lymphadenopathy, apart from adnexal involvement in the first patient. Arinelli et al (2020) reported that all their POGS patients had intense inflammatory reaction involving the bulbar conjunctiva, related to the dense lymphatic supply of this tissue [12]. POGS caused by sporotrichosis can be easily misdiagnosed as it is the lesser-known cause in comparison to more common ones like cat-scratch disease. Late diagnosis may delay treatment initiation resulting in ocular complications and sequalae.

Sporotrichosis can be diagnosed based on a combination of clinical, epidemiological, and supportive laboratory data. Culture of a tissue biopsy is confirmatory of sporotrichosis infection [3]. All patients in this series were culture positive from the biopsy samples. However, obtaining culture results may take several weeks and a false negative culture could be attributed to the deeply lodged residing cyst in host tissue [11]. In a case series of 10 patients with POGS caused by sporotrichosis by Ribeiro et. al., 7 of them were culture negative. Even so, favourable outcomes were achieved after early treatment [12]. Therefore, early treatment is recommended if there is a high index of suspicion for sporotrichosis. Ocular complications such as symblepharon and conjunctiva fibrosis have been reported to occur

Table 1: Chronologically reported cases of ocular sporotrichosis from tropical countries.

Author/Year	Country	No of cases	Feline Exposure	Ocular Manifestation	Treatment	Outcome
Ramirez et al 2015 [15]	Peru	21	Yes (10 pts)	Ocular Adnexa	Potassium Iodide	Complete resolution
Yamagata M et al 2017[7]	Brazil	3	Yes (2 pts)	Granulomatous conjunctivitis	Oral Itraconazole	Symblepharon & Conjunctival fibrosis (2 pts)
Ferreira TA et al 2018[16]	Brazil	1	Yes	Granulomatous conjunctivitis	Oral Itraconazole	Complete resolution
Ling JL et al 2018[17]	Malaysia	1	Yes	POGS	Oral Itraconazole	Complete resolution
Furtado et al 2019[18]	Brazil	2	Yes (1 pt)	POGS Ocular Adnexa (dacryocyctitis) Choroiditis	Oral Itraconazole	Complete resolution
Ribeiro CR et al 2020 [12]	Brazil	10	Yes	POGS	Oral Itraconazole	Complete resolution
Gameiro et al 2020[19]	Brazil	1	Yes	Ocular Adnexa Granulomatous conjunctivitis	Oral Itraconazole	Complete Resolution
Reinprayoon et al 2020[11]	Thailand	1	Yes	Conjunctival Plaque	Topical Terramycin Topical Maxitrol	Complete resolution
Ahmad Fauzi et al 2020[20]	Malaysia	6	Yes	Granulomatous conjunctivitis Eyelid lesions	Oral Itraconazole	Symblepharon (4 pts)
Lee HY et al 2020[21]	Malaysia	1	Yes	POGS	Oral Itraconzole	Complete resolution
Theng LY et al 2021[22]	Malaysia	1	Yes	Granulomatous Conjunctivitis	Intralesional Amphotericin B Topical Fluconazole	Complete resolution
Ramirez et al 2021[23]	Brazil	3	Yes (1 pt)	Ocular Adnexa	Oral Itraconazole	Complete Resolution
Liborio et al 2021[24]	Brazil	1	Yes	POGS	Oral Itraconazole	Complete Resolution
Lemes et al 2021[25]	Brazil	2	Yes	POGS	Oral Itraconazole	Complete Resolution

even after treatment [7,20].

The treatment regime used in all our patients was oral Itraconazole 200 mg BD for an average duration of 3 months; and continued for a period of 2-4 weeks after resolution of clinical signs. This is similar to the regime used in most studies that were included in our literature review [7, 12, 16-21, 23-25]. Other treatment options such as potassium iodide [10], topical tetracycline [13] and intralesional amphotericin B have been described [22]. Itraconazole, an azole antifungal, has been long established as the drug of choice for treatment of sporotrichosis owing to its low toxicity and good tolerance even in long term treatment [13]. We recommend that ocular sporotrichosis should be treated with oral itraconazole 100 – 200mg, similar to the dose for cutaneous infection until complete resolution of the lesions. This may be extended to an addition of 2-4 weeks, with a total duration of 3-6 months [14].

CONCLUSION

Sporotrichosis is a zoonotic infection in many tropical countries and ocular sporotrichosis is potentially disabling as described in this case series. Misdiagnosis can cause delay in treatment and further exacerbate and worsen the condition. History of contact with diseased cats even without cat scratch or bites is a strong risk factor for sporotrichosis. Antifungal treatment with Itraconazole should be started when there is a strong suspicion of sporotrichosis while waiting culture results from tissue biopsy.

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Original Article

FLOOD DISASTER PREPAREDNESS: KNOWLEDGE, ATTITUDE AND PRACTICE AMONG MALAYSIAN

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ABSTRACT

Floods pose a significant threat to lives and property, and recent events in Malaysia underscore the need for robust disaster preparedness. This study explores the Knowledge, Attitudes, and Practices (KAP) of Malaysians regarding flood disaster preparedness to enhance community resilience. The survey, distributed nationwide, involved 442 respondents and utilized demographic factors such as gender, age, ethnicity, education, income, and residency. Findings indicate that Malaysians exhibit varied levels of knowledge, attitudes, and practices, with notable disparities across socio-demographic factors. While educational qualifications positively influence knowledge, gender, ethnicity, and income impact attitudes and practices. The study highlights the importance of targeted education, awareness campaigns, and practical initiatives to bridge gaps and enhance disaster readiness. Despite limitations, including a short research period and biased sample composition, the study provides valuable insights for policymakers and researchers aiming to improve flood preparedness in Malaysia. Recommendations include extending research duration, increasing sample diversity, and incorporating face-to-face surveys for enhanced reliability. Strengthening disaster preparedness activities is vital for building a resilient and well-informed society.

INTRODUCTION

Floods represent a prevalent natural disaster capable of inflicting substantial harm to human lives and property [1]. Recent years have witnessed Malaysia grappling with significant flood-related incidents, underscoring the imperative for robust disaster preparedness and response strategies. The efficacy of mitigating the impact of such calamities is not solely confined to the purview of authorities and disaster management agencies; it crucially extends to the preparedness and proactive efforts of citizens [2]. This study aims to scrutinize the Knowledge, Attitudes, and Practices (KAP) of Malaysians concerning flood disaster preparedness, with the overarching objective of enhancing community resilience and diminishing vulnerability [3].

Malaysia's geographic diversity, encompassing coastal regions, river systems, and urban centers, exposes a substantial segment of its populace to the threat of flooding [4]. A nuanced comprehension of the public's KAP in flood catastrophe preparedness is imperative, given the severe repercussions floods impose on human lives, infrastructure, and the economy [5]. Existing research underscores the significance of addressing knowledge gaps, attitudes, and practices to optimize the efficacy of disaster planning and response operations [6]. Thus, this study endeavors to scrutinize and evaluate the levels of KAP among Malaysians, serving as a foundational basis for informed policy formulation and community-driven initiatives.

The overarching objective of this research is to appraise Malaysians' understanding, attitudes, and behaviours pertaining to flood catastrophe preparedness, aiming to identify areas for enhancement in public awareness and conduct.

METHODOLOGY

The survey was systematically distributed nationwide through random sampling. The determination of the sample size utilized the Raosoft software. The prescribed sample size was a minimum of 400 respondents, determined by identifying the smallest acceptable size of a demographic subgroup with a ±5% margin of error and a 95% confidence level [7]. The questionnaire survey, consisting of 30 questions, was adapted from Aung, K. T. et. Al (2019) with substantial modifications [8]. It was constructed using Google Forms and offered in two language versions, English and Malay. Additionally, a QR Code and a shortened link were generated to facilitate ease of access for survey respondents. Survey invitations, disseminated through various online platforms such

as WhatsApp, Telegram, Facebook, Twitter, Instagram, and email, included comprehensive information about the survey, its objectives, and a consent statement.

The data collection spanned over 40 days, commencing from 1st May 2022, to 10th June 2022. The inclusion criteria for this study encompassed Malaysians aged 18 years and above. The research team utilized a self-constructed questionnaire through Google Forms, focusing on three primary components: knowledge, attitude, and practice. The survey aimed to assess the preparedness of Malaysians for a flood disaster by examining these three key components—knowledge, attitude, and practice (KAP). A pilot study was conducted before the main study, and the Cronbach's alpha coefficient was 0.896, indicating high internal consistency (Knowledge: 0.855, Attitude: 0.834, and Practice: 0.810).

RESULT

From our findings, the results there are 442 respondents, consisting of Malaysians, both male and female. From our results, we have obtained the frequencies for each variable, which are demographic characteristics and KAP for flood disaster preparedness (Table 1).

Knowledge

There is no significant association between knowledge of flood disasters and age, gender, and qualification (Table 2). However, there is a significant association between ethnicity, income, residency and knowledge of flood disaster preparedness.

Attitude

There is no significant association between attitude of flood disaster preparedness and gender, age and residency (Table 3). However, there is a statistically significant association between ethnicity, qualification, income and attitude towards flood disaster preparedness.

Practice

There is no significant association between Practice of flood disaster and age, income, ethnicity and qualification (Table 4). However, there is a statistically significant association between gender, residency and practice of flood disaster preparedness.

DISCUSSION

The study surveyed 400 respondents from Malaysia, including Sabah and Sarawak, to assess flood preparedness. The main issue is the lack of knowledge about flood risks, early warning signs, and

Table 1: Demographic characteristics of study respondent.

Demographic characteristics		Percentage (%)
Gender	Male	53.85
	Female	46.15
Age	18-29	68.1
	30-39	6.3
	40-49	14.3
	50-59	9.5
	>60	1.8
Ethnicity	Malay	93.4
	Chinese	1.4
	Indian	2.3
	Others	2.9
Education	Certificate	6.1
	Diploma	19.2
	Bachelor	60
	Master	5.2
	PhD	1.6
	Others	7.9
Income	<5000	74.9
	5000-10000	16.7
	>10000	8.4
Residency	Northern	14.3
	Central	38.7
	East coast	28.3
	Southern	14.7
	Others	4.1

Table 2: Pearson correlation between knowledge and ethnicity, income and residency.

Socio-demographic	Knowledge						Pearson Chi-square
	Poor		Moderate		Good		
	Frequency	%	Frequency	%	Frequency	%	
Ethnicity							
Malay	3	0.7	130	31.5	280	67.8	
Chinese	0	0.0	5	83.3	1	16.7	
Indian	0	0.0	5	50.0	5	50.0	p<0.05
Others	1	7.7	5	38.5	7	53.8	
Income							
< 5000	1	3.0	96	108.6	234	219.4	
5000-10000	0	0.7	33	24.3	41	49.1	p<0.05
> 10000	3	0.3	16	12.1	18	24.5	
Residency							
Northern	0	0.6	10	20.7	53	63.0	
Central	2	1.5	53	56.1	116	171.0	
East coast	1	1.1	52	41.0	72	125.0	p<0.05
Southern	0	0.6	25	21.3	40	65.0	
Others	1	0.2	5	5.9	12	18.0	

Table 3: Pearson correlation between attitude and ethnicity, qualification and income.

Socio-demographic	Attitude						Chi-square value	Pearson Chi-square
	Poor		Moderate		Good			
	Frequency	%	Frequency	%	Frequency	%		
Ethnicity								
Malay	1	0.2	75	18.2	337	81.6		
Chinese	1	16.7	0	0.0	5	83.3	36.297	p<0.05
Indian	1	10.0	2	20.0	7	70.0		
Others	1	7.7	1	7.7	11	84.6		
Qualification								
Certificate	0	0.0	8	29.6	19	70.4		
Diploma	1	1.2	19	22.4	65	76.5		
Bachelor	0	0.0	41	15.5	224	84.5	21.326	p<0.05
Master	1	4.3	4	17.4	18	78.3		
PhD	0	0.0	0	0.0	7	100.0		
Others	2	5.7	6	17.1	27	77.1		
Income								
< 5000	1	3.0	54	58.4	276	269.6		
5000-10000	1	0.7	18	13.1	55	60.3	23.427	p<0.05
> 10000	3	0.3	6	6.5	29	30.1		

Table 4: Pearson correlation between and ethnicity, qualification and income.

Socio-demographic	Practice						Chi-square value	Pearson Chi-square
	Poor		Moderate		Good			
	Frequency	%	Frequency	%	Frequency	%		
Gender								
Male	76	37.3	94	46.1	34	16.7	12.326	0.002
Female	81	34.0	140	58.8	17	7.1		
Residency								
Northern	10	22.4	38	33.4	15	7.3		
Central	56	60.7	98	90.5	17	19.7		
East coast	56	44.4	57	66.2	12	14.4		< 0.001
Southern	31	23.1	30	34.4	4	7.5		
Others	4	6.4	11	9.5	3	2.1		

essential preparedness measures. These gaps can hinder effective disaster response and recovery efforts. To bridge this gap, education and awareness campaigns are essential. Access to resources, such as emergency kits, evacuation routes, and shelters, significantly influences preparedness practices. Identifying resource gaps and ensuring equitable access to these resources is crucial.

Education plays a pivotal role in preparing communities for disasters [9]. Assessing the inclusion of disaster preparedness education in school curricula and the availability of training programs for the public is essential [10]. Investing in education and training can empower individuals and communities to be more resilient in the face of floods. Promoting sustainable and eco-friendly flood preparedness practices is also crucial [11]. The study found that there is no significant difference in knowledge, attitude, or practice among Malaysians according to socio-demographic factors. Education levels play a pivotal role in influencing individuals' ability to access the latest flood warnings and updates [12]. Gender-based differences in responses suggest a potential influence of gender on individuals' willingness to be proactive in assisting others during flood disasters [13].

Ethnicity also played a significant role in shaping individuals' responses to disasters, influencing their perceptions of risk, and guiding their actions when confronted with such situations [14]. Therefore, bridging knowledge gaps, improving communication and awareness campaigns, and promoting sustainable and eco-friendly flood preparedness practices are essential for a more resilient future [15]. The study found a significant relationship between income, residency, ethnicity, and attitude in flood disaster preparedness. Individuals earning less than $5000 had a higher level of knowledge (70.7%) compared to those with incomes between $5000 and $10000 (55.4%) and those earning over $10000 (48.6%). This could be attributed to their heightened vulnerability to flood disasters and the need for additional knowledge, experience, and skills related to catastrophes.

Residence also showed a significant correlation with knowledge, with individuals residing in the northern region having a higher level of knowledge (84.1%) compared to those in other areas. Ethnicity also played a role, with "Others" displaying a higher level of positive attitude (84.6%) compared to Malay, Chinese, and Indian ethnic groups. Differences in culture and language, particularly among new immigrant communities, render them vulnerable and less knowledgeable, ultimately affecting their preparedness and ability to recover swiftly from flood emergencies. Educational qualifications also played a significant role in shaping attitudes, with PhD holders exhibiting the most positive outlooks, while certificate holders displayed the lowest rate of positivity at 70.4%. Income levels were associated with a higher likelihood of possessing good knowledge, with lower income levels being associated with a higher likelihood of possessing good knowledge.

Flood disaster preparedness showed a clear distinction between genders, with female respondents exhibiting a notably higher level of preparedness (58.8%) compared to male counterparts (46.1%). Understanding these gender-based variations is essential for tailoring effective disaster preparedness and response strategies that address the specific needs and behaviors of different demographic groups. Regional knowledge disparities were also observed, with people residing in the northern region having the highest level of awareness, possibly influenced by regional factors, access to education, or local awareness campaigns [16]. Recognizing these disparities is crucial for policymakers and educators to target knowledge

enhancement initiatives and disaster preparedness efforts effectively [17].

The study on the Knowledge, Attitude, and Practice (KAP) of Flood Disaster Preparedness among Malaysians highlights the importance of improving these elements to strengthen disaster readiness. Enhancing knowledge through comprehensive information dissemination, fostering positive attitudes through awareness campaigns, and facilitating practical actions is crucial. This can be achieved through informative campaigns, workshops, and educational programs [18]. Attitudes play a significant role in motivating people to take action towards flood preparedness [19]. Public awareness campaigns can emphasize the importance of preparedness and highlight the benefits of being proactive [20]. Showcasing success stories of those who have effectively prepared for floods can inspire others to adopt a similar mindset [21]. Implementing practical preparedness measures, such as creating emergency kits, developing evacuation plans, and conducting regular drills, can empower Malaysians to be better prepared for flood events [22].

The research was conducted with 442 participants from diverse regions of Malaysia, including Sabah and Sarawak. A significant challenge in evaluating KAP in flood preparedness lies in the existence of knowledge gaps. Addressing these knowledge gaps through educational and awareness campaigns is imperative. The availability of resources, such as emergency kits, evacuation routes, and shelters, profoundly influences preparedness practices [23]. Identifying resource gaps and ensuring equitable access to these resources is indispensable. Education is also a pivotal factor in preparing communities for disasters, underscoring the importance of incorporating disaster preparedness education in school curricula and the availability of training programs for the public [9].

Attitude towards flood disaster preparedness was found to be influenced by factors such as education levels, gender-based differences, ethnic disparities, income levels, and regional variations [24]. Recommendations for strengthening disaster readiness include enhancing knowledge through comprehensive information dissemination, fostering positive attitudes through awareness campaigns, and facilitating practical actions by enabling individuals to implement preparedness measures [25].

However, the study faced limitations, including a short research period, a small sample size, and reliance on online survey methods. Recommendations include extending the research duration, increasing the sample size, and incorporating face-to-face surveys for more accurate results. Biases were identified in sample composition, with an overrepresentation of women, degree holders, and certain educational levels, suggesting the need for broader and more representative sampling for increased reliability.

CONCLUSION

The study found that Malaysians have a poor understanding of flood disaster preparedness, with bachelor's degree holders showing better preparedness knowledge. However, gender disparities in attitudes towards flood preparedness were noticeable, with females showing a more positive attitude. Knowledge levels varied across geographic regions, with the northern region showing the highest awareness. Ethnicity also influenced knowledge levels, with Malays outperforming other ethnic groups. Lower-income people had higher levels of knowledge, highlighting the need for information dissemination and preparedness initiatives for vulnerable populations. Future research should address limitations by extending the study duration, increasing sample variety, and ensuring a more equitable representation of gender and education levels. Strengthening preparedness activities is crucial for a more resilient and disaster-ready society.

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Case Report

CONTRALATERAL OPTIC NEUROPATHY IN SPHENOID WING MENINGIOMA WITH MIDBRAIN COMPRESSION

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ABSTRACT

A 38-year-old lady presented with progressively worsened binocular diplopia for 2 months associated with periorbital pain, headache, nausea and right sided tinnitus. Ophthalmic examination revealed Left Relative Afferent Pupillary Defect (RAPD) with impaired optic nerve function and right 6th cranial nerve palsy. Fundus examination showed bilateral optic disc swelling, more in the left eye. Humphrey Visual field showed left superior quadrant field defect. MRI Scan revealed right sphenoid meningioma with midline shift causing compression of the adjacent ventricle. She underwent preoperative angioembolization of the tumour followed by right craniotomy and tumour excision. Post-operatively, the diplopia, RAPD, optic disc swelling and visual field defect resolved. Optic neuropathy may be worst on the contralateral side of a space-occupying lesion despite bilateral optic disc swelling.

INTRODUCTION

Papilloedema is a medical emergency as it indicates raised intracranial pressure (ICP). A raised ICP may result in compressive optic neuropathy, particularly causing Relative Afferent Pupillary Defect (RAPD) on the ipsilateral side of the more severe optic disc swelling, alongside other compressive features affecting cranial nerve involvement, commonly the 6th cranial nerve. Contralateral RAPD may however be seen in optic tract lesions due to decussation of the optic nerve fibres at the optic chiasm. We report a case of a patient with a right sphenoid wing meningioma with increased ICP and an RAPD on the contralateral side of the tumour.

CASE REPORT

A 38-year-old lady with no known medical illness presented with binocular horizontal diplopia for 2 months. It was initially intermittent but worsened to persist throughout the day. The symptom was relieved when she turned her head towards the left side. There was no blurring of vision, central scotoma or metamorphopsia. The diplopia was associated with a right-sided tinnitus and headache which worsened upon waking up from sleep or when bending forward. She also had periorbital pain which was aggravated on eye movement. She had nausea but no vomiting for 1 month. There was no other significant neurological complaint.

Ophthalmic examination revealed best corrected visual acuity of 20/60 in both eyes. There was presence of Relative Afferent Pupillary Defect (RAPD) and reduced optic nerve function on the left eye (LE). Further examination showed limitation in the right lateral gaze consistent with right 6th cranial nerve palsy evidenced on Hess chart. Fundus examination showed bilateral optic disc swelling, more profound in the LE. Humphrey Visual field (HVF) showed incongruous left homonymous hemianopia with an enlarged blind spot in both eyes. Other neurological examination was unremarkable.

Magnetic resonance imaging of the brain revealed a well-circumscribed extra-axial mass at the right middle cranial fossa established by the presence of a CSF cleft and cortical buckling (Figure 1), suggesting a sphenoid wing meningioma. The lesion exerted a mass effect to its surrounding structures such as right temporal and frontal lobes and displacing the right middle cerebral artery. There was also effacement of the right lateral ventricle and significant midline shift with uncal herniation which explained the symptoms of elevated intracranial pressure.

The patient underwent preoperative angioembolization of the tumour followed by right craniotomy and tumour excision. Histopathology examination showed neoplastic meningothelial cells arranged in whorled storiform patterns and syncytial-like lobules set in collagen rich matrix (Figure 2a). The tumour cells exhibit mild nuclear

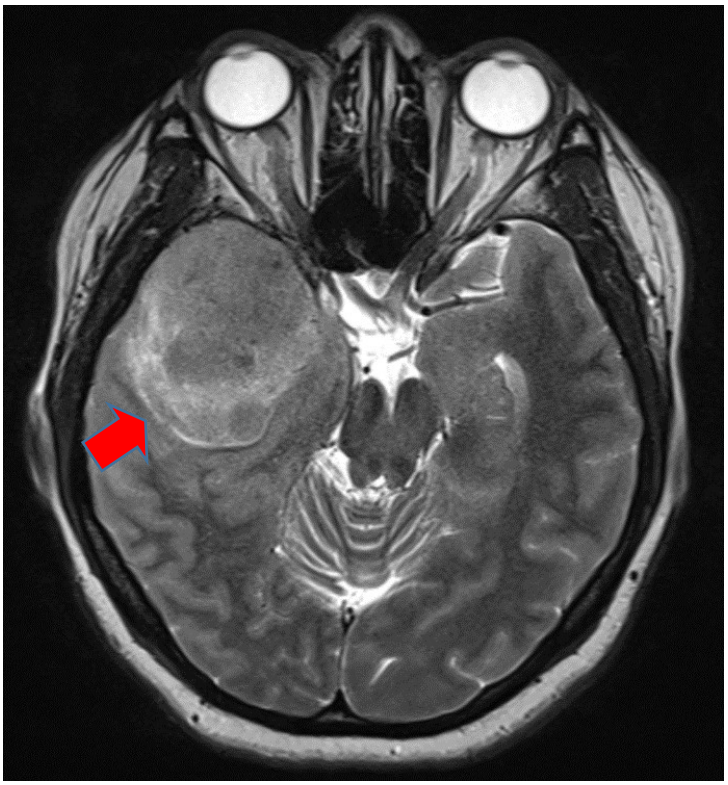

Figure 1: Axial view of T1-weighted MRI imaging showing well circumscribed extra-axial mass at the right middle cranial fossa measuring 5.4cm x 5.6cm x 6.3cm (AP x W x CC). There is midline shift to the left with uncal herniation and displacement of the right middle cerebral artery and midbrain. Bilateral globes are normal with no optic nerve compression.

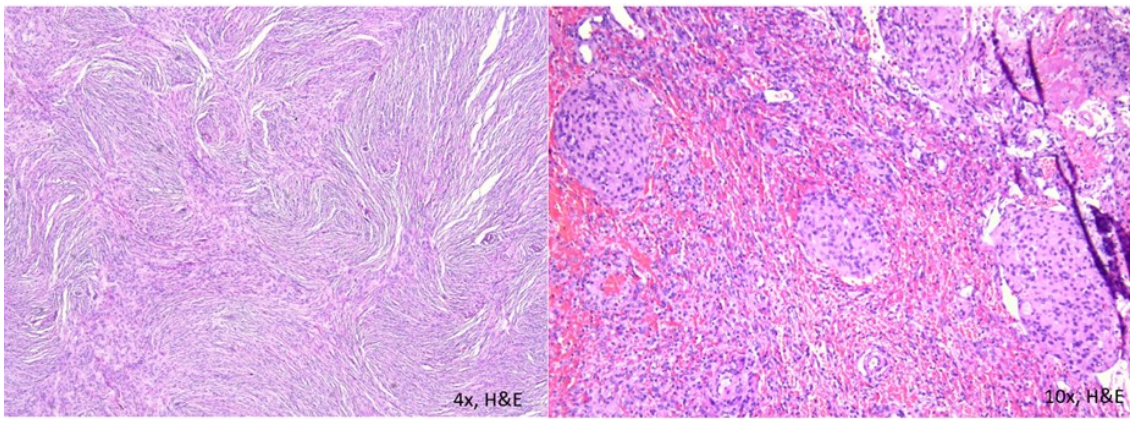

Figure 2a: H&E stain of the tumor tissue showing the tumour composed of neoplastic meningothelial cells arranged in whorled storiform patterns and syncytial-like lobules set in collagen-rich matrix depicting meningioma

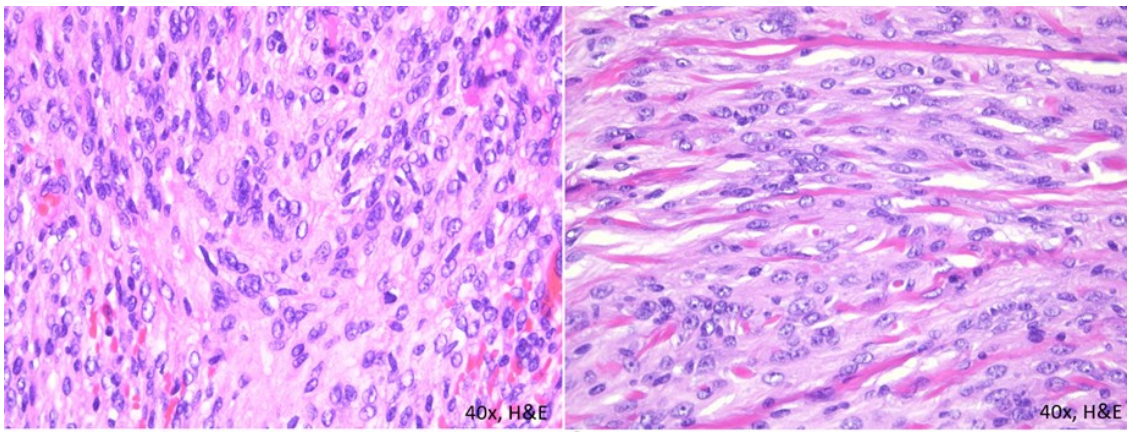

Figure 2b: H&E stain showing the tumour cells exhibiting mild nuclear atypia, round to oval, vesicular nuclei, nuclear haloes, pseudoinclusions, inconspicuous nucleoli and indistinct cytoplasmic borders. No anaplastic cells were observed.

atypia, round to oval vesicular nuclei, nuclear haloes, pseudoinclusions, inconspicuous nucleoli and indistinct cytoplasmic borders (Figure 2b). A diagnosis of sphenoid meningioma was confirmed.

Six weeks post-operatively, the patient recovered completely with no ocular complaints. Vision improved to 20/20 with no diplopia and complete eye movements in all gaze. There was also complete resolution of the left RAPD. Bilateral fundus examination showed resolving bilateral optic disc swelling (Figure 3). HVF showed normal VF with no defects (Figure 4).

DISCUSSION

Ophthalmic manifestations of space occupying lesions are indeed a useful aid in localisation of the lesion. While neurological symptoms may often be non-specific, ocular findings including mapping of visual fields can assist in correctly determining the position of the tumour in the brain.

RAPD is usually present when there is optic nerve dysfunction causing abnormal light transmission in the afferent pupillary pathway. It is however most common due to a pre-chiasmal pathology causing the defect to be detected on the same side of the insult. A contralateral RAPD can also happen, albeit less frequently. This occurs in optic tract lesions due to decussation of the optic nerve fibres at the optic chiasm whereby 53% of fibres receives input from the contralateral nasal retina. This is attributed by the presence of higher photoreceptor density in the nasal than the temporal retina. Because of this asymmetric distribution of photoreceptors and the ratio of crossed to uncrossed fibers in the chiasm, an RAPD can also result from contralateral optic tract and midbrain lesions [1]. The lesion is more suggestive to be at the optic tract when it is accompanied with complete homonymous hemianopia. The pupillary defect will be present on the side opposite to the lesion, resulting from damage to afferent nasal fibers that cross at the optic chiasm which will then continue on the optic tract and subsequently synapse at the pretectal

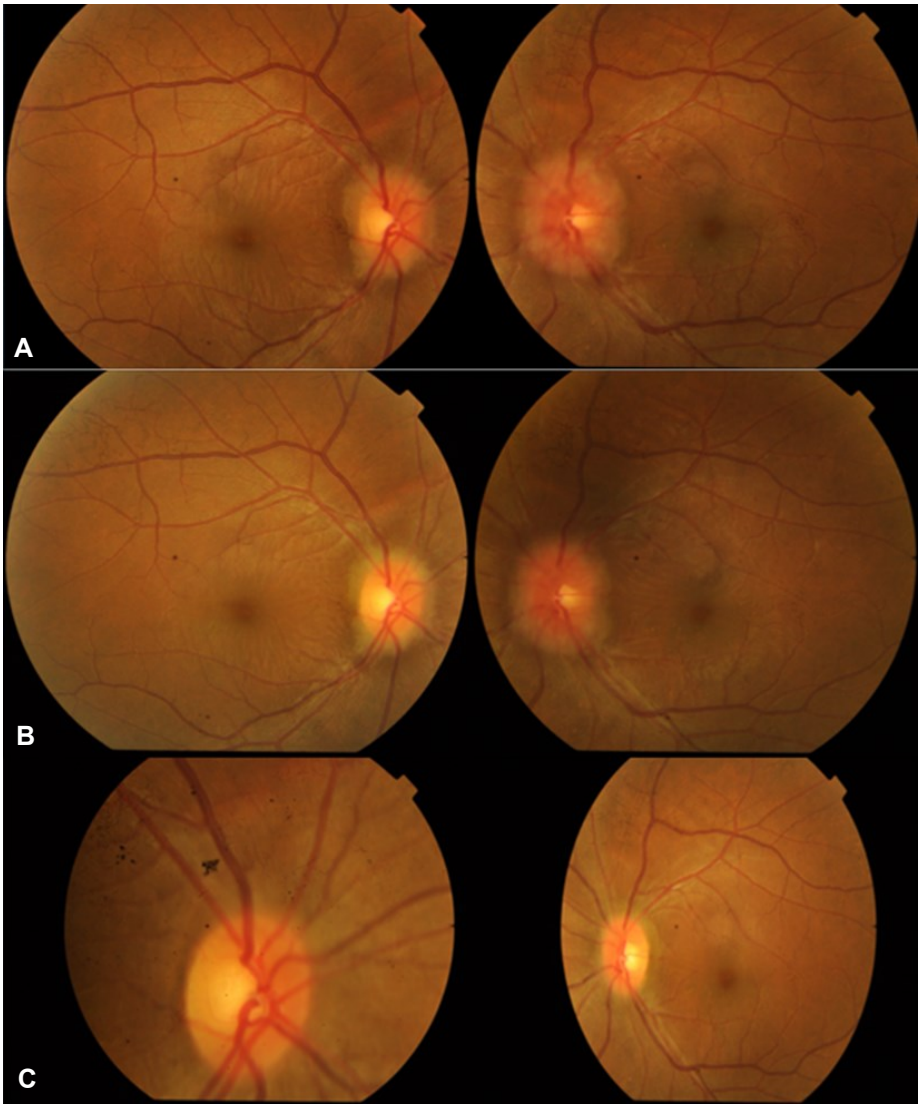

Figure 3: (A) Coloured fundus photograph showing bilateral optic disc swelling at presentation. (B) One week post tumour excision showed reduction in optic disc swelling with clearer disc margins. (C) Six weeks post tumour excision showing complete resolution of the optic disc swelling.

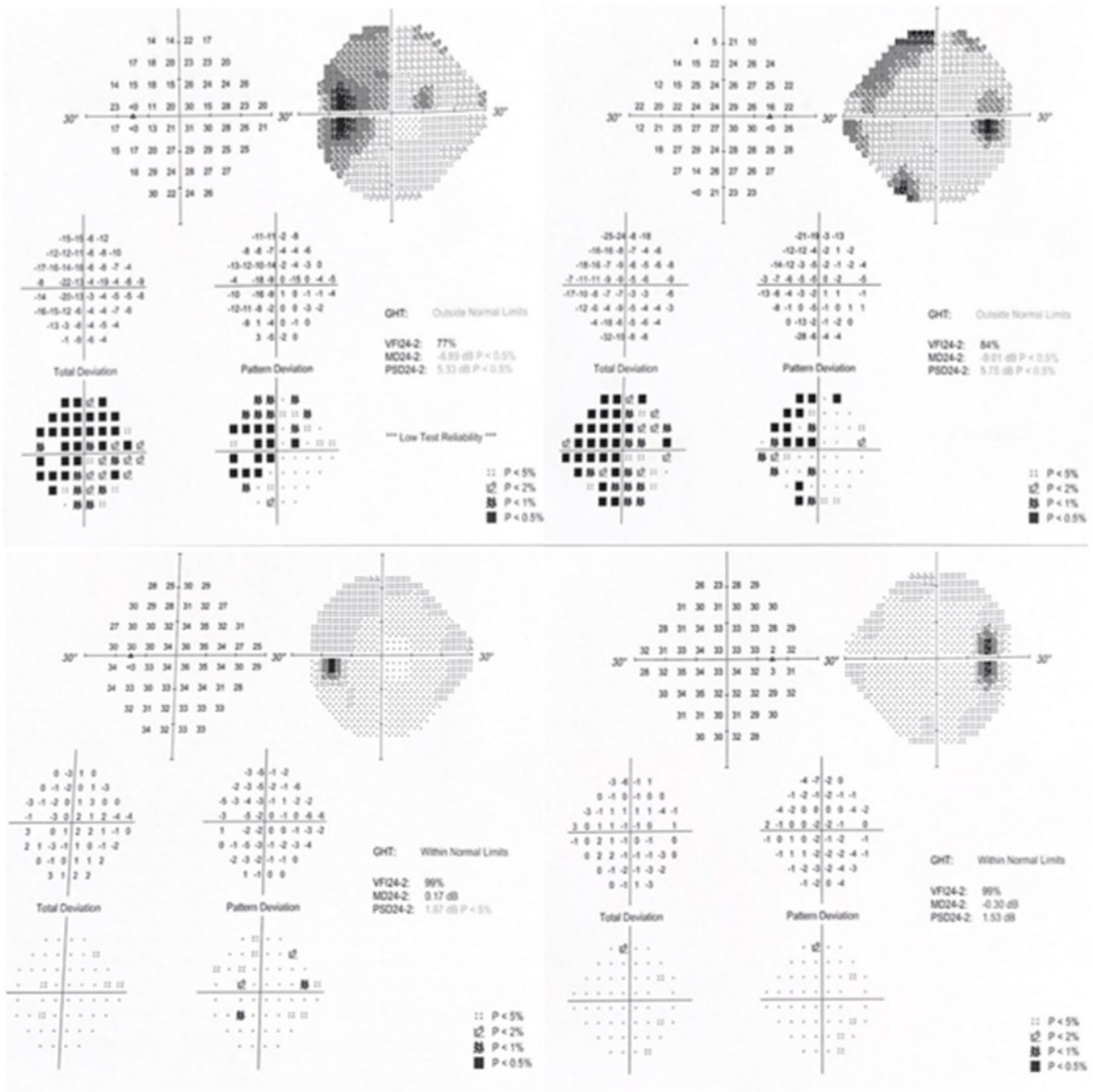

Figure 4: (Top) 24-2 Humphrey visual field on presentation showing incomplete left homonymous hemianopia with (Bottom) resolution of visual field defect 6 weeks port tumour excision.

nuclei, before partly decussating to synapse at the Edinger-Westphal nuclei as part of the afferent pupillary light reflex pathway [2].

The presence of RAPD can also distinguish between an optic tract lesion or damage posterior to the lateral geniculate nucleus as there will be a band-shaped atrophy of the contralateral optic disc in optic tract lesion [3]. In certain cases, RAPD may be seen despite the absence of any afferent visual pathway lesion [4]. This can be further explained as the midbrain contains retinotectal tract that is made up of a small subset of ganglion cells where 10% retinal afferent fibers bypass the lateral geniculate nucleus and is relayed here [1]. This tract will then transverse the superior colliculus and subsequently synapse at the pretectal nucleus near the junction of midbrain and forebrain. From here it projects to the Edinger-Westphal nucleus, the postganglionic ciliary ganglion where impulse is sent to the pupillary constrictors as well as ciliary muscles. Lesions affecting these fibers that have branched off from the optic tract during their trajectory to the dorsal midbrain can result in contralateral RAPD without visual field defect as the terminal portion of the afferent pupillary pathway is affected [1].

In this case, the lesion is localized at the contralateral middle cranial fossa which is large enough to cause displacement of the midbrain away from the midline. However, factors of increased CSF pressure affecting more on the contralateral optic nerve should be taken into consideration to explain the presence of a contralateral RAPD in this case, although the visual field demonstrated incongruous left homonymous hemianopia. There was no bowtie optic atrophy seen in eye with RAPD, possibly because of the early presentation, allowing near complete resolution of all ophthalmic features in this patient. Younger age, early presentation and

early surgical excision may yield better visual outcome and optic disc changes before optic atrophy sets in [5]. These are among good prognostic factors apart from tumour size, tumour location and extension, preoperative visual status, duration of symptoms, and the surgical technique [6].

CONCLUSION

Contralateral optic neuropathy may be seen in a tumour causing bilateral disc swelling. Early treatment and excision of a space-occupying lesion may result in better visual outcome, reversal of visual field defect and RAPD.

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Case Report

A BLINDING NEEDLE

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ABSTRACT

Acupuncture, a practice rooted in traditional complementary medicine (TCM), involves the insertion of thin needles into the skin. It has been proposed as an adjunct treatment for optic nerve and retinal diseases. However, there have been documented cases of ocular infections, including cellulitis and endophthalmitis, associated with acupuncture. In this report, we present a case of pan-ophthalmitis, an infection affecting the entire eyeball, that occurred following acupuncture treatment. The purpose of this report is to highlight the risks associated with TCM treatments, which are often overlooked or insufficiently communicated to patients. Tragically, the outcome for this patient was blindness, emphasizing the importance of informed decision-making when considering acupuncture as a treatment option.

CASE REPORT

A 76-year-old gentleman with underlying chronic obstructive pulmonary disease presented to our Ophthalmology Clinic for follow-up on bilateral advanced glaucoma, which was being managed with triple antiglaucoma medications, and allergic conjunctivitis. The patient is clinically blind in his left eye due to decompensated cornea caused by left herpetic keratitis. He has a history of multiple eye surgeries, including bilateral trabeculectomy with mitomycin C, bilateral cataract extraction with intra-ocular lens implantation, and left (OS) trans-scleral cyclophotocoagulation.

The patient visited our clinic complaining of right eye (OD) pain with discharge persisting for 8 days. He also experienced reduced vision and periorbital swelling. No fever was reported. Upon further inquiry, the patient revealed that a week prior to the onset of symptoms, he had undergone traditional acupuncture. He mentioned that four needles were inserted in his right periorbital area during the procedure. The symptoms began on the same day as the acupuncture session. The following day, the patient returned to the acupuncturist, who then provided unlabeled antiseptic eyedrops, as depicted in Figure 1. However, the symptoms continued to worsen. Due to fear and lack of transportation, the patient did not seek medical treatment until the eighth day following the acupuncture session.

Upon examination, the vision of the right eye was limited to perceiving light only, while there was no perception of light in the left eye. The right eyelids appeared swollen, and the conjunctiva was congested. Examination of the right cornea revealed corneal melting with thinning and descemetocele, as shown in Figures 2 and 3. A negative Seidel's test was obtained. The anterior chamber was not visible due to the hazy cornea caused by decompensation. Evaluation of the extraocular muscles showed a general reduction in ocular movements, with adduction at 0, elevation and depression at -1, and abduction at -2. No fundus view was attainable.

Examinations of the left eye were consistent with previous findings of advanced glaucoma. The anterior segment displayed features of a decompensated cornea, as depicted in Figure 4. Fundus examination revealed a pale, fully cupped disc. Based on these findings, the patient was diagnosed with infective panophthalmitis in the right eye and was subsequently admitted for further management.

Ultrasonography of the right eye revealed the presence of large loculations in the vitreous, as depicted in Figures 5 and 6. Subsequently, vitreous tapping was performed, and the culture results indicated the growth of Pseudomonas aeruginosa, as shown in Figure 7. Other investigations did not reveal any significant findings.

Figure 1 : Unlabelled topical eyedrop given to patient upon discharge from acupuncture.

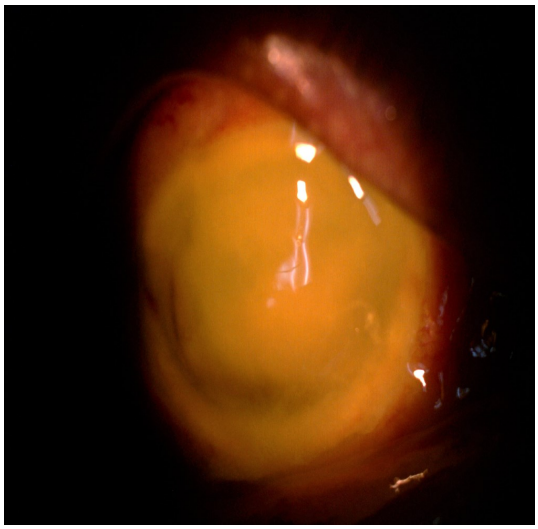

Figure 2: Anterior segment photograph of the right eye; diffuse keratitis with dense infiltrates.

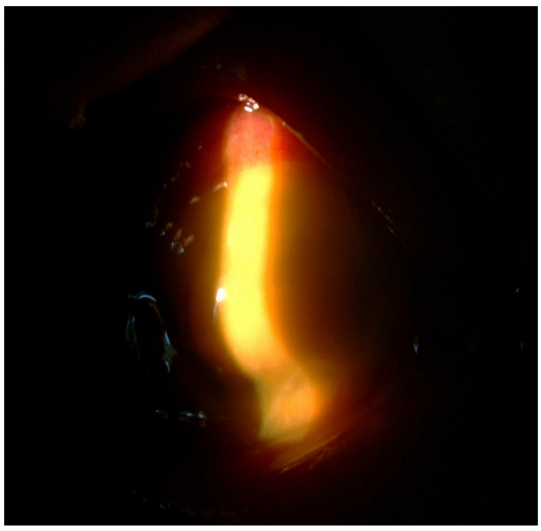

Figure 3: Severe thinning in the inferior cornea with descemetocele seen at the central cornea of the right eye.

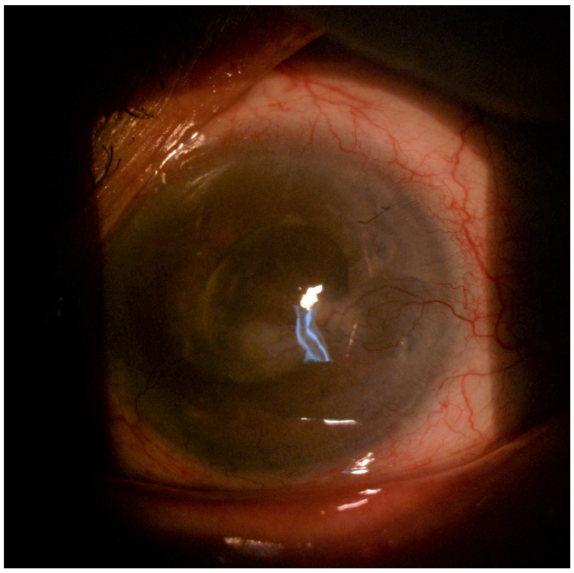

Figure 4 : Anterior Segment examination of the left eye; decompensated cornea, otherwise no signs of infection.

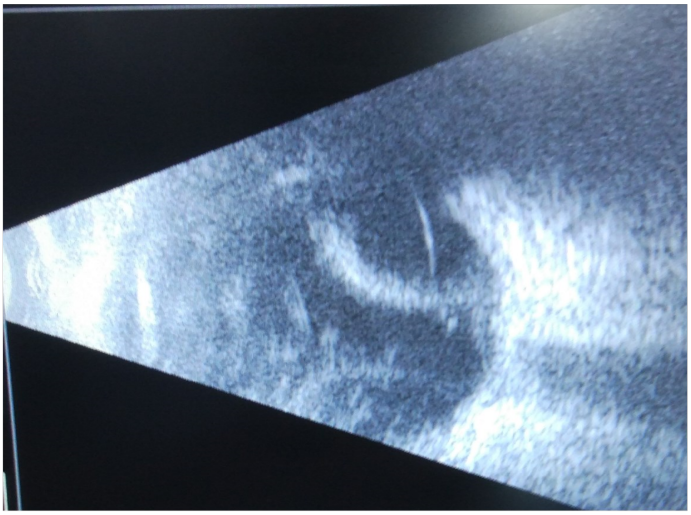

Figure 5: Ultrasonography of the right eye; loculations in the vitreous with dense vitritis.

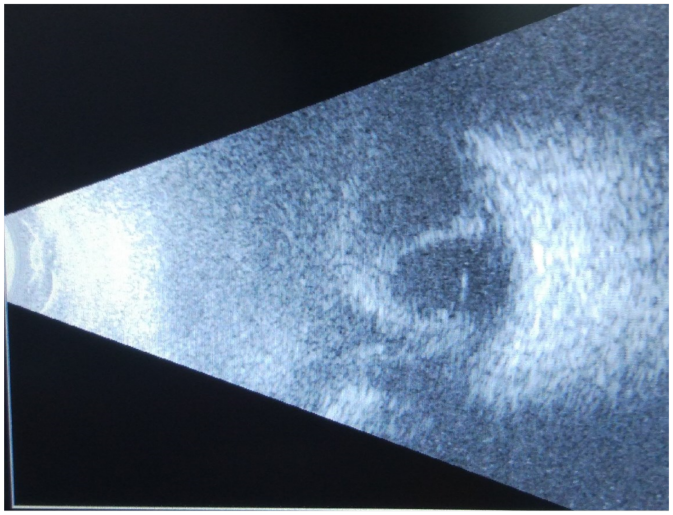

Figure 6: Ultrasonography of the right eye; loculations in vitreous.

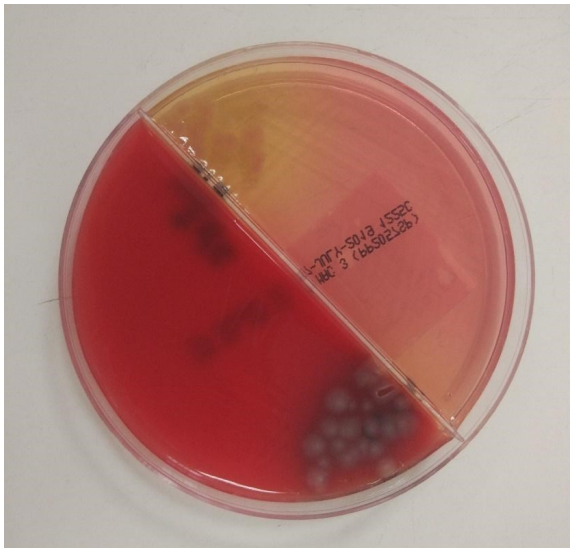

Figure 7: Bacterial culture from vitreous tap specimen revealed *Pseudomonas sp.*

Following the diagnosis, the patient was managed as an in-patient. Multiple intravitreal injections of ceftazidime (2mg/0.1ml) and vancomycin (1mg/0.1ml) were administered. Additionally, intensive medical treatment was initiated, consisting of ceftazidime (5%) and gentamicin (0.9%) eye drops, along with systemic ciprofloxacin. The patient received intravenous ciprofloxacin at a dosage of 750mg twice daily for a duration of two weeks.

Despite the aggressive treatment administered over a period of 10 days, the patient's eye condition continued to worsen, necessitating the decision to proceed with evisceration.

DISCUSSION

The morbidity experienced by this patient may be attributed to a lack of understanding regarding the importance of sterility and infection control within the traditional complementary medicine (TCM) community. Although efforts were made to discharge the patient with antiseptic eye drops, it is crucial to emphasize that the efficacy of antiseptic eye drops relies on a sterile preparation. In this case, the preparation and storage of the mentioned eye drops raised concerns about their sterility. It is worth noting that the documented and reported possibility of gram-negative bacterial colonization of Povidone Iodine is known among the medical fraternity but may not be common knowledge within the TCM community [3].

Furthermore, it is important to highlight that despite the exploration and trial of acupuncture for glaucoma, there is currently no evidence supporting its efficacy in the treatment of glaucoma [4].

In 2010, Woo PCY published an article in BMJ discussing infections associated with acupuncture [2]. The study revealed a high prevalence of skeletal muscular and skin infections among acupuncture recipients. Additionally, LEE SY, in

2002, also documented cases of endophthalmitis related to acupuncture, with Staphylococcus aureus being commonly implicated [1].

In Malaysia, the government is currently taking steps towards the registration and licensing of Traditional Complementary Medical (TCM) practitioners. As part of this process, an investigation body has been established to address and investigate any complaints reported against TCM practitioners.

CONCLUSION

Establishing investigation bodies to address complaints and regulate the practice of TCM is an important step in safeguarding patient well-being. Overall, this case serves as a reminder for healthcare professionals, patients, and the TCM community to prioritize patient safety, adhere to proper infection control practices, and rely on evidence-based treatments in order to minimize risks and optimize patient outcomes.

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Case Report

ACQUIRED CONJUNCTIVAL INCLUSION CYST FOLLOWING MULTIPLE EYELID SURGERIES POST TRAUMA

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ABSTRACT

This report highlighted that multiple surgery on the eyelid can lead to an acquired conjunctiva inclusion cyst. A 6-year-old healthy boy was referred to the oculoplastic department with a complaint of swelling over the right upper eyelid and cosmetic concerns following multiple complicated surgeries to the right upper eyelid. Under the oculoplastic team, a right eye ptosis repair with resuturing of the upper eyelid was done under general anesthesia. Intraoperatively, a conjunctival inclusion cyst measuring 1.5mm was excised subcutaneously with an intact capsule in the medial segment of the upper eyelid. Postoperatively, he still had ptosis with highbrow position and frontalis over action. However, his visual acuity improved from 6/9 to 6/6 on the right eye following a mild resolution of ptosis. Through this report, it is concluded that the complications of conjunctiva cyst following eyelid repair can be avoided with proper surgical technique during the primary repair.

INTRODUCTION

Conjunctival inclusion cysts are slow-growing, benign lesions that can be congenital or acquired due to surgery or trauma. These cysts are filled with serous fluid containing shed cells and mucin. Inclusion cysts are classified as primary or secondary, depending on their causes [1]. We report a case of an acquired conjunctival inclusion cyst following multiple eyelid surgeries.

CASE REPORT

A 6-year-old healthy boy was referred to the oculoplastic department with a complaint of swelling over the right upper eyelid and cosmetic concerns following multiple complicated surgeries to the right upper eyelid. One month prior, he sustained a traumatic laceration to the right upper eyelid after getting pierced by a metal hook attached to a cradle and visual acuity on the right eye was 6/10.

He first underwent right upper eyelid toilet and suturing under general anesthesia on post-trauma day one, followed by refashioning of the upper eyelid on day three. Subsequently, he developed a cicatricial ectropion with granuloma and underwent a third surgery for excision and refashioning of the upper lid again. Unfortunately, his wound healed poorly with dense scar tissue, mechanical ptosis and irregular lamellar surface (Figure 1).

Under the oculoplastic team, a right eye ptosis repair with resuturing of the upper eyelid was done under anesthesia (Figure 2). Intraoperatively, a conjunctival inclusion cyst measuring 15 x 10 mm was excised subcutaneously with an intact capsule in the medial segment of the upper eyelid (Figure 3). Mini-monoka was used to intubate the lacerated upper punctum and canaliculi. Histopathology of the cyst was sent however was lost due to a technical glitch.

Postoperatively, he still had ptosis with highbrow position and frontalis over action (Figure 4). However, his visual acuity improved from 6/9 to 6/6 on the right eye following a mild resolution of ptosis.

DISCUSSION

Inclusion cysts are classified as primary or secondary, depending on their causes. The primary inclusion cyst is generally restricted to the superomedial side of the orbit and is congenitally developed during the embryonal period by the separation of a portion of conjunctival epithelial cells. The secondary type of inclusion cyst is more

Figure 1: Right eye mechanical ptosis with dense scarring (blue arrow)

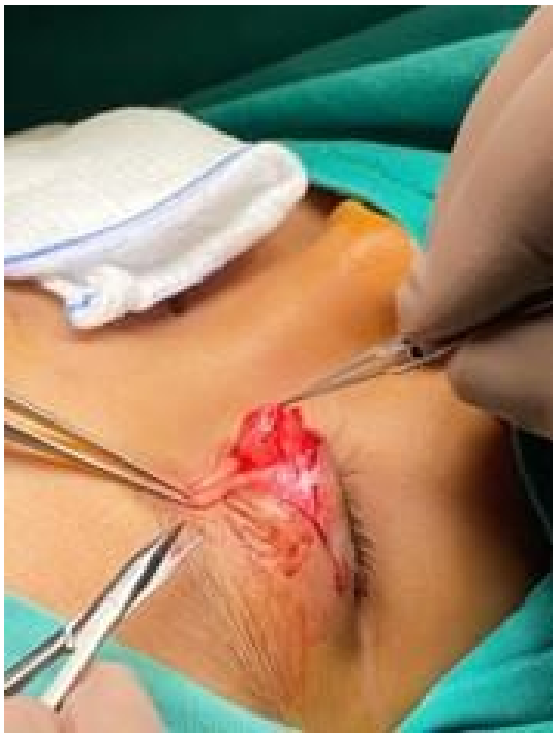

Figure 2: Right eye resuturing of eyelid revealed conjunctival inclusion cyst.

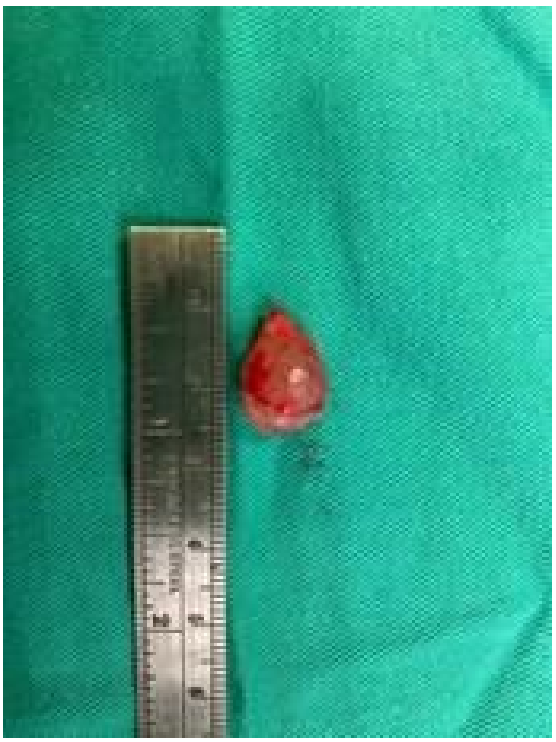

Figure 3: Macroscopic appearance of the conjunctival inclusion cyst measuring 15x10 mm,thin walled and firm consistency filled with serous fluid.

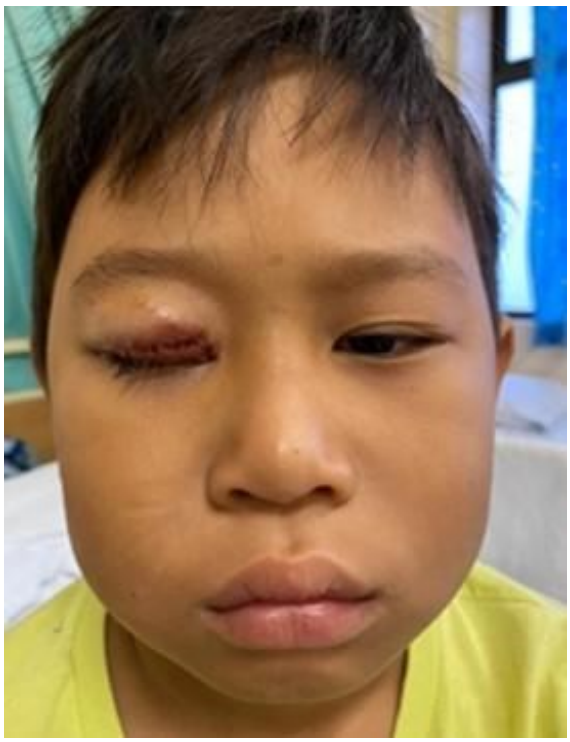

Figure 4: Post operative day 2. Swollen eye-lids with intact sutures and highbrow position.

prevalent than the primary cyst [2]. It is an acquired type of cyst and is located primarily in the superolateral side of the orbit. It occurs naturally or under inflammatory conditions of the conjunctiva, and it may be developed by amalgamation of mucosal folds. In most cases, it is developed by detachment of a portion of the conjunctival epithelium by surgery or trauma and its following implantation onto the conjunctival epithelium.

The histopathologic section usually reveals conjunctival cyst lined with nonkeratinizing stratified

epithelium filled with Periodic Acid Schiff (PAS) positive ingredients with no inflammatory cells in the vicinity [3].

In this case, the amalgamation and implantation of conjunctival epithelium into the eyelids following multiple eyelid surgeries are therefore responsible for the occurrence of an inclusion cyst within the eyelid structure. In addition, histamine, eosinophil, major basic protein, prostaglandin F, cytokines and other characteristic inflammatory mediators of post traumatic reactions may cause the development of inclusion cysts by inducing a certain toxic reaction [4,5]. However, this is difficult to confirm, as immunological examinations and biopsy of the inclusion cysts was not performed in this case.

CONCLUSION

The complications of conjunctiva cyst following eyelid repair can be avoided with proper surgical technique during the primary repair. This can be achieved with good knowledge of eyelid anatomy thus minimizing complications and reducing the need for multiple surgeries.

ETHICAL CONSIDERATION

This study has been conducted in accordance to the Declaration of Helsinki and an informed consent form has been obtained from the patients' parent.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

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Original Article

ENUCLEATION TRENDS AND RISK FACTORS OF RETINOBLASTOMA PATIENTS IN MALAYSIA

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ABSTRACT

A study was conducted to investigate the clinical presentation of retinoblastoma cases in Malaysia, with a focus on identifying risk factors associated with enucleation. We conducted a cross-sectional analysis of registry data from the National Retinoblastoma Registry spanning from 2004 to 2022. Results based on a cohort of 277 retinoblastoma patients, yield noteworthy insights. The median age at diagnosis was 16 months, with a predilection for unilateral presentation (65%) over bilateral (35%). Gender distribution exhibited no significant bias, with 55.6% males and 44.4% females. Ethnicity-wise, the Malay group demonstrated the highest incidence at 57.0%, followed by Chinese (19.1%) and Indian (7.2%) populations. Leukocoria emerged as the predominant initial symptom, manifesting in 65.4% of cases. Combining leukocoria and strabismus accounted for 12.3% of cases, while strabismus alone was observed in 4.5% of cases. Extraocular extensions, detected radiographically, were noted in 12% of patients, with optic pathway involvement being the most prevalent (3.5% unilaterally and 2.9% bilaterally). Risk factors for enucleation were also examined, revealing that unilateral cases carried a significantly higher enucleation risk (10.48 times) compared to bilateral cases. A family history of retinoblastoma was associated with a noteworthy 89% reduction in enucleation risk. Additionally, advanced International Intraocular Retinoblastoma Classification (IIRC) stages D and E correlated with an elevated likelihood of enucleation. In conclusion, our study underscores the importance of early detection, particularly in unilateral cases and advanced stages of retinoblastoma. These findings hold significant clinical relevance and can inform more informed clinical decision-making and patient counselling.

INTRODUCTION

Retinoblastoma, though rare, stands as the predominant primary intraocular malignancy in paediatric populations. Despite its rarity, global incidence approximates 1 in every 15,000 to 20,000 live births, translating to an estimated annual caseload of around 9,000 [1]. The key genetic event implicated in its pathogenesis pertains to the inactivation of the RB1 gene, located at the chromosomal locus 13q14, a known tumor suppressor gene. This inactivation typically transpires through mutation or deletion mechanisms affecting both alleles of this gene [2].

Globally, the predominant manifestation of retinoblastoma is leukocoria, accounting for approximately 60% of cases, according to recent research. Strabismus follows, presenting in about 10% of instances, with proptosis making up 7%, and a co-occurrence of leukocoria and strabismus in approximately 4% of pediatric cases [3]. 12% of patients exhibit symptoms indicative of advanced disease progression, such as proptosis, lid swelling, and ocular hyperemia. A comparative pattern of symptom presentation was observed in a study conducted by Shridevi et al., which investigated local retinoblastoma occurrences in Malaysia, identifying leukocoria as the leading presentation, followed by strabismus and proptosis [4]. Less frequent presentations in this study encompassed ocular erythema, preseptal cellulitis, epiphora, hyphema, secondary glaucoma, hemorrhagic ocular discharge, with one case noted incidentally post-cataract surgery.

The diagnosis of retinoblastoma principally relies on clinical observation during examination under anesthesia, supplemented by radiological tools including B-scan ultrasonography, magnetic resonance imaging (MRI), and computed tomography (CT) scans. Due to the potential risk of seeding, biopsy for histopathological diagnosis is typically avoided. CT scans, which were initially the diagnostic standard, particularly for evaluating leukocoria, had a sensitivity rate of 81-96% for

identifying calcification [5]. However, the utility of CT scans is limited by the child's radiation exposure and its comparative inferiority to MRI in detecting optic nerve invasion. Current evidence indicates the superior sensitivity of MRI in assessing retinoblastoma, especially in detecting optic nerve infiltration, extraocular extension, and intracranial spread [5].

The classification model for retinoblastoma has undergone substantial evolution. The first proposed system, the Reese-Elsworth classification, was based on the probability of preserving the eye following external beam radiotherapy (EBRT) [6]. However, with the advent of intravenous chemotherapy in the 1990s, the Intraocular Retinoblastoma Classification (IIRC) was introduced, centered around the risk of treatment failure, enucleation, or EBRT [7]. This classification, while useful, was limited in its singular assessment of ocular loss risk, without reflecting the holistic risk to the child from retinoblastoma. Consequently, a modified classification, the Intraocular Classification of Retinoblastoma (ICRB), was developed, emphasizing the prediction of outcomes following intraocular chemotherapy [8]. Another widely utilized classification system is the American Joint Committee on Cancer (AJCC) classification, which employs TNM staging with a focus on primary site involvement [9].

The primary objectives of retinoblastoma treatment encompass achieving oncological remission, conserving the globe and vision where possible, and ultimately mitigating the risk of systemic metastasis or life-threatening outcomes for the patient [10]. The therapeutic approach to retinoblastoma has markedly evolved, transitioning from the historical norm of enucleation to efforts to salvage the affected globe. There are many treatment modalities currently utilised, each presenting its unique set of indications, benefits, and drawbacks. Mendoza et al. (2016) have systematically listed these options in their publication [11]. Broadly, these interventions can be divided into non-surgical and surgical categories. The non-surgical options can be further stratified into focal therapy, chemotherapy, and external beam radiotherapy. Focal therapy, confined to the globe, includes adjunctive treatments such as thermotherapy, photocoagulation, cryotherapy, and plaque brachytherapy. Chemotherapy, on the other hand, can be administered through various routes including intravenous, intra-arterial, intravitreal, and periocular methods.

Intravenous chemotherapy involves a 2, 3, or 4 drug regimen delivered through an intravenous catheter on a monthly basis for 6–9 consecutive months. In general, intravenous chemotherapy is used for patients with the following: germline mutation retinoblastoma, bilateral retinoblastoma, familial retinoblastoma, age of 4 months or younger, suspicious evidence of early optic nerve or choroidal invasion [12]. Intraarterial chemotherapy, first introduced by Akihiro Kaneko in 1990, is indicated for non-germline mutation retinoblastoma, unilateral retinoblastoma, age greater than 4 months, recurrent retinoblastoma following previous intravenous chemotherapy or plaque radiotherapy, recurrent subretinal seeds involving two or more quadrants, and recurrent vitreous seeds [12, 13]. Periocular chemotherapy, primarily indicated for bilateral advanced groups D or E, is utilized when a higher local dose of chemotherapy is desired or for recurrent localized tumors [12]. Intravitreal chemotherapy is typically employed for vitreous seeds nonresponsive to standard therapy, or vitreous seeds recurring after previous treatments [12].

Enucleation, a surgical intervention primarily reserved for advanced-stage disease, continues to be the gold standard in avoiding life-threatening complications associated with retinoblastoma. The procedure entails meticulous removal of the entire globe and a significant portion of the optic nerve, while minimizing globe trauma and reducing the risk of tumor dissemination into the orbit [14].

Extensive investigations have been conducted into the histopathological risk factors and metastatic risks associated with retinoblastoma. However, the literature presently lacks studies pertaining specifically to the risk factors related to enucleation in retinoblastoma patients. The primary objective of our study is to discern the risk factors associated with enucleation, with a focus on demographic, clinical, and radiological features of patients presenting in Malaysia. Additionally, we aim to offer updated demographic and clinical statistics of retinoblastoma patients diagnosed within tertiary care centers in Malaysia. Our aspiration is that the insights gleaned from this investigation will equip ophthalmologists with the ability to estimate the probability of enucleation in retinoblastoma patients before the initial examination under anesthesia. We envision that these findings will enable more precise and targeted counselling strategies for parents, thereby facilitating the complex decision-making process concerning the potential enucleation of their child's eye.

MATERIAL AND METHOD

This is a cross-sectional study with a retrospective review of registry data from the National Retinoblastoma Registry of Malaysia which is part of the Malaysian National Eye Database (NED) from January 2004 to December 2022. Approval was obtained from the Ethics Committee of the National Medical Research Registry (NMRR). This study was performed according to the Declaration of Helsinki and ICH guidelines for good clinical practice.

All patients who were diagnosed and treated for retinoblastoma, whose data was entered into the retinoblastoma registry between the years 2004 to 2022 were recruited into the study. The subjects were eligible provided that: 1) They had a confirmed diagnosis of retinoblastoma clinically or by histopathological examination, 2) They had complete data entered into the registry pertaining to the scope of this study. No sampling was performed in this study due to the unknown size of the registry

between the years 2004 to 2022. However, based on a retrospective descriptive study by Shridevi et al (2018) in the Asian Pacific Journal of Cancer Prevention between the years 2004-2012, a sample size estimation was made using formulae for estimating a proportion without finite population correction. A minimum of 373 eyes are acquired to estimate a proportion of 58.6% enucleation based on the study with a 95% confidence interval and a margin of error of 5%.Sample size estimation was performed using Sample Size Calculator for Estimations, version 1.0.03 (2008).

Data was obtained from the vendor of the National Eye Database after approval by the person in charge of the National Eye Database and the National Retinoblastoma registry. The data that was collected included: age, gender, ethnicity, state of residence, presence of family history of retinoblastoma, symptoms of presentation, confirmation of diagnosis, laterality of disease, computed tomography (CT) findings if available, magnetic resonance imaging (MRI) findings if available and staging of the disease at time of diagnosis based on the International Intraocular Retinoblastoma Classification (IIRC). Out of a total of 384 patients entered into the registry for the duration of the study, only 277 patients met the inclusion criteria which accounted for a total of 374 eyes evaluated.

A descriptive analysis of all the demographic and outcome variables was performed. The results of the continuous variables were described with median and interquartile range and results of categorical variables were described with frequency and percentage. Chi Square test and Fisher Exact test were used to determine the association between categorical variables. Univariable and multivariable binomial logistic regression is carried out on the outcome variable to determine factors predisposing to the outcome. All statistical analysis was performed using Statistical Package for Social Science (SPSS) Ver 23.0 and *p -values of less than 0.05 were considered to be significant.*

RESULTS

In our analysis of 277 patients, Table 1 presents detailed information regarding the demographic characteristics of retinoblastoma patients in

Table 1: Demographic Characteristics of Retinoblastoma Patients in Malaysia.

Demographic Profile							
	Unilateral RE, n(%)	Unilateral LE, n(%)	p value[1]	Total Unilateral Cases, n(%)	Total Bilateral Cases, n(%)	p value[2]	Total (n, %)
Age of presentation [IQR: Total cases(6-33), Unilateral cases(6-33), Bilateral cases(6-36)]							
<1	11 (4.0)	12 (4.3)	0.735[3]	23 (8.3)	43 (15.5)	<0.001[3]	66 (23.8)
1- <2	17 (6.1)	26 (9.4)		43 (15.5)	28 (10.1)		71 (25.)
2- <3	27 (9.8)	21 (7.6)		48 (17.3)	18 (6.5)		66 (23.8)
3- <4	17 (6.1)	19 (6.9)		36 (13.0)	5 (1.8)		41 (14.8)
4- <5	5 (1.8)	7 (2.5)		12 (4.3)	1 (0.4)		13 (4.7)
5 and above	9 (3.3)	9 (3.3)		18 (6.5)	2 (0.7)		20 (7.2)
Gender							
Male	42 (15.2)	56 (20.2)	0.148[3]	98 (35.4)	56 (20.2)	0.614[3]	154 (55.6)
Female	44 (15.9)	38 (13.7)		82 (29.6)	41 (14.8)		123 (44.4)
Ethnicity							
Malay	45 (16.3)	59 (21.3)	0.313[3]	104 (37.6)	54 (19.5)	0.249[3]	158 (57.0)
Chinese	17 (6.1)	12 (4.3)		29 (10.5)	24 (8.7)		53 (19.1)
Indian	5 (1.8)	8 (2.9)		13 (4.7)	7 (2.5)		20 (7.2)
Others	19 (6.9)	15 (5.4)		34 (12.3)	12 (4.3)		46 (16.6)
Family History							
Positive	2 (0.7)	1 (0.4)	0.607[4]	3(1.1)	6 (2.2)	0.070[3]	9 (3.3)
Negative	84 (30.3)	93 (33.6)		177(63.9)	91 (32.9)		268 (96.8)

[1] *p value to determine significant association between variables and laterality in unilateral cases.*
[2] *p value to determine significant association between variables and laterality overall*
[3] *Chi square test*
[4] *Fisher exact test*

Malaysia. Our data demonstrated that more than 2/3rds of the total retinoblastoma cases in Malaysia were under the age of 3 years old. The age of presentation that exhibited the greatest number of bilateral cases was among children aged less than 1 year, accounting for 43 patients or 15.5% of the total sample size. Unilateral retinoblastoma was more prevalent in the age group 1- <2 years. An inverse relationship between age of onset and retinoblastoma incidence was observed across all categories. The median age of presentation was determined to be 16 months [IQR 6-33] overall and specifically 16 months [IQR 6-33] for unilateral cases and 15 months [IQR 6-36] for bilateral cases. With regards to gender, male patients accounted for a slightly larger proportion of retinoblastoma cases with 154 cases (55.6%) versus 123 female cases (44.4%).

The distribution of retinoblastoma across different ethnicities revealed that the Malay ethnic group had the highest incidence totalling 158 cases (57.0%). The Chinese ethnic group reported 53 cases (19.1%) while the Indian ethnic group had 20 cases (7.2%) overall. Other ethnicities reported a total of 46 cases (16.6%). In terms of family history, a positive history of retinoblastoma was reported in 3 unilateral cases (1.1%) and 6 cases (2.17%) of bilateral disease, totalling 9 cases (3.25%). The majority of patients (96.8%), however, did not have a familial history of the disease.

Statistical analyses utilizing the Chi-Square Test and Fisher Exact Test demonstrated an absence of statistically significant correlations between the prevalence of retinoblastoma in either the right or left eye among patients with unilateral presentations while accounting for variables including age, gender, ethnicity, and familial predisposition to the disease. However, a marked statistical significance was observed in comparing unilateral and bilateral instances with respect to age ($P<0.001$). Notably, our data showed that unilateral cases were more likely to present at an older age group compared to bilateral cases which had a tendency to present earlier comparatively.

Table 2 shows the distribution of presenting symptoms in our patients. Among the cases, leukocoria alone is the most common symptom, accounting for 65.4% of the total. Leukocoria, combined with strabismus, follows at 12.3%. Strabismus without leukocoria is observed in 4.3% of patients. Notably, advanced presentations, including redness, proptosis, vision loss, hyphema, lid swelling, cellulitis, and secondary glaucoma, collectively account for 16.2% of cases. Other symptoms, such as tearing, nystagmus, screening for RB, and incidental findings, are less frequent, each representing less than 1% of the total cases. Cornea opacity and eye discharge are the least reported symptoms, each at 0.4%. 2 cases (0.7%) from our dataset had retinoblastoma diagnosed after presenting with cataracts which had undergone cataract removal surgery.

Based on the examination of 374 eyes from a total of 277 retinoblastoma patients using imaging techniques namely computed tomography (CT) and magnetic resonance imaging (MRI) to detect extraocular extensions, 12% (45 eyes) showed evidence of extraocular extensions (Table 3). MRI scans (18.3%, 23 eyes) were found to be more sensitive than CT scans (9.2%, 27 eyes) in detecting these extensions. The Optic Pathway exhibits the highest prevalence of extraocular extension, with 13 cases (3.5%) in the unilateral and 11 cases (2.9%) in the bilateral group. The Orbit/Adnexa and Intracranial regions have lower frequencies, while cases involving multiple regions are less common.

The distribution of International Intraocular Retinoblastoma Classification (IIRC) staging was

Table 2: Distribution of Initial Presenting Symptoms in Retinoblastoma Patients in Malaysia.

Presenting Symptom	Unilateral, n(%)	Bilateral, n(%)	Total, n(%)
Leukocoria only	116 (41.9)	65 (23.5)	181 (65.4)
Leukocoria & Strabismus	25 (9.0)	9 (3.2)	34 (12.3)
Strabismus only	7 (2.5)	5 (1.8)	12 (4.3)
Proptosis	10 (3.6)	1 (0.4)	11 (4.0)
Redness	7 (2.5)	4 (1.4)	11 (4.0)
Poor vision/Loss of vision	5 (1.8)	1 (0.4)	6 (2.2)
Hyphaema	4 (1.4)	0 (0.0)	4 (1.4)
Lid swelling	2 (0.7)	1 (0.4)	3 (1.1)
Tearing	1 (0.4)	1 (0.4)	2 (0.7)
Secondary glaucoma	0 (0.0)	2 (0.7)	2 (0.7)
Cellulitis	0 (0.0)	2 (0.7)	2 (0.7)
Nystagmus	0 (0.0)	2 (0.7)	2 (0.7)
Screening for RB	0 (0.0)	2 (0.7)	2 (0.7)
Incidental finding post cataract surgery	2 (0.7)	0 (0.0)	2 (0.7)
Incidental finding (unspecified)	0 (0.0)	1 (0.4)	1 (0.4)
Eye discharge	1 (0.4)	0 (0.0)	1 (0.4)
Cornea Opacity	0 (0.0)	1 (0.4)	1 (0.4)

Table 3: Incidence of Extraocular Extensions in Retinoblastoma Patients in Malaysia based on Imaging Findings.

Extraocular Extension	Unilateral , n(%)	Bilateral , n(%)
Optic Pathway	13 (3.5)	11 (2.9)
Orbit/Adnexa	5 (1.3)	1 (0.3)
Intracranial	0 (0.0)	0 (0.0)
Optic Pathway and Orbit/Adnexa	4 (1.1)	2 (0.5)
Optic Pathway and Intracranial	1 (0.3)	0 (0.0)
Orbit/Adnexa and Intracranial	1 (0.3)	1 (0.3)
Optic Pathway, Orbit Adnexa and Intracranial	4 (1.1)	0 (0.0)

Footnote: Imaging that were performed for the patients were either a CT scan or MRI scan or Both. In cases where both imaging modalities were utilized the results of the MRI scan was taken due to its superiority in detecting extraocular extension.

Table 4: Distribution of International Intraocular Retinoblastoma Classification (IIRC) Staging in Malaysian Retinoblastoma Patients.

IIRC Stage	Unilateral, n (%)	Bilateral Right Eye, n (%)	Bilateral Left Eye, n(%)	Total, n(%)
Group A	0 (0.00)	13 (3.5)	11 (2.9)	24 (6.4)
Group B	1 (0.3)	14 (3.7)	13 (3.5)	28 (7.5)
Group C	8 (2.1)	10 (2.7)	7 (1.9)	25 (6.7)
Group D	28 (7.5)	23 (6.2)	16 (4.3)	67 (17.9)
Group E	143 (38.2)	37 (9.9)	50 (13.4)	230 (61.5)

analyzed, as presented in Table 4. The findings revealed varying proportions across the different IIRC stages. Among the different stages, Group E is the most prevalent, accounting for 38.2% of unilateral cases and 23.3% of bilateral cases, contributing to an overall representation of 61.5% of the total cases. Group D also holds significance, representing 7.5% of unilateral cases, and 10.5% of bilateral left eye cases, summing up to 17.9% of the total cases.

An extensive analysis was conducted to investigate the potential associations between various variables and the risk of enucleation among our patients by evaluating a total of 374 eyes. Single and multiple logistic regression analysis (Table 5) were performed, focusing on factors such as age, gender, ethnicity, laterality of disease, presence of family history, IIRC staging, and the presence of extraocular extension on imaging. We determined that the rate of enucleation from our dataset based on the number of eyes treated was 68.4%.

The single logistic regression revealed that age exhibits a noteworthy pattern, with increasing odds ratios for enucleation in relation to age groups, ranging from 2.18 to 5.99 for ages 1-2 years through ≥ 5 years. Notably, unilateral cases show significantly higher odds of enucleation compared to bilateral cases, with an odds ratio of 15.16. A positive family history of retinoblastoma significantly reduces the odds of enucleation (odds ratio: 0.15). IIRC Staging Group E and the presence of extraocular extension on imaging both have substantial odds ratios for enucleation, at 147.13 and 4.19, respectively. Other factors like gender, ethnicity, and IIRC Group B exhibit less impactful associations.

The multivariable logistic regression analysis revealed that three variables, namely laterality, family history, and IIRC Group, were found to be statistically significant in the main effect model. Adjusting for other confounders, patients with unilateral eye involvement had odds of enucleation that were 10.48 times higher than patients with bilateral eye involvement. Patients with a family history had odds of enucleation that were 90% lower compared to patients without a family history. Furthermore, patients in IIRC group D had odds of enucleation that were 5.11 times higher, while patients in group E had odds of 69.99, both compared to patients in group A. No interactions or multicollinearity were observed among the variables. The classification table yielded an accuracy of 90.6%. Furthermore, the Hosmer and Lemeshow test demonstrated no significant deviation from the expected values, with a p-value of 0.716 (>0.05). The Nagelkerke R2 value for the logistic regression was 0.707, indicating a substantial explanatory power.

The multiple logistic regression analysis revealed that three variables, namely laterality, family

Table 5: Single and Multiple logistic regression analysis evaluating demographic, clinical and radiographic risk factors for enucleation

		Crude Odds Ratio	**95% CI**		**P value**	**Adjust-ed Odds**	**95% CI**		**P value**
			Upper Limit	Lower Limit			Upper Limit	Lower Limit	
Age	< than 1	Ref	-	-		Ref	-	-	
	1 – 2 years	2.18	1.23	3.85	0.007	0.86	0.35	2.10	0.735
	2 – 3 years	2.51	1.36	4.62	0.003	0.98	0.34	2.84	0.971
	3 – 4 years	5.27	2.17	12.81	<0.001	1.21	0.27	5.49	0.808
	4 – 5 years	5.68	1.21	26.58	0.027	0.28	0.03	2.46	0.250
	5 years and above	5.99	1.68	21.44	0.006	0.68	0.08	5.61	0.721
Sex	Male	Ref	-	-		Ref	-	-	
	Female	1.21	0.78	1.89	0.402	1.19	0.57	2.50	0.642
Ethinicity	Malay	Ref	-	-		Ref	-	-	
	Chinese	0.84	0.49	1.46	0.544	1.33	0.52	3.37	0.551
	Indian	0.82	0.36	1.88	0.641	0.64	0.17	2.51	0.524
	Others	2.06	1.01	4.22	0.048	1.44	0.45	4.56	0.540
Laterality	Unilateral	15.16	8.06	28.49	<0.001	10.48	4.26	25.81	<0.001
	Bilateral	Ref	-	-		Ref	-	-	
Family Histo-ry	No	Ref	-	-		Ref	-	-	
	Yes	0.15	0.05	0.50	0.002	0.10	0.01	0.75	0.026
IIRC Group-ing	A	Ref	-	-		Ref	-	-	
	B	0.00	0.00	-	0.998	0.00	0.00	-	0.998
	C	0.28	0.48	15.79	0.257	1.05	0.15	7.36	0.964
	D	12.03	2.62	55.28	0.001	5.11	1.03	25.29	0.046
	E	147.13	31.73	682.22	<0.001	69.99	14.17	345.75	<0.001
EOE on Im-aging	No	Ref	-	-		Ref	-	-	
	Yes	4.19	1.61	10.90	0.003	1.11	0.26	4.82	0.892

history, and IIRC Group, were found to be statistically significant in the main effect model. Adjusting for other confounders, patients with unilateral eye involvement had odds of enucleation that were 10.48 times higher than patients with bilateral eye involvement. Patients with a family history had odds of enucleation that were 90% lower compared to patients without a family history. Furthermore, patients in IIRC group D had odds of enucleation that were 5.11 times higher, while patients in group E had odds of 69.99, both compared to patients in group A.

DISCUSSION

Our investigation demonstrated the median age of retinoblastoma presentation to be 16 months, with specific findings of 16 months for unilateral cases and 15 months for bilateral cases. This, however, contradicts an earlier Malaysian study by Subramaniam et al (2014), reporting a median presentation age of 22 months from 2004-2012 suggesting a possibility of improved detection rates and patient awareness in the country [4]. Asian research indicates a median presentation age of 29-34 months, with unilateral and bilateral cases at 34-36 months and 18-30 months respectively [15]. Global analyses on the other hand indicate a median age of 23.5 months, further specified as 14.1 months in high-income countries and 30.5 months in low-income countries [16]. Our findings align with these global trends, reflecting Malaysia's ongoing development towards a high-income nation. Malaysia's progress towards becoming a developed country has contributed to improvements in addressing the higher median age of retinoblastoma presentation. Efforts to overcome socioeconomic

challenges such as delayed diagnosis, limited healthcare access, lack of awareness about retinoblastoma, and inadequate infrastructure have been made. However, additional steps are needed to enhance screening programs, expand training for healthcare professionals, establish more specialized treatment centres, improve accessibility and financial support, address cultural factors, ensure proper counselling and support, and strengthen government and NGO involvement. By addressing these areas, Malaysia can further advance in the early detection and treatment of retinoblastoma, benefiting patients across the country.

In relation to the laterality of retinoblastoma, our study found that approximately two-thirds of patients exhibited unilateral retinoblastoma, and the remaining one-third displayed bilateral disease. The proportions were specifically 65.0% and 35.0% for unilateral and bilateral cases respectively, corroborating a large study by Zain et al over 41 years involving 1925 retinoblastoma cases [17]. This distribution was also mirrored in an Asian study by Sahu et al [18]. Our gender distribution findings suggest almost equal occurrence between males (55.6%) and females (44.4%), with a ratio of roughly 1.25:1. Fabian et al's large-scale study align with our results, suggesting no gender predilection in retinoblastoma across 4351 cases from 153 countries [19]. The distribution of retinoblastoma cases amongst the primary ethnic groups in Malaysia likely mirrors the nation's general population demographics, with Malays representing the majority of cases (57.0%), followed by the Chinese and Indian ethnic groups with 19.1% and 7.2% of cases respectively [20].

When examining the symptomatic presentation of retinoblastoma, our study found that leukocoria alone was the most prevalent initial symptom, reported in 65.4% of patients. This was followed by the dual occurrence of leukocoria and strabismus in 12.3% of cases, with strabismus presenting alone in 4.3% of patients. Symptoms characteristic of advanced stages of retinoblastoma, such as proptosis, secondary glaucoma, and cellulitis, were observed within a range of 0.4% to 4.0%, with proptosis being the next most common symptom after leukocoria and strabismus. These findings resonate with the global symptom presentation pattern for retinoblastoma as described by Prat et al [3].

Of note, we detected two cases (0.7%) where patients presented with a cataract. The tumor was only identified post-cataract surgery during fundus examination. Both patients were diagnosed with Group E unilateral retinoblastoma. This observation could be explained by the tumor's physical interaction with the natural crystalline lens or by the upregulation of the TGF-B growth factor by the tumor, leading to cataract development [21]. Considering that the standard use of ultrasound B-scan in the assessment of the posterior segment of patients with cataract that limit the view of the fundus, it is highly unlike that a sizeable mass would have been missed and it is possible that in these two isolated cases, the retinoblastoma may be of an infiltrative type which tends to grow horizontally along the retina instead of vertically and tumour cells inducing the cataractous changes seen [22].

Furthermore, our study documented only 2 cases (0.7%) of retinoblastoma which were picked up during screening. This could potentially be attributed to the absence of a comprehensive national screening program. Despite this, it is standard procedure in Malaysia to request other children in the family to undergo screening when a patient is diagnosed with retinoblastoma, especially when indications of a germline mutation are present.

The rate of enucleation in our study based on number of eyes treated was shown to be 68.4%. On performing a single logistic regression analysis, our results indicated that age, ethnicity, laterality, family history, IIRC grouping, and the presence of extraocular extensions on imaging were significant risk factors contributing to enucleation. However, multiple logistic regression analysis revealed only unilateral cases (OR: 10.48) and an advanced IIRC group (OR: 5.11 in group D and OR: 69.99 in group E) as significant predictors of enucleation. Surprisingly, the presence of a family history of retinoblastoma (OR: 0.10) seemed to inversely correlate with the likelihood of a patient undergoing enucleation.

The elevated risk of enucleation associated with unilateral cases could be due to a delayed diagnosis, as these cases might present fewer noticeable symptoms compared to bilateral cases. This could lead to larger tumor size and more advanced disease at the time of presentation, thereby limiting treatment options. A report by Rodriguez-Galindo et al (2007) states that enucleation alone, barring extraocular disease, is curative in 85-90% of children with unilateral retinoblastoma [23]. They suggest that enucleation is indicated for all Group E eyes and that laterality may strongly influence the decision to perform enucleation in Group D eyes. Similarly, Shields et al (2002) recommend considering enucleation in unilateral cases with Reese-Elsworth groups 4 and 5 [24]. Moreover, a study by Lu et al (2019) demonstrates that unilateral cases have a 3.9% chance of metastasis within a year of enucleation, yet this still results in a low rate of metastatic death in patients [25].

In Malaysia, cultural stigma plays a significant role in various aspects of life, including the medical field, due to its multiracial nature and emphasis on traditions and religion. As a result, cases of retinoblastoma sometimes present late as parents initially opt for traditional treatments or are hesitant to consider enucleation or chemotherapy for their children, choosing instead traditional or alternative medicine. Such decisions lead to delays in effective management, potentially exacerbating the condition and having fatal consequences for the child. The Child Act 2001 (611) is in place to protect children in the country, requiring doctors to intervene and

provide care if a child needs treatment or if parents refuse necessary medical intervention [26]. However, enforcement of this act is hampered by cultural and religious considerations, leading to a lack of action. Strengthening the enforcement of existing laws and empowering healthcare providers to act decisively may help address this issue.

It's important to note that the rate of enucleation in advanced unilateral retinoblastoma has been decreasing, particularly with the introduction of systemic and targeted chemotherapy methods, such as intraarterial chemotherapy. However, this approach may not always achieve the desired outcome and enucleation still has its role in certain cases, especially in those with persistent vitreous seeding caused by poor vitreous penetration, an inactive state of tumor seeds within the avascular vitreous cavity, and resistance to chemotherapy drugs [27]. While pre-enucleation chemotherapy can be used to shrink the tumor, Zhao et al found no significant survival difference in children receiving 1-3 cycles, and a worsened survival rate in those receiving 4 or more cycles [28]. Furthermore, they observed a higher incidence of high-risk histopathology and decreased survival in children with Group E retinoblastoma who underwent pre-enucleation chemotherapy compared to those who underwent primary enucleation.

Similarly, patients with a negative family history could be diagnosed later than those with a positive family history, likely because they are more prone to sporadic mutations and tend to present with a more advanced tumor. Jagadeesan et al explain that sporadic retinoblastoma, which accounts for 65-75% of cases, typically results in late-onset, unilateral, and unifocal tumors [29]. Draper et al further elucidate that among children who possess a mutation but have no family history of the disease, 30% develop bilateral disease and 60% develop unilateral retinoblastoma [30]. These findings support that patients with a negative family history may be more likely to develop unilateral tumors, which can present later and at a more advanced stage compared to bilateral cases. Recognizing these key risk factors associated with increased enucleation risk could enable medical professionals to tailor approaches better. This knowledge can also assist in patient counselling, enabling parents to better understand potential findings and accept proposed treatment plans.

Our study has several strengths that underscore the value of its findings. The large sample size used in this research enhances the power and reliability of the results, allowing for a more accurate and detailed analysis of the retinoblastoma cases in Malaysia. The study's utilization of multiple logistic regression analysis offers a more controlled insight into potential confounding factors, therefore adding strength to the validity of the results. The study's continuous comparisons to previous research allow for a broader context and validation of the findings, increasing its value and implications for the field.

This study, while robust in its findings, does have certain limitations that must be acknowledged. There could be an inherent selection bias present as the data is taken from a specific geographical area. This could potentially limit the generalizability of the results to the wider global population. In addition, the retrospective nature of this study may have introduced inaccuracies related to historical data and potential missing information. For instance, a retrospective study may not have complete data for all variables of interest, such as socio-economic status, genetic factors or access to healthcare, which could act as confounding factors influencing the disease presentation and outcome. We should also acknowledge that human error may contribute to discrepancies in data during data entry which could ultimately affect the overall outcome of the study. It is important that future research considers these variables in the data collection and analysis to control these potential confounders.

CONCLUSION

This study provides valuable insights into retinoblastoma's epidemiology and clinical features, emphasizing enucleation risk factors. The study revealed a median presentation age of 16 months, mostly unilateral cases with no gender bias, and an ethnic distribution reflecting national demographics. Leukocoria was the common initial symptom, highlighting the need for early detection. Unilateral cases and advanced IIRC groups were linked to higher enucleation risk, while a family history of retinoblastoma appeared protective. The study recorded a 68.4% enucleation rate. These findings may help aid clinicians in early identification and treatment decisions, benefiting parent counselling. The results stress the importance of early detection, interventions, and improved strategies, particularly for unilateral cases and advanced IIRC groups.

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Review Article

EMPOWERMENT OF ISLAMIC PRINCIPLE IN DISEASE PREVENTION

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ABSTRACT

This paper explores the significant impact that Islamic teachings have in disease prevention. It dives into the significant relationship between Islamic teachings and the maintenance of one's health, incorporating ideas from both scientific and Islamic viewpoints. By examining the Quran and Hadith, this study uncovers valuable guidance on health, disease, and strategies for preventing illnesses from an Islamic standpoint. In addition to this, it details the development of Prophetic Medicine (Al-Ṭibb Al-Nabawī), beginning with the time of the Prophet Muhammad (ﷺ) and continuing up until the present day. This paper outlines a comprehensive strategy to empower Muslims with the knowledge and skills necessary for disease prevention, grounded in Islamic principles.

INTRODUCTION

Within the framework of this study, we evaluate the potential contributions that Islamic ideas bring to the prevention of diseases. Using both scientific and Islamic views, it is vital to examine the significant connection between Islamic teachings and disease prevention. By researching the Quran and Hadith, we can discover Islamic perspectives on health, sickness, and disease prevention measures. In addition, we will explore the development of Al-Ṭibb Al-Nabawī, also known as Prophetic Medicine, from the time of the Prophet Muhammad (ﷺ) until the present. In the concluding section of this paper, we will describe a method to empower Muslims with the information and abilities necessary for disease prevention, based on Islamic principles.

DEFINING HEALTH AND ILLNESS: A SCIENTIFIC AND ISLAMIC PERSPECTIVE

Man is the best creation of Allah. Allah says regarding the creation of man, "Verily, We created man in the best form" (Quran 95:4). This is the subject being sworn about, and it is that Allah created man in the best image and form, standing upright with straight limbs that He beautified [1].

The human body is a complex system made up of numerous organs and components that cooperate to keep us healthy. The skeletal system, muscular system, neurological system, endocrine system, cardiovascular system, respiratory system, digestive system, urinary system, and reproductive system are just a few of these organs and systems. Each system serves a distinct purpose and cooperates with the others to maintain the body's general health. The entire body may be impacted if one component of it isn't operating properly.

According to a hadith narrated by Ibn Abbas, health is a gift from Allah. Prophet Muhammad (ﷺ) said: "There are two blessings that many people lose: health and free time" [2]. In another hadith narrated by Abu Hurairah: Prophet Muhammad (ﷺ) said: "There is no blessing better than good health" [2]. Furthermore, in a hadith narrated by Anas bin Malik, Prophet Muhammad (ﷺ) said: "Ask Allah for forgiveness and health, for after being granted certainty, one is given nothing better than health" [2]. These Hadith teach us that good health is a precious blessing from Allah for which we should be grateful.

Before we explore the connection between Islamic principles and the prevention of disease, it is crucial to define health and illness from both scientific and Islamic viewpoints. In the scientific realm, health as defined by the World Health Organization (WHO), is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity [3]. However, Islam adds a spiritual dimension to this understanding. In the Islamic tradition, health encompasses not only the physical and mental aspects but also the spiritual well-being of an individual. A person is considered healthy when they maintain harmony in all these dimensions, including their relationship with God.

Health is essential for all individuals, regardless of age, gender, or race. Good health permits us to experience life to its fullest and to realise our full potential. It also assists us in being more productive and contributing to our communities. Health is a dynamic state, and it can be influenced by a variety of determinants of health.

The Health Field Concept of Lalonde identifies four key determinants of health: The Human biology which consists of our genetic makeup, age, and sex is the first determinant. Next the Environment, which consists of the physical, social, and economic conditions of our living and working environments. Then the Lifestyle, which includes our dietary, physical, smoking, and alcohol consumption choices. The Health Care System, which includes the availability and quality of health care services, is the final component. These four health determinants are crucial for good health, and health promotion strategies should target them all [4] Among the most important aspects of health include physical health which refers to the overall condition of the body and its organs and systems. Physical health can be influenced by factors such as diet, exercise, sleep, and genetics. Next, mental health which refers to the emotional, psychological, and social well-being of an individual. Mental health can be influenced by factors such as stress, trauma, and genetics. In addition, social health which refers to the quality of an individual's relationships with others and their involvement in their community. Social health can be influenced by factors such as social support, access to resources, and discrimination. Moreover, spiritual health refers to the condition of balance and harmony within one's inner self, which is frequently closely tied to their beliefs, values, and sense of purpose. Spiritual health is influenced by a variety of factors, including core beliefs and values, religious affiliation and regular religious practises (such as prayer, worship, or rituals), life events (such as love, joy, success, loss, illness, or trauma), mental and emotional health, social connections (relationships with family, friends, and spiritual communities), and an individual's ethical and moral principles.

In contrast, disease is a deviation from the normal Gaussian mean that disrupts normal body function [5]. In other words, when an individual's health status falls significantly outside the range of what is considered normal for the population, it may be indicative of a disease. The Western medicine of the 20th century biomedical model of approach to illness is based on the biomedical paradigm, with molecular biology acting as its essential scientific foundation. According to this approach, deviations from established norms of quantifiable biological components completely explain the occurrence of disease. The model generally emphasizes the biological and physiological aspects of illness, focusing on the diagnosis and treatment of diseases based on biological factors such as pathogens, genetics, and physiological abnormalities. When examining sickness within its framework, it does not allow for the incorporation of social, psychological, and behavioural factors [6]. According to the aetiology disease triangle concept, the interactions between three factors contribute to the occurrence and severity of disease. The agent, or disease-causing organism or substance, such as a virus, bacteria, fungus, parasite, or toxin, is the first factor. Next, the host or the person, animal, or plant that is susceptible to the disease. Following that the environment or the physical, biological, and social factors that influence the transmission and spread of the disease [7].

From an Islamic standpoint, everything, including disease and health, is ultimately under Allah's sovereignty. Muslims believe that Allah has determined all aspects of human life, including the occurrence of disease, as a test or trial for individuals. Muslims are taught to respond to illness with patience, gratitude, and faith in Allah's wisdom. Illness and disease are seen as tests from Allah. Muslims are exhorted to be patient and consistent in their religion during times of illness, as it can be an opportunity for spiritual growth and sin purification. The Quran addresses this notion, highlighting the importance of patience and reliance on Allah during times of adversity. "And We will undoubtedly test you with something of terror and hunger, as well as a loss of riches, lives, and fruits, but We will offer good news to the patient." (Quran 2:155). While Muslims believe in Allah's ultimate authority over health and sickness, they are also advised to seek medical treatment and care for their bodies.

The Prophet Muhammad (ﷺ) emphasized the importance of seeking medical care and using remedies for illnesses. He is reported to have said: "Make use of medical treatment, for Allah has not made a disease without appointing a remedy for it, with the exception of one disease, namely old age." [8] This hadith encourages seeking medical treatment and using available remedies for various illnesses and health issues. It reflects the Islamic perspective on healthcare and the importance of maintaining one's health.

This hadith emphasises the significance of obtaining medical attention while sick. When Muslims are sick, they are advised to pray for healing and recovery. They think Allah hears their prayers and can heal them. The Quran mentions supplication in regard to illness: "And when I am ill, it is He (Allah) who cures me." (Quran 26:80). In short, the concept of disease in Islam is connected with the belief in divine decree and the significance of responding to illness with patience and trust in Allah. While getting medical treatment is recommended, there is also a heavy focus on the spiritual side of living with disease and embracing it as an opportunity for personal growth and introspection. In the Islamic response to disease, community support and prayer are critical.

In this context, Imam Ibn Qayyim looks at a spiritual perspective on diseases. There are two types of problems related to the heart: doubt and error and passion and desire. The Quran addresses both of these: "In their souls lies a disease (of doubt and hypocrisy), and Allah has increased it" (Quran 2:10). The Quran also tells

Prophet's wives that they should be faithful, strong in their beliefs, and not let people with bad intentions influence them: "Oh, Prophet's wives! You are unique among ladies. If you fulfil your commitment (to Allah), be strong in your statement, lest anybody whose heart is afflicted with a disease (of hypocrisy or an evil proclivity for adultery) be enticed (Quran 33:32). According to Imam Ibn Qayyim, when a person gains knowledge about their Lord and what they should do, their heart becomes healthy. A healthy heart focuses on pleasing Allah and follows His commandments, while avoiding anything that displeases Him [9].

ISLAMIC PRINCIPLES AND DISEASE PREVENTION

The Quran and Hadith, as foundational texts in Islam, provide guidance on various aspects of health, disease, and their prevention. These sacred texts emphasize the importance of cleanliness, dietary choices, and lifestyle practices that promote physical well-being. For instance, the Quran encourages moderation in all aspects of life, including eating and drinking (Quran 7:31), which aligns with modern notions of a balanced diet and lifestyle. Moreover, the Hadith contains valuable guidance from the Prophet Muhammad (ﷺ) who is known to have said, "Your Lord has a right over you, your soul has a right over you, and your family has a right over you; so you should give the rights of all those who has a right on you" [8].

This Hadith highlighting the significance of taking care of one's physical health. These principles promote disease prevention by encouraging practices such as regular exercise, proper nutrition, and maintaining personal hygiene. Furthermore, this hadith teaches us that we have a responsibility to take care of our bodies. We should eat healthy food, exercise regularly, and get enough sleep. We should also avoid harmful substances such as drugs and alcohol.

Prevention of disease entails taking measures to avoid becoming ill. It can be done on a personal level, for example, by choosing a healthy lifestyle, or on a population level, by implementing public health measures such as vaccination and water treatment. There are three main types of disease prevention; the first is primary prevention, which aims to intervene before health effects occur through vaccinations, changing risky behaviours (poor eating habits, tobacco use), and banning substances known to be linked to a disease or health condition. Next is secondary prevention focuses on screening to detect diseases in their earliest stages, before the onset of symptoms, using methods such as mammography and routine blood pressure monitoring. In addition, tertiary prevention aimed in managing disease post diagnosis to slow or stop disease progression through measures such as chemotherapy, rehabilitation, and screening for complications [10].

From an Islamic perspective, on the other hand, one of the most important Islamic principles regarding disease prevention is the concept of tawhid. Muslims believe that God is the creator of all things, including disease. This implies that God heals diseases and cures people in the end. Muslims also believe that humans have a duty to care for their health and take preventative measures against disease. Muslims believe that God has entrusted people with the responsibility of caring for our own health in addition to that of others. Imam Ibn Qayyim explained three essential rules of medicine: staying healthy, avoiding harm, and eliminating harmful substances from the body. He supported these principles with Quran verses related to Hajj, fasting, and ablution. Allah says, “But if any of you is ill or on a journey, the same number (should be made up) from other days” (Quran 2:184). This shows that Allah allows flexibility for the sick. For travellers, Allah permits breaking the fast to maintain their health and strength during the journey. The Quran (4:43) suggests a precautionary measure for those who are ill, traveling, after using the restroom, or in contact with women without water available – use clean earth for Tayammum (ritual purification) [9].

Numerous verses in the Quran emphasise the importance of disease prevention. The following Quranic verses are applicable to disease prevention. First, Allah says, “And spend of your substance in the cause of God and make not your own hands contribute to your destruction but do good; for God loveth those who do good” (Quran 2: 195). Next, Allah says, “O children of Adam! wear your beautiful apparel at every time and place of prayer: eat and drink: but waste not by excess for God loveth not the wasters” (Quran 7: 31). This verse encourages us to eat and drink in moderation, which is important for maintaining good health and preventing diseases. Allah says, “Eat of the good things We have provided for your sustenance, but commit no excess therein, Lest My wrath should justly descend on you: and those on whom descends My wrath do perish indeed” (Quran 20:81).

Regarding the prohibition on the consumption of known to be unhealthy foods such as pork and blood, Allah says, “He hath only forbidden you dead meat and blood and the flesh of swine and that on which any other name hath been invoked besides that of God but if one is forced by necessity without wilful disobedience nor transgressing due limits then is he guiltless. For God is Oft Forgiving Most Merciful” (Quran 2: 173). Regarding consumption of good food, Allah says, “O ye who believe! eat of the good things that We have provided for you and be grateful to God if it is Him ye worship” (Quran 2: 172).

In addition, the following verse provides detailed instructions for performing wudu, the ritual ablution performed prior to prayer. Wudu entails washing the face, hands, arms, head, and feet, thereby removing dirt and preventing the spread of disease. Allah says, “O ye who believe! when ye prepare for prayer wash your faces and your hands (and arms) to the elbows; rub your heads (with water); and (wash) your feet to the ankles. If ye are in a state of ceremonial impurity bathe your whole body. But if ye are ill or on a journey or one of you cometh from offices of nature or ye have been in contact with women and ye find no water then take for yourselves clean sand or earth and rub therewith your faces and hands. God doth not wish to place you in a difficulty but to make you

clean and to complete His favour to you that ye may be grateful". (Quran 5: 6).

These verses can be applied to disease prevention in several ways. For example, the verses that encourage moderation in food and drink can help to prevent diseases such as obesity, heart disease, and diabetes. The verses that prohibit the consumption of certain foods, such as pork and blood, can help to prevent diseases that are associated with these foods. The verses that emphasize the importance of cleanliness and hygiene can help to prevent the spread of disease.

Numerous Hadiths highlight the importance of disease prevention. Regarding cleanliness, Prophet Muhammad (ﷺ) used to say: "Cleanliness is half of faith." [8]. Next, Hadith narrated by Abdullah ibn Abbas: Prophet Muhammad (ﷺ) said: "Healing is in three things: A cup of honey, a cupping, and branding with fire (cauterizing). But I forbid my followers to use (cauterization) branding with fire" [8]. In addition to these specific hadiths, there are general hadiths that emphasise the significance of health and wellness, for example, the Prophet Muhammad (ﷺ) said: "A strong believer is superior and more beloved to Allah than a weak believer" [8]. This hadith instructs us to be physically fit and healthy so that we can better fulfil our religious duties and serve our community. Furthermore, Abdur-Rahman bin Auf narrated: I heard the Messenger of Allah (ﷺ) said: "Whoever hears that there is a plague in a land, he should not enter it; and whoever is in the land when the plague breaks out, he should not leave it" [8]. In another Hadith narrated Abu Hurairah: Prophet Muhammad (ﷺ) said: "The sick should not be taken to the healthy" [8]. These Hadiths teach us the importance of taking steps to prevent disease, such as avoiding areas where there is a known outbreak, avoiding contact with sick people, and maintaining a healthy lifestyle. By following this guidance, we can protect ourselves and others from illness. In addition to these specific hadiths, the Prophet Muhammad (ﷺ) also provided general guidance on how to live a healthy life, for example, he encouraged his followers to eat healthy foods, exercise regularly, and get enough sleep. He also discouraged them from engaging in harmful behaviours such as smoking and excessive alcohol consumption.

By following the Prophet Muhammad (ﷺ) example, we can take steps to protect our health and well-being. In addition, there are numerous specific Islamic teachings on the prevention of disease. For instance, Muslims are encouraged to consume a healthy diet, engage in regular exercise, and get sufficient rest. Muslims are also advised to avoid unhealthy behaviours such as smoking and alcohol consumption. Moreover, Islam places a strong emphasis on cleanliness. Muslims must wash their hands before and after eating and using the restroom. Muslims are also required to maintain a clean home and community. Finally, Islam teaches Muslims to be compassionate and to help those in need. This includes helping people who are sick or who are at risk of becoming sick.

PROPHETIC MEDICINE: AN EVOLVING TRADITION

Al-Ṭibb Al-Nabawī, or Prophetic Medicine, is a rich tradition within Islam that has evolved over time. It originated with the medical practices and advice given by the Prophet Muhammad (ﷺ) and his companions. Its origins can be traced back to the teachings of Prophet Muhammad (ﷺ) in the seventh century CE. Prophetic medicine contains a divine aspect since Prophet Muhammad (ﷺ) got revelation from Allah revealing what is beneficial for him and what is not. In fact, Prophet Muhammad (ﷺ) gives us with a type of treatment that doctors cannot fully comprehend or achieve by testing, hypothesis, or hypotheses. Prophet Muhammad (ﷺ) provides cures that heal the heart from whatever ails it, strengthen it, and build reliance and confidence on Allah. Furthermore, as the soul and heart get stronger (spiritually), they will work together to combat the illness. Prophet Muhammad (ﷺ) was a spiritual leader as well as a guide in many aspects of life, including health and happiness. His teachings included a wide range of topics, including food, cleanliness, and medical procedures. These teachings were passed down verbally from generation to generation, and they served as the foundation for prophetic medicine.

The Persian philosopher Ibn Sina, also known as Avicenna, wrote the first notable work on prophetic medicine in the 10th century. One of his famous medical works is the "Canon of Medicine" (Arabic title "Al-Qanun fi al-Tibb") - a comprehensive medical encyclopaedia that covers a wide range of medical concerns and is recognised as one of the most prominent medical manuals of the Middle Ages. Avicenna's "Canon of Medicine" includes sections on prophetic medicine, a type of traditional medicine based on the Prophet Muhammad's (ﷺ) teachings and practises. In this context, Avicenna's treatise on prophetic medicine frequently contains discussions on many aspects of health, hygiene, and medications seen to be congruent with the Prophet's traditions. Among the topics covered in Avicenna's "Canon of Medicine" sections on prophetic medicine are the following: First, Dietary Guidelines: Recommendations for what to eat and drink, as well as what to avoid, in order to maintain good health, based on the Prophet Muhammad's (ﷺ) dietary practises. Next, Islamic rules dictate personal hygiene, cleanliness, and grooming routines. Following that, Remedies: Descriptions of natural medicines and herbs thought to have medicinal properties, frequently with references to the Prophet or his companions' use of these cures. Finally, Preventive and disease management: Advice on how to avoid common ailments and manage health problems based on the Prophet's teachings. Information on traditional therapeutic procedures, such as the Islamic cupping tradition, which is thought to have medical benefits [11].

Prophetic medicine flourished in the Islamic world for centuries after that. Among those who contributed to its growth were Ibn Rushd (Averroes), Ibn Zuhr (Avenzoar), and Jalal al-Din al -Suyuti. In their treatises, these professionals

concentrated on the concepts and procedures of prophetic medicine. During this time, prophetic medicine became an integral part of Islamic medicine as a whole. As Islam grew, the concepts of prophetic medicine were introduced to new areas, including Europe and Africa. This diffusion has a profound impact on the evolution of these medical practises. Cupping and black seed, for example, have their Islamic origins in European medicine. From the 16th to the 19th century CE, the significance of prophetic medicine diminished as Western medicine gained dominance. However, its influence has endured among Muslim communities, and in the twentieth and twenty-first centuries, there has been a growing interest in prophetic medicine. In recent years, there has been a resurgence of interest in Prophetic Medicine, as people seek natural and holistic approaches to health. This resurgence has led to research and development in the field, producing a wealth of knowledge that can be integrated into modern healthcare practices.

EMPOWERING MUSLIMS TO PRACTICE DISEASE PREVENTION ACCORDING TO ISLAMIC PRINCIPLES.

Following on from the preceding debates, the next step is to empower Muslims to accept and practise disease prevention in accordance with Islamic principles. Analytically and operationally, there are numerous interpretations of what empowerment entails. Empowerment is the process of increasing an individual's or group's capacity to make purposeful choices and convert those choices into desired actions and outcomes [12]. In other words, the concept of empowerment has many facets and is related to the process of regaining control, autonomy, and the capacity to act in ways that have an impact on one's life. It comprises giving people the opportunities, tools, and resources they need to realise their full potential and accomplish their goals.

Empowering Muslims to practice disease prevention according to Islamic principles involves combining Islamic teachings with effective public health strategies. Islam encourages the use of reason and the pursuit of knowledge to benefit humanity. Combining these Islamic principles with modern scientific understanding can help Muslims effectively practice disease prevention while staying true to their faith. Disease prevention is a fundamental aspect of public health that transcends cultural and religious boundaries. In the Islamic tradition, there are specific teachings and principles that guide individuals towards maintaining good health and preventing illness. The following procedures and techniques are designed to equip Muslims to implement disease prevention within an Islamic framework and to integrate Islamic ethics and values into healthcare practises.

First, Education and Awareness.

Promoting disease prevention within an Islamic context is an important activity that is in line with the teachings of Islam, notably the preservation of life, which is a central idea in Islam. Islamic ethics are strongly ingrained in the idea of "guarding the soul," or Hifz al-Nafs, which emphasises the significance of keeping good health to safeguard one's life. Education and awareness are essential for effectively promoting disease prevention within this framework. In this paper, we'll go into more detail on the value of knowledge and awareness in the context of disease prevention within an Islamic framework, using references to Islamic teachings and customs. This strategy can be accomplished by the following methods.

i. **Islamic teachings on health and wellbeing** place a strong emphasis on maintaining good health as a method of carrying out one's religious obligations and leading a fulfilling life. The necessity of maintaining one's physical and mental health is frequently mentioned in the Quran and Hadith. For instance, the Prophet Muhammad (ﷺ) is attributed with saying, "Your body has a claim over you" [8], emphasising the need for people to take care of their health. These teachings provide a solid basis for illness prevention within an Islamic context.
ii. **The Involvement of Religious Leaders**: Scholars and imams among other religious figures play a significant part in informing and teaching the populace about illness prevention. They might incorporate Islamic health doctrine into their sermons and lectures, highlighting the moral and ethical necessity of upholding one's health. They can encourage people to have better lifestyles and take disease prevention steps by doing this.
iii. **Thinkers and community leaders**: In addition to religious authorities, individuals with intellectual influence and community sway can make a substantial contribution to illness prevention initiatives within an Islamic context. These people can work on advocacy and research projects to close the gap between Islamic ideals and contemporary medical understanding. Additionally, they can plan seminars and instructional programmes to address particular public health problems, such diabetes, heart disease, or infectious diseases.
iv. **Awareness initiatives:** Awareness initiatives that combine Islamic principles and teachings have a great chance of reaching more people. To distribute information on hygiene, immunisation, diet, and disease prevention methods, these campaigns can employ a variety of media platforms, such as television, radio, social media, and community gatherings. The idea that illness prevention is a religious duty can be strengthened by including religious themes and messages that connect with the audience.
v. **Community Involvement**: Community participation is crucial. Mosques, Islamic institutions, and neighbourhood associations can plan health fairs, exams, and workshops to inform people about disease prevention. Additionally, they can make it simpler for community members to access healthcare resources and services, facilitating their ability to take preventative measures to safeguard their health. References to Islamic Jurists and Scholars.
vi. **In Islamic jurisprudence, Islamic scholars and jurists** have addressed a variety of topics related to health and disease prevention (fiqh). They can

be a valuable source of information when creating health regulations and policies that adhere to Islamic morals and values.

Second, Incorporating Islamic Ethics.
To further promote disease prevention, it is importance to integrate disease prevention strategies with Islamic beliefs and values. It suggests that by doing so, individuals, particularly Muslims, can be motivated to adopt and adhere to preventive methods more effectively. Islamic ethics, derived from the Quran and Hadith play a central role in guiding the conduct and choices of Muslims. Quran 2:195 states, "And take provisions, but indeed, the best provision is Taqwa (piety, righteousness). So, fear Me, O you of understanding". Hadith literature contains numerous narrations emphasizing cleanliness, personal hygiene, and maintaining health. Emphasizing the concept of cleanliness (Taharah) and its significance in Islam encourages personal hygiene and cleanliness practices. Hadith of Prophet Muhammad :(ﷺ) "Cleanliness is half of faith." Quran 74:4-5 encourages cleanliness: "And your clothing purifies. And uncleanliness avoid." By linking the concept of cleanliness (Taharah) to disease prevention, Muslims are encouraged to practice personal hygiene diligently. Proper handwashing, a key component of personal hygiene, has been highlighted by health experts as a crucial measure in preventing the spread of diseases, including COVID -19. Islamic teachings underscore the idea of communal responsibility (Ummah). Moreover, Muslims are reminded of their obligation to safeguard not only their own health but also the health of their neighbours and society as a whole. This sense of communal responsibility is deeply rooted in Islamic teachings and reinforces the importance of disease prevention as a collective effort. Furthermore, encouraging Muslims to adhere to preventive measures such as vaccination, mask-wearing, and social distancing not only protects their own health but also contributes to the well-being of the broader community. Finally, integrating Islamic beliefs and values, such as the importance of cleanliness and communal responsibility, into disease prevention efforts can be a powerful motivator for Muslims to adopt preventive measures. This approach aligns health practices with their religious convictions and reinforces the idea that disease prevention is a collective responsibility in Islam, promoting the well-being of both individuals and society as a whole.

Encouraging Healthy Lifestyle Choices.
Promoting healthy lifestyle choices is central to disease prevention within an Islamic framework. Several practices align with Islamic teachings and can contribute to better health:

a. Balanced Diet (Tayyib): In Islam, there is an emphasis on maintaining a balanced and wholesome diet. Tayyib refers to food that is pure, clean, and good for one's health. Islamic dietary guidelines promote the consumption of such foods. Islamic teachings encourage moderation in all aspects of life, including eating. It advises against overindulgence or excessive consumption of unhealthy and harmful foods. This means following the dietary guidelines and restrictions prescribed by Islamic law, such as avoiding pork and alcohol. These standards are designed to promote physical and spiritual well-being.
b. Physical Activity: The mention of "The Prophet Muhammad (ﷺ)" in the context of physical activity highlights the fact that physical fitness and sports have a deep-rooted place in Islamic tradition. It is important to note that Islam encourages a balanced and healthy lifestyle, and physical activity is seen as a means to achieve this balance. The Prophet Muhammad himself set an example by engaging in various physical activities during his lifetime. The Prophet Muhammad (peace be upon him) encouraged physical fitness and various sports, such as swimming, horseback riding, and archery. The inclusion of swimming as one of the encouraged sports is significant. It reflects the practicality and relevance of physical fitness to the Islamic way of life. Swimming is not only a valuable life skill but also an excellent form of exercise that promotes cardiovascular fitness and overall well-being. Horseback riding has historical and practical importance in Islamic culture, especially in regions where horses were essential for transportation, warfare, and agriculture. Engaging in horseback riding not only served practical purposes but also provided an opportunity for physical activity and skill development. Archery was a skill valued in many historical contexts, including warfare and hunting. It required strength, focus, and precision, making it both a physical and mental exercise. The Prophet Muhammad's (ﷺ) encouragement of archery aligns with the idea that physical fitness should be complemented by mental and spiritual well-being. Regular physical activity has numerous health benefits, including improved cardiovascular health, better weight management, increased muscle strength, enhanced flexibility, and reduced risk of chronic diseases such as diabetes and heart disease. Physical activity is not just about the body but also has positive effects on mental and emotional well-being. It can reduce stress, anxiety, and depression while promoting a sense of well-being and positivity. In the context of Islamic tradition, maintaining good health is essential for fulfilling one's religious obligations. When individuals are physically healthy, they are better able to engage in acts of worship, fulfill their responsibilities, and serve their communities.
c. Adequate Rest and Sleep: Proper rest and sleep are essential for a healthy body and mind. The recommendation of daytime naps (Qailulah) and sleeping on the right side aligns with the principles of self-care in Islam.
d. Avoidance of Harmful Substances: Smoking, recreational drugs, and excessive alcohol consumption are considered harmful and forbidden (haram) in Islam. Encouraging Muslims to abstain from these substances is a

crucial aspect of disease prevention.

e. Islamic Etiquette: Following Islamic etiquette when coughing or sneezing, such as covering the mouth and nose with the elbow or a tissue and saying "Alhamdulillah" (Praise be to Allah) after sneezing, promotes hygiene and reduces the spread of diseases.
f. Clean Environment: Maintaining a clean and hygienic living space, along with proper sanitation and waste disposal, is essential for preventing the spread of diseases within the community.
g. Prayer and Supplication: Alongside practical steps, Muslims are encouraged to pray for health and well-being. The Quran and Hadith contain many supplications for protection from illness and harm, reinforcing the spiritual dimension of disease prevention.

CONCLUSION

Promoting disease prevention within an Islamic framework involves a multifaceted approach that combines education, ethics, and healthy lifestyle choices. The fundamental Islamic concept of "protection of life" (Hifz al-Nafs) underscores the significance of maintaining good health and preventing illness. By integrating Islamic teachings and values into healthcare practices and involving religious leaders and community influencers, we can foster a culture of disease prevention that aligns with Islamic principles and benefits the entire society. Ultimately, the holistic approach to health and well-being within an Islamic framework serves as a valuable contribution to the global effort to combat disease and promote public health.

This study underscores the significance of Islamic principles in empowering individuals and communities with the knowledge and abilities necessary for disease prevention. It reminds us of the holistic nature of health and encourages us to seek well-being not only in the physical and mental aspects but also in the spiritual and social dimensions of our lives. By integrating these principles into healthcare and public health initiatives, we can work towards a healthier and more harmonious society, in alignment with the teachings of Islam. Empowering Muslims to practice disease prevention in accordance with Islamic principles is a holistic approach that combines faith -based teachings with modern public health strategies. Islam promotes reason, knowledge, and the preservation of life, making it inherently compatible with disease prevention efforts. Islamic teachings emphasize the importance of good health and well-being, reinforcing the duty of individuals to care for their physical and mental health.

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Review Article

A REVIEW ON BAUHINIA PURPUREA L.: TRADITIONAL USES, PHARMACOLOGICAL PROPERTIES AND CHEMISTRY

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ABSTRACT

Bauhinia purpurea L. can be considered as one of the popular medicinal plant in Southern Asia and is widely distributed in Asia's region. Extensive research and studies have been carried out to prove the pharmacological properties of various part of this plant as claimed by the traditional medicinal practice. Furthermore, the isolation of the responsible bioactive compounds from the plant has become the major interest in providing the information of its chemical constituents that correlates with the pharmacological properties. B. purpurea has a value in biological activities such as antinociceptive, antifungal, wound healing, antidiabetic, antiulcer, antioxidant, hepatoprotective, nephroprotective, antidiarrhoeal, anti-inflammatory, antipyretic, analgesic, antimalarial, gastro protective and cytoprotective activity. This review presents a detailed survey of literature on phytochemistry, traditional and biological evaluated medicinal uses of B. purpurea.

INTRODUCTION

Bauhinia purpurea L. belongs to the family fabaceae and commonly known as butterfly tree [1]. In Malaysia, the tree is known as '*tapak kerbau*' or '*tapak kuda*' while in India, which the plant is widely used by the people, this plant is known as '*kachnar*' or '*khairwal*'. *Bauhinia purpurea* is a small to medium-sized deciduous fast-growing tree. Its bark is pale grey brown and the twigs are slender, light green and slightly hairy. The heartwood of *B. purpurea* is brown, hard and durable. The leaf of *B. purpurea* is unique because of its two-lobed and equally wide and also the flowers usually appear on the trees from September to November with purple colour. The flowers have brown, flat seed pods.

300 species of the genus Bauhinia are found in tropical regions. The genus includes trees, vines and shrubs that are frequently planted as ornamental. The generic name commerates Jean and Gaspard Bauhin. The two lobes of the leaf exemplify both Swiss botanists and the specific name refers to the purple colour of the flowers. *B. purpurea* is native in Southern Asia, South East Asia, Taiwan and Province of China. This plant also can be found in Australia, United States of America and Puerto Rico.

TRADITIONAL USES

Bauhinia purpurea L. can be found throughout peninsular India. It has been reported that the root, stem, bark and leaves are being used against diseases such as jaundice, leprosy, cough and also in several Ayurvedic medicine formulation [20]. The people of Kathkors and Gondas of India cooked and eat the young pods and mature seeds of B. purpurea [23]. Chopra et al. also reported that the bark of this plant is used traditionally as an astringent in diarrhoea. Some also reports that the plant is used in the treatment of dropsy, pain, rheumatism, convulsions, delirium, and septicaemia [2]. The decoctions are also recommended for ulcers as a useful wash [10]. Another report stated that the plant parts are used in indigenous medicine for curing body pain, fever, cancerous growth in the stomach and indigestion [9].

The Paliyar tribals in Theni district of Tamil Nadu used the decoction of stem bark of *B. purpurea* to treat dysentery [7]. The bark extract of this plant is also extensively used in glandular disease and as an antidote to poison [28]. The bark paste is also used by the Taungya community of eastern Uttar Pradesh to treat scorpion bites and rheumatism and the flowers paste is used to treat constipation [22]. The root of *B. purpurea* is also used for treatment in carminative, diarrhoea, ulcer, boils and abscesses based on the study of the medicinal plants in the Sitamata Wild life sanctuary in Chittorgarh district of Rajasthan [10]. Decoction of the bark is used externally as astringent and internally for diarrhoea by the people in Mizoram [27]. In Pakistan, the fresh and dried flower buds of *B. purpurea* are used as a food material. The leaves, stems and roots are also widely used in Pakistan to treat infections, pain, diabetes, jaundice, leprosy and cough and also in

several medicinal formulations [15]. Although this plant is used in Southern Asia, there is no documentation found for its uses as medicine in other continents.

PHARMACOLOGICAL PROPERTIES

The pharmacological properties of *B. purpurea* has been recently studied among researchers in order to evaluate and proved the claim of traditional medicine on the ability of various part of the plant that are used to treat diseases.

Root

The root of *B. purpurea* has been studied for several pharmacological properties and it has been proved to have antimalarial, antimycobacterial, anti-fungal, anti-inflammatory and cytotoxic activities [4]. I t also proven as anti-cancer [14].

Leaves

The aqueous extract of the leaves of *B. purpurea* has been proved to possess antinociceptive, anti-inflammatory and antipyretic properties by Zakaria et al [35]. The leaves were also tested for its antioxidant activity using DPPH radical scavenging assay and also superoxide scavenging assay and showed high activity [34]. Ethanol extract of the leaves are used for analgesic, antipyretic, anti-inflammatory, antispasmodic and antimicrobial activity [29]. The leaf extract of *B. purpurea* was also reported to have significant antidiarrheal activity in vivo [16].

Stem

The stem of *B. purpurea* was studied and proved that its ethanolic extract and fraction exhibited anti-diabetic property in alloxan-induced diabetic rats. The extract and fraction also possess adrenergic activity [17].

Bark

The bark extract of *B. purpurea* was studied and has been proved for its regulation of circulating thyroid hormone concentrations in female mice without causing hepatotoxic effects [18].

BIOACTIVE COMPOUNDS AND CHEMISTRY

Root

Studies also have been done in isolation of the bioactive compounds from the root of *B. purpurea*. A crude CH_2Cl_2 extract of *B. purpurea* root was purified and 11 new secondary metabolites have been discovered by Boonphong et al. [4]. These includes two flavanones, five known bibenzyls, eight dihydrodibenzoxepins, a dihydrobenzofuran, a novel spirochromane-2,1'-hexenedione and a new bibenzyl.

Leaves

A phytochemical screening of *B. purpurea* leaves aqueous extract has revealed the presence of several compounds such as flavonoids, saponins, triterpenes and steroids [34].

Stem

From the stem of *B. purpurea,* a novel flavone glycoside, 5,6-dihydroxy-7-methoxyflavone 6-O-ß-D -xylopyranoside was isolated from the chloroform-soluble fraction of the ethanolic extract [32]. Chalcone glycosides [3] and amino acids [6] also have been obtained, previously.

Heartwood

A study done by Kuo et al. [12,13] reveals a novel 6-butyl-3-hydroxyflavone, 6-(3"-oxobutyl)-taxifolin from the heartwood of *B. purpurea* derived from the methanol extract. Previously, 22 compounds including flavonoids, phenols, chromones and sugars have been isolated [12].

Seed

The seed of *B. purpurea* are rich in crude proteins (25.6-27.2%), crude lipid (12.3-14.3%), fibre (4.6-5.8%), carbohydrates (51%), minerals and amino acids, as reported by Rajaram & Janardhanan (1991) and Vijayakumari et al. [30]. Unsaturated fatty acids comprise 66% of the total fatty acid content. Other compounds such as free phenolics, tannins, phytic acid, L-dopa, protease inhibitors, lectins, hydrogen cyanide, saponins and oligosaccharides also have been discovered from *B. purpurea* seed [23,30,33]. Another chemical study done by Bhartiya & Gupta [3] and Wahab et al. [31] on the methanolic extract from seeds of this plant identified flavonoids and their glycosides. A recent study by Ramadan et al.[25] has characterized neutral lipids in the crude seed oil and also glycolipids and phospholipids. Linoleic, palmitic, oleic and stearic were the major fatty acids in the crude seed oil and its lipid classes. The oil was also characterized by a relatively high amount of phytosterols as the sterol markers were ß-sitosterol and stigmasterol. ß-Tocopherol has been isolated as the major tocopherol isomer with the rest being δ-tocopherol.

CONCLUSION

Globally is now changing towards the application of plant products for traditional medicine. Various part of plant is used to treat various ailments and *B. purpurea* possesses huge pharmacological ability capable to treat wide range of disease. Various scientific researches proved the phyto-pharmacological properties and this review provides the information about the pharmacological potential of *B. purpurea.*

CONFLICTS OF INTEREST

None to declare

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Case Report

FAMILY FUNCTIONING AND ADOLESCENT DEPRESSION

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ABSTRACT

A 14-year-old girl student presented with a depressive mood that led to aggression. She is diagnosed with major depressive disorder with multiple histories of suicidal attempts resulting from family factors, life events and environmental factors. She is predisposed to her parents' divorce, leading to a weak parent-child relationship. This condition is precipitated by some physical and emotional abuse by her mother as well as attention deficit that causes an acute stress response, which manifests as feelings of persistent sadness and worry. It is perpetuated by the lack of social support and stigmata of mental illness towards her. The patient is treated with antidepressants for mood regulation and supportive psychotherapy. Additionally, psychosocial therapy such as cognitive behavioural therapy (CBT) could be used along with pharmacotherapy to optimize the effectiveness of major depression disorder for this patient. Psychosocial support is provided to her by the paediatrician, the Social Welfare Malaysia, the One-Stop Crisis Centre, and the police.

INTRODUCTION

Globally, it is estimated that depression occurs among 1.1% of adolescents aged 10–14 years, and 2.8% of 15–19 years old [1], yet these remain largely unrecognized and untreated. There are a number of factors that contribute to adolescent depression and among all, the common variable in adolescent depression is family factors. Greater bonding between parents and child predicts lesser depressive symptoms and it is also associated with a decrease in externalizing problems [2]. Family relationship variables of high discord, low cohesion, and high affectionless control were all important predictors of general child pathology, including depression [3]. Therefore, the relationships among adolescent depressive symptoms with family cohesion and family social support were inversely related.

The objective of this case report is (i) to discuss the impact of family dysfunction on adolescent mental health, and (ii) to examine the bio-psycho-social-spiritual perspective in the management of family dysfunction.

CASE PRESENTATION

A 14-year-old Malay girl, single and Form 2 student at SMK Keat Hwa, presented to the hospital with aggressive behaviour. She has been a known case of major depression disorder for the past year. She described her feelings as frustration and anger towards her mother. It started with an issue occurring at school on the day of admission. She claimed of accused by her teacher and embarrassing her in front of other students. The teacher accused the patient of badmouthing her to PK HEM and asked her to rectify to PK HEM. Hence, she went back to PK HEM to clear up the misunderstandings. In return, PK HEM told her not to worry about it and sent her back to her classroom. At that time, she felt very frustrated, overwhelmed, and stressed as she felt that whenever she tried to feel better, there were always problems to bring her down. Therefore, she thought that it was best if she died. In the classroom, she harmed herself by slitting her forearm with scissors. She denied any suicidal thoughts or attempts. The act was noticed by her math teacher and she was brought home by her mother. Once they arrived home, the patient locked herself in the bedroom and slit her forearm once again with a

kitchen knife that she kept inside her room. She also called her boyfriend and found out that her mother called him first to ask about her stressor that day. At the same time, the mother went to seek help from her neighbour and called the patient's stepbrother. The patient was furious as she hated her mother interfering with her relationship. She went out to confront her mother at the house compound. She strangled her mother and pushed her mother down to the ground. The neighbour witnessed the incident and called the police and ambulance. The patient cried and refused to go to the hospital but was able to do so after persuading her for 30 minutes.

She also complained of persistent low mood, difficulty sleeping and frequent night awakening, easily irritated, cried for no reason and poor attention in school for the past four days. She has no psychotic or manic symptoms. She has no history of abuse of illegal substances.Her father, a 58-year-old working odd jobs, and her mother, a 54 -year-old HR manager, had separated when she was 11 years old. Her mother was the second wife and she is the only child from her parent's marriage. Her father had a 30-year-old son and a 12-year-old daughter resulting from his marriage to his first wife. Before her parent's divorce, she had a good relationship with her father compared to her mother. After the divorce, she lived with her mother and occasionally visited her father. She no longer feels comfortable around her father and has not been close to him since, although she still gets along well with him, the stepmother, and the step-siblings.

She described her father as a strict but loving father meanwhile her mother as a non-understanding mother that controlled her. Her mother's personality often leads to physical fights among them. Her mother always verbally abused her and physically disciplined her by choking her or scratching her. Her mother has had a new partner for the past one year. Her mother's boyfriend is a gangster who benefits from her mother's money. Her mother bought him a new car and lent him thousands of ringgits. She also noticed that her mother was busy with her new partner and no longer spent time with her. Her mother spent the weekends with her boyfriend and was on the phone with him for two to three hours every night. The mother's boyfriend is a hot-tempered person, and they frequently argue with each other. The patient described it as an unhealthy relationship. She felt sad and thought that her mother did not care about her anymore. She also worried about her mother's safety.

As a result, she developed depressive moods and psychotic features that led to multiple histories of suicidal attempts. She attempted suicide by overdosing on medication and cutting her wrist. She compensates for her condition by vaping and smoking. She had a history of two admissions within two months due to suicide attempts. It was due to non-compliance to medication as she complained of feeling more anxious than before.

She is a Form 2 student at SMK Keat Hwa. She had poor academic school performance as a consequence of missing school because of hospital admission and medical leave prescribed by her psychiatrist. She is also unable to keep up with her studies and feels anxious about the upcoming exam. Her mother complained of her frequently skipping school whenever she had minor problems such as arguing with her boyfriend. The patient would use depression as an excuse to skip school. Because of that, the teachers disliked her and had a prejudice against her. She did not have any close friends as other students saw her as a problematic student. For the past two years, she has changed schools multiple times due to disciplinary problems and was unable to cope with the school environment. Previously, she was suspended from school due to vaping and smoking. Hence, her mother moved her to SMK Keat Hwa against her will to discipline her. Furthermore, she felt anxious and hated going to school because students around her talked behind her about her behaviour. In addition, the boy seniors verbally assaulted her and she was afraid of being molested by them.

She has been in a relationship with a 21 years old boy for one year. She knows him from a dating app. She deeply loves and trusts him as he is a loving and soft person. The boyfriend always accompanied her at home when her mother was busy with work. She describes him as someone who respects her and has boundaries in the relationship. Her boyfriend always calmed her whenever she had a fight with her mother. Sometimes, she felt stressed and mad at her boyfriend as he always backed up her mother. This is because she felt as if her boyfriend did not understand her. She denied any sexual activity with her current boyfriend.

Mental status examination reveals a medium build and height Malay girl, in school uniform, who appears sad and irritated. She is cooperative and speaks in Malay. Her speech is rational, relevant, and coherent. The mood is low and affect is appropriate. She cries through tears. No formal

thought disorders. She also does not exhibit psychotic features. Her cognitive functions are intact. She has poor judgement and insight. Physical examinations showed a superficial cut wound over her left wrist.

A diagnosis of major depression disorder with anxious distress resulting from multiple stressors including family factors, life events and environmental factors is made. She is predisposed to family crises at a young age along with some physical and emotional abuses. Her condition was precipitated by environmental factors that caused an acute stress reaction, expressed in anger, anxiety, and sadness. It is perpetuated by the lack of social support and the absence of a close confidant. Biological investigations such as a complete full blood count, renal profile, liver function test, thyroid function test, fasting blood glucose, and lipid profile show no abnormalities. Psychosocial investigations also show no abnormalities.

Treatment includes prescription of selective serotonin reuptake inhibitors, fluvoxamine 50 mg ON and zolpidem 10 mg PRN. Supportive therapy on coping skills and emotional regulation may help improve her condition. The prognosis depends on the safety of her living environment, the availability of social and legal support, and the coping strategies she uses to deal with stress reactions to emotional neglect.

DISCUSSION

Depression is a common mental disorder characterized by sadness, inability to experience happiness, self-criticism, and physical symptoms such as poor concentration, fatigue, loss of energy, and disturbed sleep or appetite [4]. Depression can seriously affect adolescents' physical and mental development, leading to other problem, including lower grades, dropping from school, low self-esteem as well as externalizing problems. It also can increase risk of substance abuse and, in severe cases, even suicide.

Previous studies have found that poor family functioning can make individuals depressed [5] and family functioning plays an important role in the development, process, and relapse of depression [6]. However, few studies have explored the mediating and moderating mechanisms of family functioning on depression. According to the ecological systems theory, family, peer, and individual psychological characteristics (e.g., self-esteem, etc.) have a strong impact on an individual's mental health [7]. The roles of self-esteem and peer relationships in the influence of family functioning on adolescent depression deserve attention.

Family functioning is the function of the family system itself, which refers to the ability of the family to function effectively to meet basic needs and manage conflicts [8]. The circumplex model of marital and family systems considers family as functioning in three dimensions: family cohesion, flexibility (initially called adaptability), and communication. Family cohesion is the ability to maintain strong emotional bonds among family members. Flexibility focuses on how the family system balances stability and change. Good communication promotes family cohesion and flexibility [9].

Numerous theoretical and empirical studies have linked family dysfunction to depression. The effect of family functioning on adolescent depression can be explained using the family system theory. According to family system theory, the better the overall function of the family system, the better the psychological state and behavioral performance of its members, leading to less depression or other emotional and behavioral problems [10]. Family cohesion can provide a warm family environment and positive emotional support, thus reducing the likelihood of adolescents developing depression or other forms of adverse emotional distress. Family flexibility, on the other hand, enables families to cope with change and reduces the impact of negative events on adolescents' mental health [11]. Positive communication leads to less family conflict, enhancing family adaptability and cohesion and thus playing a protective role in adolescent mental health. Empirical studies have found that family functioning has a significant influence on adolescent depression [12], that family cohesion is significantly negatively correlated with depression [13], and that low family adaptability and poor family communication play important roles in adolescent depression [14]. A recent meta-analysis showed that family dysfunction is closely related to depressive symptoms, and that family functioning is an important predictor of individual depression [15].

Available treatments used in intervention studies for depression in adolescent generally fit into one of the following categories: cognitive–behavioral therapy, interpersonal psychotherapy, and family systems approaches. Each treatment category represents diverse guiding assumptions, and there is considerable variation with regard to intervention techniques used within some of these categories.

Depression is seen as a natural consequence of the loss of social connectedness, attachment disruptions, or difficulties establishing emotional autonomy in relation to primary caregivers. Therefore, treatment emphasis is on rebuilding relationships and resolving

interpersonal conflicts. Interpersonal psychotherapy for adolescents (IPT-A) is a well-defined, manualized treatment. IPT-A believes that recovery can be facilitated once the interpersonal relationships are reconstructed to provide better social support. Hence, the unique emphasis of IPT-A is to develop skills that will help the depressed adolescent regain the sense of attachment and improve the quality of social relationships [16].

The family is a system that seeks to maintain its current functioning. The depressive symptoms would either be related to that family member's role in maintaining the homeostasis of the family system, or a sign that the current family system is not adequately meeting the needs of the family [17]. However, the general goal across systemic therapy approaches is to alter patterns of communication and behavior, to assist all family members in meeting their needs and the family's goals without psychologically distressing symptoms. There are two specific types of family systems approaches that have specifically been evaluated with depressed youth. One is the systemic-behavioral family therapy (SBFT) and the other is the attachment-based family therapy (ABFT). The components of SBFT include principles from systemic family therapy, functional family therapy, and behavioral therapy. SBFT includes skill-building in communication, incorporating reinforcement, and distinct aspects of cognitive restructuring [18]. ABFT incorporates family systems and attachment theory in a manualized treatment for depression in youth. ABFT is designed to assist the adolescent in the task of developing autonomy from the family, while simultaneously maintaining healthy communication and positive relationships in the family as a whole. Treatment progresses through two stages. First, the therapist assists the youth in identifying and confronting troubled family relationships. Next, the goal is to encourage developmentally appropriate and parent-supported autonomy for the youth, working with the family as a unit [19].

CONCLUSION

Family functioning and depression in adolescences are inversely related and can be treated according to the bio-psychosocial-spiritual paradigm.

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