ANALYSIS OF MALAY MEDICAL MANUSCRIPT MSS 3136 AND REMEDIES FOR EYE-RELATED DISEASES

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ABSTRACT

Malay medical manuscripts (MMM) are ancient writings from the Malay civilisation depicting traditional remedies to treat various diseases. Unfortunately, the manuscripts are not well studied by scientists, perhaps because of scepticism with traditional medicine. To date, only 12 MMM have been transliterated and published despite the initial work that had been started since more than 10 years ago. One of the diseases frequently mentioned in MMM is eye diseases. Some eye diseases may be treated with invasive procedures such as operations, e.g. cataracts. By referring to MMM, there might be remedies to those kinds of eye problems. Hence, this study aims to transliterate MSS 3136, a manuscript kept in the Pusat Kebangsaan Manuskrip Melayu, to enhance the collection of transliterated MMM for future data mining, as well as to extract medicinal information regarding eye diseases. This was achieved by transliterating the text from *Jawi* to Roman alphabets using standard edition transliteration. The diseases and formulations were extracted, tabulated and numbered. The ingredients related to eye problems were analysed by comparing the findings against contemporary studies. Overall, there were 13 diseases found in the manuscript with 45 formulations. Three diseases are related to the eyes with six formulations. Eleven ingredients were identified from the formulations and five were found to have pharmacological activities related to eyes, namely *Curcuma* spp, *Acorus calamus*, *Anethum graveolens*, *Eclipta alba* and *Aloe vera*, which were indicated for conjunctivitis, cataract, age-related macular degeneration, conjunctivitis and cataract, respectively. The manuscript was successfully transliterated despite some obscured and indecipherable words. The diseases and formulations were effectively extracted, and comparative analysis of eye disease formulations showed that some ingredients used are supported by contemporary studies. Nevertheless, some plants have not been tested in modern studies, which warrants further research in the future. The findings of the current study also serve as the basis for natural product experiments in the pharmaceutical field.

Keywords: Malay medical manuscript, traditional medicine, complementary, herbal medicine, natural product.

INTRODUCTION

Manuscripts are defined as ancient texts aged more than 50 years that are written by hands before the existence of printing; containing significant values that may contribute to the knowledge of culture, history, architecture, sea navigation, astronomy, medicine and others (Perpustakaan Nasional Republik Indonesia, 2019). The medical manuscript is one of the genres presented in Malay manuscripts. The oldest Malay manuscript, hosting medicinal theme, dated back approximately to 1400 A.D., was originally written by Sheikh Shafiyuddin al-'Abbasi (Mohamad Zain, 2016). The existence of Malay medical manuscript (MMM) since hundreds of years ago indicates that Malay people were knowledgeable in medicine, even before the Western colonisation. In fact, the Western colonisers had stolen numerous Malay manuscripts from the Malay in order to supplement their body of medical knowledge. For example, Sir Stamford Raffles took 300 manuscripts bound in volumes to Europe in 1823 (Jones, 1999). Though there is still a large collection of Malay manuscripts exist, particularly medicinal genre, these are just kept in their respective places. For instance, Pusat Kebangsaan Manuskrip Melayu (PKMM) holds the most extensive manuscript collection in Malaysia whereby it holds 4884 manuscripts (as of 2018) of various genres (National Library of Malaysia, 2018). Approximately 1% or about 40 manuscripts are medicinal-based writings. Yet, the effort to scrutinise the content of the manuscripts can be considered at a minimum level. Some of these manuscripts are fragile and soon to be degraded beyond readable. This marks an urgency to preserve the manuscripts' content so that the Malay's scientific civilisation can remain in existence.

Studies on Malay manuscripts is rare, what more in the field of science and medicine. A traditional perception is that the medicinal content of the hundreds of years information is obsolete. Malay medicine is also presumed to have lack of scientific evidence because its method on remedy formulation did not follow contemporary methods of hypothesis testing. The perception lingers until now, especially among the Malay Archipelago researchers who are supposed to appreciate and utilise local plant resources. To date, there are only around 12 MMMs that have been transliterated and published into a modern format (Mohd Shafri, 2019), which means the Malay traditional medicine still has a long way to go before it can be accepted as a well-practised complementary discipline.

Moreover, the Malaysian government has established the Traditional and Complementary Medicine (TCM) unit under the Ministry of Health since 1996; aiming to develop traditional medicine in Malaysia, which uses abundant natural resources in the country. Nevertheless, the progress in empowering the effort is relatively slow and some parties even took advantage of the term 'traditional medicine' to promote so-called herbal-based products that are claimed to treat many diseases at a time without presenting solid evidence or scientific investigation. Indeed, it does not serve the main purpose of TCM division establishment. Effort must be put to contribute to the success of TCM division empowerment especially when statistics showed that 29.35% of Malaysian use TCM as complementary treatment to the modern medicine and 52.96% of them choose Malay traditional medicine as the remedies (Institute of Public Health, 2015). Therefore, the endeavour to institutionalise Malay traditional medicine must be expedited so that traditional medicine clients or patients would not be deceived by opportunists when proper regulations are well established. One of the efforts by the government is the gazetting of Traditional and Complementary Medicine Act in 2016 that regulates the practise of TCM in Malaysia, which involves several stakeholders especially the practitioners and patients.

A regular Malay medical manuscript explains several diseases which sometimes come together with symptom explanation, and then each disease is followed by a list of formulations. The disorders presented can range from all the body parts and systems, and one of them is the eye. Various eye conditions are mentioned in various manuscripts including *mata daging-dagingan* (pterygium) (Mohd. Shafri, 2019), *mata kabur* (dimness in vision), *mata sapar* (unclear vision) (Mat Piah & Mustapha, 2019), *mata bengkak* (swollen eyes) (manuscript MSS 4837; available at PKMM), and *sakit mata* (sore eyes) (manuscript MSS 4016; available at PKMM). In some of the conditions, invasive surgical interventions are involved. For instance, pterygium and cataracts require surgery to remove the growth (Gupta, Rajagopala, & Ravishankar, 2014; Hacıoğlu & Erdöl, 2017), and myopia needs the wearing of spectacles or laser-assisted *in situ* keratomileusis (LASIK) surgery for treatment (Cooper & Tkatchenko, 2018). Therefore, some patients may look forward for herbal-based therapies to avoid invasive procedures, and this is where the MMM information may be helpful. However, not all transliterated manuscripts contain formulations for eye diseases. Therefore, this study aims to transliterate MSS 3136 to provide more resources for Malay traditional medicine researches in the future as well as to extract medicinal information regarding eye diseases.

METHODOLOGY

Selection of manuscript

The selection of the manuscript was done by assessing a few criteria: readability, physical condition, completeness, and authorship. Readability refers to the handwriting and condition of ink which dictates whether the text is legible. Physical condition refers to the manuscript's physical state in which a frail manuscript may not be transliterated. Completeness refers to the continuation of the text from a page to a page that ensures the pages' correct order with none missing. Some manuscripts are in sheets and not bound, so there is a possibility that the sheets obtained by the keeper are not in sequence. Authorship refers to the presence of information about the author, which is an added value as it increases the credibility of the content itself.

The screening of manuscripts was carried out at the PKMM, Kuala Lumpur and the search for Kitab Tib or medicinal books were done by browsing catalogues of manuscripts prepared by the National Library of Malaysia. Subsequently, potential manuscripts were requested from librarians, and each of the manuscripts was screened page by page based on the above-mentioned criteria. Eventually, MSS 3136 was selected because it fulfils most of the criteria.

Transliteration

Transliteration involved the changing of alphabets from *Jawi* into Roman alphabets. The transliteration method used was standard transliteration, a transliteration method that amends the original text, which includes correction of misspelled words, addition of punctuations, and adjustment of spelling based on the current spelling and sectioning of the text (Mohd Shafri, 2019). Standard edition was chosen because the main purpose was to render the manuscript into a format that can be easily understood by today's readers. Therefore, transliteration that follows the current system is vital to achieve the purpose.

Data Extraction

Different chapters in the manuscript were indicated with a phrase *Fasal ini* in red ink, representing a type of disease. Other formulations for the same illness were denoted by the phrase *Sebagailagi* in red ink. Therefore, the diseases mentioned in the manuscript were extracted, tabulated and numbered using this format 3136.F/NF.xx.yy. The number 3136 represents the manuscript catalogue number; F or NF refers to the formulation or non-formulation which means supplication or spells; xx refers to the sequential order in which a disease is mentioned in the manuscript and yy refers to the number of formulations for the respective disease. For example, the third formulation of the second disease mentioned in the manuscript from the first page would have a number of 3136.F.02.03. This numbering is important in creating a database for Malay traditional medicine in the near future.

Comparative Analysis

Once the data was extracted, each disease's name was matched with possible current nomenclature based on the symptoms and literatures. Then, each plant scientific name was identified through Google search engine, online dictionary of Pusat Rujukan Persuratan Melayu, online dictionary of Kamus Besar Bahasa Indonesia, and a reference book (Mat Piah & Mustapha, 2019). The comparative analysis was accomplished by using the Scopus database and Google Scholar. Keywords including "plant scientific name", "disease name", "related pharmacological action" and "eye" were used together with Boolean operators. The resulting articles were screened by their title at first and then abstract. If the articles were relevant, the full-text articles were retrieved for further analysis.

RESULTS

Selection of Manuscript

The manuscript contains 16 pages with an unknown number of missing pages. Based on observation, it is hypothesised that the pages were misarranged. The first page of the manuscript is about leprosy remedies, which probably continues from the missing previous page, while the last page also describes leprosy remedies. When the first and last pages are matched together, the sentences complement each other. In addition, based on the manuscript's overall content, all diseases appear to be systematically grouped, i.e., when a condition is mentioned, the original author listed out all the formulations and would not repeat the same disease on other pages. Therefore, it could be that the first page arranged by PKMM is not the true first page. However, for this study, the arrangement was maintained as it is to avoid confusion in the future. Despite a few missing pages and torn or disrupted edges, the manuscript's physical condition is considered good. Most of them do not affect the writing. The writing is legible, neat and systematic. Although there are some missing pages at the beginning, in the middle and at the end, the other pages flow continuously. There is no information of the manuscript's authorship or date. Generally, the manuscript fulfilled the criteria set for this research.

Transliteration and Data Extraction

Each chapter that begins with the phrase "*Fasal ini…"* is describing remedies for a particular disease. Overall, there are 13 diseases and 45 formulations mentioned in this manuscript. There are seven single formulations and 38 compounded formulations (a mixture of two or more ingredients) (Table 1). A total of 82 plant-based, 4 animal-based, 15 mineral-based, 3 unclassified and 5 obscured materials were found. The diseases and remedies intended for each condition were extracted and numbered according to the order they were mentioned in the manuscript. There are three types of eye diseases mentioned in the manuscript which are *ubat*

mata sakit (sore eyes), *ubat mata tumbuh* (trachoma/chalazion), and *ubat mata putih ertinya bular* (cataracts), which constitute one formulation for each except the last one with four formulations.

Table 1: List of diseases in MSS 3136 with their respective matching contemporary diseases, their number and types of formulations.

Diseases (*in Malay as mentioned in manuscript*/ Possible current nomenclature)	No. of formulations	No. of single/compounded formulations
Integumentary System		
Sopak/Leprosy	2	1 single, 2 compounded
Puru parang/A type of yaws	3	Compounded
Tangan balar kena puru parang atau salah makan	5	Compounded
Sensory Organs		
Ubat mata sakit/Sore eyes	1	Single
Ubat mata tumbuh/Trachoma/Chalazion	1	Compounded
Ubat mata putih ertinya bular/Cataracts	4	1 single, 3 Compounded
Kelemayar/A type of centipede-like insect (that enters ears)	4	1 single, 3 compounded
Telinga sakit/Earache (because of insects enter ears)	5	Compounded
Gastrointestinal System		
Hati pedih/Heartburn	1	Compounded
Seriawan/Mouth ulcer	5	1 single, 4 compounded
Urinary System		
Karang-karangan/Bladder stone	7	Compounded
Mixed Systems		
Pitam pening/Headache or faint	6	2 singles, 4 compounded

The transliteration and translation of the formulations for eye diseases are shown below:

3136.F.04.01 Sebagailagi ubat mata sakit. Maka ambil ibu kunyit, kupas, maka hiris-hiris tiga hiris, maka bubuh pada cawan putih. Maka bubuh air yang bermalam. Maka rendamkan seketika lagi, ambil kapas buat pemerahnya. Sentiasa jangan jemu berubat dan menghendak lekas baiknya itu. Nescaya tiada menjadi melainkan jangan waswas daripada baiknya. InsyaAllah ta'ala 'afiyat olehNya.

Translation: This is the remedy for sore eyes. Take turmeric, peel off, slice into three slices, then put them in a white cup. Pour in water and soak overnight and a little while more. Take cotton to squeeze. Do not give up and hope for speed recovery as it will not work. And do not hesitate with the formulation. InsyaAllah will be granted recovery.

3136.F.05.01 Fasal ini pada menyatakan ubat mata tumbuh. Pertama ambil jeringau yang baharu diambil daripada pohonnya, panjang sejengkal telunjuk dan beras dikupas tujuh-tujuh kali tujuh dan jeringau tujuh kali tujuh hiris. Maka kulum dan sekali mengulum tujuh hiris jeringau dan tujuh biji beras. Maka jilat mata yang tumbuh itu dan sekali menjilat buang sehiris jeringau dan buang sebiji beras tiap demikian itu jua sampai ketujuh kali menjilat dan tujuh kali lagi membuang sehingga sampai tujuh hari berturut. Demikian inilah syaratnya. Maka jika telah sampailah tujuh hari, maka ambil pula daun pulut-pulut. Maka pusar dan sekali memusar tiga pucuk dan airnya air embun. Maka perahkan pada mata yang tumbuh itu kiri kanan. Kemudian isinya itu perahkan pada telinga keduanya tiga pagi berturut-turut dan jika hendak memerahi, jilat dahulu maka perahi dan isyarat berubat itu pada ketika pagi sebelum bersugi dan basuh muka. Maka berubat demikianlah isyaratnya. InsyaAllah ta'ala 'afiyat olehNya.

Translation: This is the remedy for growth in the eyes (trachoma/chalazion). Firstly, take fresh calamus from its tree measuring a span and raw rice that has been peeled off. Prepare seven portions and each portion contains seven uncooked rice and seven slices of the calamus. Then, keep in the mouth a portion and subsequently lick on the affected eye. After each lick, discard the uncooked rice and a slice of calamus, then lick until all are discarded. Repeat the steps every day for 7 days. After the seventh day, take Caesarweed leaves and crush them. For every crush, use three shoots of leaves together with dew. Subsequently, drop the extract into the affected eyes and squeeze the remaining roughage into both eyes. Before the squeeze, lick the roughage first. This should be done in the morning before brushing teeth and washing face. InsyaAllah will be granted recovery.

3136.F.06.01 Sebagailagi ubat mata putih ertinya bular. Maka ambil kulit lawang, mamah, maka kain yang nipis, maka tampalkan pada kelopak mata. Maka hembus dari luar dengan kulit lawang yang dimamah itu sehabisnya nafas kita sehingga hilanglah maka berhenti. InsyaAllah ta'ala 'afiyat olehNya.
Translation: This is the remedy for white eyes (cataract). Take *kulit lawang* and chew. Take a thin piece of cloth and patch it on the eyelids. Blow the chewed *kulit lawang* from outside with one full blow. Repeat the steps until the cataract is gone. InsyaAllah will be granted recovery.

3136.F.06.02 Sebagailagi ubat mata bular maka ambil akar kayu kelempong kira-kira besar jari dan panjang segenggam. Maka ambil kemenyan putih, kulum kemenyan, maka hembus akar kelempong itu kepada bular mata itu barang tujuh hari. Apabila ada nipis sedikit, jangan khali sehingga hilanglah, maka sudah. InsyaAllah ta'ala.

Translation: This is the remedy for cataracts. Take a fistful of *kayu kelempung* root about the size and length of a finger. Then, take white incense, keep in mouth, and blow the *kayu kelempung* root to the affected eyes for seven days. When the eye clouding becomes thinner, do not stop until it vanishes. InsyaAllah will be granted recovery.

3136.F.06.03 Atau ambil adas manis dan bunga urang-aring yang gugur, maka pipis. Airnya air susu kanak-kanak yang belum tumbuh gigi. Maka perahkan pada mata itu. InsyaAllah ta'ala 'afiyat olehNya.

Translation: Or take dill and false daisy, and blend them with milk from a breastfeeding woman with a child that has not grown teeth yet. Then squeeze it into the affected eyes. InsyaAllah will be granted recovery.

3136.F.06.04 Sebagailagi ubat bular. Bahawa ambil lidah buaya, maka kupas buang kulitnya, kemudian hiris tujuh hiris, maka maka basuh 7 kali lagi كارن 7 hiris 7 kali lagi, dibasuh kemudian bubuh air pula, maka bubuh tawas sedikit kepada mata yang tumbuh itu dan jangan menghendak segeranya hilang hingga jangan jemu daripada berubat. InsyaAllah ta'ala 'afiyat olehNya.

Translation: This is the remedy for cataracts. Take aloe vera, peel off the skin, then slice into seven parts. Wash seven times, كارن seven more slices, then wash them and pour water together with a bit of alum. Put it on the affected eyes. Do not hope for a speedy recovery and do not give up. InsyaAllah will be granted recovery.

Comparative analysis

Out of the nine plant-based ingredients mentioned in the formulations for eye diseases, five have scientific evidence of their pharmacological actions related to eye diseases, namely *Curcuma* spp., *Acorus calamus*, *Anethum graveolens, Aloe vera* and *Eclipta alba* (Table 2). Each plant-based ingredient was analysed in comparison with contemporary studies.

Table 2: List of ingredients and their pharmacological actions found in contemporary studies that are related to eye diseases.

Disease	Formulation no. (3136.F.xx.yy)	Ingredients			Pharmacological actions* (type of study)	References
		Vernacular name	Part	Scientific name		
Ubat mata sakit (Sore eyes)	04.01	*Kunyit* (Turmeric)	Rhizome	*Curcuma* spp.	− Effects of curcumin on various eye diseases (clinical trial) − Used for uveitis treatment (clinical trial) − Used for conjunctivitis (in vivo)	Biswas et al. (2001) Lal et al. (1999) Chung et al. (2012)
		Air yang bermalam (Water left outdoor for overnight)	-	-	No evidence	-
Mata tumbuh (Trachoma or chalazion)	05.01	*Jeringau*		*Acorus calamus*	Used for anticataract (in vivo).	Kumar & Singh (2011)
		Beras (Rice)	Grain	*Oryza sativa*	No evidence.	-
		Pulut-pulut	Leaf	*Urena lobata*	No evidence.	-
		Air embun (Dew)	-	-	No evidence	-
Mata putih atau bular (Cataract)	06.01	*Lawang*	Bark	*Cinnamomum culilawan*	No evidence.	-
	06.02	*Kelempong*	Root	*Ficus obpyramidata*	No evidence.	-
	06.03	*Adas manis* (Dill)	Seed	*Anethum graveolens*	*A. graveolens* is one of the foods that contains high content of lutein. Lutein was suggested to improve age-related macular degeneration (AMD) (human trial) and cataract (in vivo).	The Low Vision Centers of Indiana (n.d.) Włodarek & Głabska (2011) Arnal et al. (2009)
		Urang-aring	Flower (fallen)	*Eclipta prostrata* or *Eclipta alba*	One of the ingredients for conjunctivitis remedy in a traditional preparation in India.	Sharma & Singh (2002)
	06.04	*Lidah buaya*	Flesh	*Aloe vera*	− Used in keratoconjunctivitis sicca in dogs − Showed inhibition of diabetes-induced cataract	Dees & Kent (2020) Haritha et al. (2014)

*Pharmacological actions found in contemporary studies that are related to eye diseases.

DISCUSSION

Jawi-written Malay manuscripts are believed to begin as early as 14th century when Islam came to Malay Archipelago. However, the production of manuscripts was rather slow during the early period or perhaps most of the manuscripts produced during the epoch do not survive. Nevertheless, the manuscript production spiked in the 18th and 19th centuries (Jones, 1999). These manuscripts are currently scattered not only within Malay Archipelago but also in other parts of the world including the United Kingdom, Netherland, Australia and the United States of America. Most of them have established digitised manuscript repositories such as British Library, which enables online learning and researches (Zahidah et al., 2011). However, the effort to transliterate the manuscripts is not encouraging and thus, hampering the process of data mining. Therefore, this study aims to add the collection of transliterated manuscripts to provide more resources for data mining which is essential for establishing Malay traditional medicine.

Apart from that, this transliteration work is also aiming to render the manuscript into a more readable and comprehensible form, especially among the public. Therefore, standard edition transliteration was employed, whereby the spellings, typos, punctuations, paragraphing, etc. were corrected and added to enhance understanding. This method was also used in previous transliterated manuscripts such as Mat Piah & Baba (2014), Mohd Shafri (2019) and Mat Piah & Mustapha (2019). Recently, there has also been an effort to automate transliteration of Malay manuscripts as carried out by Abdul Razak et al. (2019) using Phrase Based Statistical Machine Translation. Though the results showed a significant error rate in the transliteration – mainly due to homograph which is defined as one spelling that can be pronounced differently and has different meanings – it is a good initiative to expedite transliteration process of Malay manuscripts, especially the medical genre.

Based on the transliteration, the arrangement of diseases in the manuscript is considered systematic. The author listed out diseases pertaining to skin at the beginning, followed by eyes, gastrointestinal system, urinary system, ears and lastly mixed system. However, it did not follow the usual arrangement of Malay medical manuscripts which present diseases from the head to toe (Mohd. Shafri, 2018). It can also be observed that most of the formulations specified the measurement for each ingredient such as *cupak*, *gantang*, *riyal*, *emas* and *paha*; and there are also measurements that use body parts such as handful and length of a finger. These measurements are common in Malay medical manuscripts, as can be observed in many other manuscripts. In modern pharmacology, the measurement can be likened as dosage which is very important as it dictates the action of a particular ingredient, either as therapeutic or poisonous (Atuah et al., 2004). Perhaps, the measurement in the manuscript must strictly be followed to achieve therapeutic effect or avoid toxicity.

This study also focuses on finding traditional remedies for eye diseases. Three eye diseases are mentioned in the manuscript. *Mata tumbuh* is defined as a disease caused by infection of *Chlamydia trachomatis* Gimlette & Burkill (1930), or trachoma. The late stage of the disease can cause scarring of the conjunctiva, cornea and eyelids (Roat, 2021). Meanwhile, Mohd Shafri (2021) defined *mata tumbuh* as chalazion, which is a swelling or lump on the eyelid due to blockage of the gland (Seltman, 2020a). Hence, in this study, both definitions are acceptable as the description for *mata tumbuh*. *Mata sakit* is defined as sore eyes (Mohd Shafri, 2021). Several causes that can lead to sore eyes include inflammation, corneal infection and abrasion, and foreign bodies in the eyes (Seltman, 2020b). *Mata putih,* another term of eye disease in MSS 3136, is also written as *mata bular*. According to Pusat Rujukan Persuratan Melayu, *bular* means white clouding on the eyes, which is a prominent symptom of cataract.

Five out of nine plant-based remedial ingredients for eye diseases have been found in contemporary studies to possess pharmacological actions. They are *Curcuma* spp, *A. calamus*, *A. graveolens*, *E. alba* and *A. vera*. *Curcuma* spp. has been indicated in the manuscript to treat conjunctivitis. *Curcuma longa* has been studied by Biswas et al. (2001) in a clinical trial of 100 patients with various eye diseases, including conjunctivitis, and found to be effective in improving the pathologic conditions. Chung et al. (2012) also reported that curcumin could suppress ovalbumin-induced allergic conjunctivitis when tested on mice models. Curcumin from *Curcuma* spp. has also been reported to show anti-inflammatory, anticancer and antioxidants (Chung et al., 2012; Lal et al., 1999). The anti-inflammatory action may play a vital role in relieving conjunctivitis since it is an inflammatory condition in response to various factors, including allergens and pathogens.

In MSS 3136, *A. calamus* is prescribed for trachoma or chalazion. Analysis revealed that no contemporary studies investigate the use of the plant for trachoma or chalazion. Nevertheless, in an animal model for cataract, *A. calamus* was shown to have anticataract activity (Kumar & Singh, 2011). *A. graveolens* was

described to treat cataract in the manuscript. Presently, the plant is not specifically tested for cataract. However, Włodarek and Głabska (2011) suggested that the plant contains a high amount of lutein, a compound indicated for AMD. *A. vera* was elucidated in the manuscript to treat cataract. Interestingly, a contemporary study showed that the plant can inhibit oxidative stress caused by diabetes, that leads to cataractogenesis (Haritha et al., 2014). Apart from being mentioned as a cataract remedy in MSS 3136, *E. prostrata* has also been documented in Indian traditional medicine to treat conjunctivitis (Sharma & Singh, 2002) and a pharmacological study supported this by showing that the plant has antibacterial activity (Kumar et al., 1997), though the authors did not specifically relate the plant with conjunctivitis.

CONCLUSION

MSS 3136 was successfully transliterated with a few obscured and indecipherable words that did not impede the significance of medicinal information contained in the manuscript. A total of 13 diseases involving various body systems and organs were identified in the manuscript constituting 45 formulations. Standard edition transliteration is a good method to transliterate a Malay medical manuscript to enhance readability and comprehensibility of a manuscript among the public. Out of 13 diseases, three of them are eye diseases with six formulations to treat them. From the formulations, nine are plant-based ingredients whereby five of them have been shown in modern studies to possess pharmacological activities related to eye diseases. *A. calamus* and *A. vera* have been shown to be effective for cataract, *A. graveolens* for age-related macular degeneration, *E. alba* and *A. vera* for conjunctivitis, and *Curcuma* spp. for various eye diseases. In conclusion, the information gathered from this study can be used as a guide to carry out experiments to verify the effectiveness of Malay traditional remedies. In addition, studies can also be done on the four plants (*O. sativa, U. lobata, C. culilawan, F. obpyramidata*) that have not been investigated with regards to eye diseases, so that more information can be obtained and used for establishing Malay traditional medicine database.

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