CONTENT ANALYSIS OF OCULAR PATHOLOGY INTERVENTIONS WRITTEN IN THE MALAY MEDICAL MANUSCRIPT OF PAHANG

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ABSTRACT

Introduction: A Malay medical manuscript (MMM) is a precious artefact inherited by Malay ancestors to be preserved and used as a reference in medical interventions. In recent years, MMMs have gained attention from researchers for identifying potential materials for modern clinical use. **Aims:** The aims of this study were to review the MMM of Pahang and to analyse its contents that are related to ocular pathology interventions. **Methods:** The MMM of Pahang was reviewed to identify the contents described in ocular pathology interventions. Subsequently, the contents were analysed using the Scientific Analysis of Kitab Tib Index (SAKTI), consisting of sub-indices of the Manuscript Selection (SAKTI-iMS) and the Pharmaceutical Prospectivity (SAKTI-iPharmaprospect). In comparing materials of the formulations used for ocular pathology interventions with published scientific evidence, we adapted the SAKTI subindex of the Comparison with Published Scientific Evidence (SAKTI-iComPSE). **Results:** The total score of the SAKTI-iMS for the MMM of Pahang was four over six. Four entries described ocular pathology interventions, including three physical approaches (for blurred vision, dry eye, and eye pain) and one non-physical approach (for conjunctivitis). For physical interventions, 12 materials were used in the formulations, five of which were found to be supported by published scientific evidence. Blurred vision and eye pain interventions scored more than nine, whereas dry eye intervention scored six for the SAKTI-iPharmaprospect. **Conclusions:** The findings revealed valuable insights into ocular pathology interventions, with several materials that have been scientifically proven for the treatment of targeted ocular pathologies. The integration of traditional knowledge and scientific validation underscores the potential of MMM in informing modern ocular healthcare. These results emphasise the importance of preserving cultural medical heritage for advancing evidence-based medical interventions.

KEYWORDS: blurred vision, dry eye, eye pain, Malay medical manuscript, ocular pathology

INTRODUCTION

Malay manuscripts are categorised as ancient material that is over 50 years old and written by Malay intellectuals. The written manuscript may be recorded on bark, paper, animal skin, bamboo, or other natural materials (Shafri, 2022). It is a valuable artefact inherited from Malay ancestors and documents Malay literature, traditions, philosophies, narratives, laws, and medicine (Ibrahim & Shah, 2020a).

Malay manuscripts discussing medical interventions, known as a Malay medical manuscript (MMM), usually use natural resources such as herbs, spices, and fauna as the main ingredients of medicines to treat diseases (Piah, 2015). The medicinal interventions usually included two forms that were empirical and spiritual (prayers, spells, incantations, and taboos) to treat various diseases (Ibrahim & Shah, 2020b). These included colds, headaches, malaria, chest pains, skin diseases, stomach pains and pathologies related to the ocular (Zayn al-Fatani, 2018). Therefore, the objectives of this study were twofold: i) to review the MMM of Pahang and analyse its quality, and ii) to analyse the medical content described in the MMM of Pahang in relation to ocular pathology interventions.

MATERIALS AND METHODS

The Malay Medical Manuscript of Pahang

The MMM of Pahang is the only *Kitab Tibb Melayu* found in Pahang. It is preserved under the manuscript collection of the Pahang Museum. Based on the acquisition records of the Pahang Museum, this MMM of Pahang (LMNP.0116.83H) was a gift from Mohd Piah Hamzah on 11 June 1983. The manuscript was estimated to be over 70 years old (Pahang Museum Acquisition Record: Kitab, 1983).

Review and Content Analysis

The MMM of Pahang was analysed using the Scientific Analysis of Kitab Tib Index (SAKTI) (Shafri, 2021). The SAKTI comprised four sub-indices: i) Manuscript selection (SAKTI-iMS), ii) Comparison with Published Scientific Evidence (SAKTI-iComPSE), iii) Pharmaceutical Prospectivity (SAKTI-iPharmaprospect), and iv) Consensus among Texts (SAKTI-iConText) (Shafri, 2021).

The SAKTI-iMS was used to systematically review the MMM of Pahang and objectively assess the quality of the manuscript. The evaluation was based on the following criteria: i) author profile, ii) completeness of the text, iii) readability of the text, and iv) percentage of medical content described in the manuscript. For

the author profile, which is clearly written in the MMM of Pahang, a score of ‘1’ was assigned, and for the author's utterly unknown background, a score of ’0' was assigned. For the criterion of completeness of the text, a score of ‘1’ was given if the content of the text was more than 80% complete, and a score of ‘0’ was given for incomplete texts. For the criterion of readability of the text, a score of ‘1’ was given if more than 80% of the texts of the MMM of Pahang were readable, and a score of '0' was given if less than 80% were not readable. For the criterion of percentage of medical content described in the manuscript, a score of '3', '2', '1', or '0' was assigned if more than 80%, 50 to 80%, 5 to 49%, or less than 5% of the MMM of Pahang contained medical content, respectively. The total score of the four criteria was above four, three to four, or below three, indicating that the MMM of Pahang was of high-, medium-, or low-quality, respectively. Manuscripts of medium- to high-quality should be considered for further research (Shafri, 2021).

The SAKTI-iComPSE method was adapted to compare plants, faunas and minerals used as materials for formulation in the MMM of Pahang with scientific reports on their exact or related uses. In this study, journal articles, books, and related documents were searched using the Google Scholar database. The functions of each material were described in a specific ocular pathology intervention rather than rating the level of evidence found as outlined in the original SAKTI-iComPSE (Shafri, 2021). It would be more useful for future researchers to evaluate whether the materials described in the MMM of Pahang have the potential to be investigated further or is less likely.

The SAKTI-iPharmaprospect was used to assess the potential of the formulations described in the MMM of Pahang in the context of ocular pathology interventions for development as pharmaceutical products. The evaluation was based on the following criteria: i) origin of material, ii) complexity of formulation, iii) simplicity of preparation, and iv) simplicity of administration route. For the criterion of material origin, a formulation consisting of local materials scored ‘3', foreign materials scored ‘2', and a combination of local and foreign materials scored '1'. For the criterion of formulation complexity, if a formulation contained a single substance or mixed substances, a score of ‘2' or '1’ was given, respectively. For the criterion of preparation simplicity, a score of ‘4’, ‘3’, ‘2’, or ‘1’ was given if the formulation could be prepared and used immediately, required one step of preparation within one day, required two or more steps of preparation within one day, or required more than one day for preparation, respectively. For the criterion of administration route simplicity, if the route of administration was topical, by nasal/eye drop, or oral, a score of ‘3’, ‘2’, or ‘1’ was assigned, respectively. If the total score of the four criteria was ten and above, seven to nine, or less than seven, the formulation was considerably high-, intermediate-, or low-prospect of being developed as a pharmaceutical product, respectively (Shafri, 2021).

The SAKTI-iConText is a method for evaluating consensus comparison of formulations written between MMMs. However, it was not used in this study due to the limited availability of MMMs in Pahang.

RESULTS AND DISCUSSION

Review of the MMM of Pahang

Review of the MMM of Pahang found that it contained 59 written pages in *Jawi.* No author profile or colophon was found in the manuscript. More than 80% of the texts were complete and readable. It comprised 144 entries, of which 80 (55.6%) described medical contents. Using the SAKTI-iMS, the criteria of author profile, completeness of the text, readability of the text, and percentage of medical content described in the manuscript were scored as '0', '1', '1', and '2', respectively. Overall, the SAKTI-iMS score for the MMM of Pahang was four out of six (Table 1). The findings indicated that the MMM of Pahang is a medium-quality manuscript with an acceptable score for further analysis (Shafri, 2021). Moreover, to the best of our knowledge, the MMM of Pahang is the only manuscript in the Pahang authority collection ("Pahang Museum Acquisition Record: Kitab," 1983). Thus, this manuscript fulfils the need and urgency to study the medical content written in it.

Table 1 Manuscript quality analysis for the MMM of Pahang using the SAKTI-iMS

	Criteria of the SAKTI-iMS				Total Score
SAKTI-iMS	**Author Profile**	**Text Completeness**	**Text Readability**	**Medical Content %**	
Score	0	1	1	2	4

% = percentage

Four of the 80 entries related to ocular pathology interventions, including dry eye, eye pain, conjunctivitis, and blurred vision. Of these four interventions, three were physical and another was non-physical, namely prayers (Table 2).

Table 2 Intervention approaches of the ocular pathology described in the MMM of Pahang

Ocular Pathology	Intervention Approach
Blurred vision *(*Penglihatan kabur)*	Physical
Conjunctivitis *(*Lil-ramad)*	Non-physical
Dry eye *(*Mata kering)*	Physical
Eye pain (**Sakit mata*)	Physical

**Original words written in the MMM of Pahang*

Content Analysis of the MMM of Pahang

Comparison with Published Scientific Evidence

As mentioned in the subsection "Review of the MMM of Pahang", the physical approach described in the MMM of Pahang was used in three ocular pathology interventions. A total of 12 materials were used to treat the three ocular pathologies: only one for blurred vision, nine for dry eyes, and two for eye pain. Tiger bile was written as material for blurred vision intervention. Nevertheless, there are no published journal articles, books, or other relevant documents that provide scientific evidence for the medicinal properties of tiger bile (Table 3).

For four of the nine materials, there was scientific evidence for the intervention of dry eyes: black myrobalan, cape jasmine, female breast milk, and key lime juice. The other five materials did not have scientific evidence nor were they identified (Table 3). Dry eye is a multifactorial disease of the tears and ocular surface that causes visual discomfort, visual disturbance, and tear film instability, which can lead to ocular surface damage. Moreover, it increases tear film osmolarity and causes ocular surface inflammation (Craig et al., 2017). Black myrobalan and key lime juice were found to have properties that act as anti-inflammatory agents (Ai et al., 2019; Fuentes & Granda, 1988; Piccinelli et al., 2008), while cape jasmine can help reconstruct ocular surface damage (Li et al., 2015) and protein properties in female breast milk provide protection and improve tear film stability to alleviate dry eye disease (Mudgil et al., 2022).

Only for opium poppy is there scientific evidence that it is helpful for eye pain (Table 3). It has been reported that opium poppy can be used to relieve pain not only in the eye but also in other parts of the body, such as the gall bladder, head, and teeth (Hamarneh, 1972).

Table 3 Comparison of the materials described for ocular pathology interventions in the MMM of Pahang with published scientific evidence

Material	Scientific Evidence
For Blurred Vision Intervention	
Tiger bile *(*Hempedu harimau)*	No scientific report has been found.
For Dry Eye Intervention	
Black myrobalan (**Halīlaj;* [ǂ]*Terminalia chebula*)	Act as an anti-inflammatory agent (Ai et al., 2019).
Cape jasmine *(*Air bunga kaca piring;* [ǂ]*Gardenia jasminoides)*	Assist in reconstructing ocular surface damage (Li et al., 2015).
Female breast milk *(*Air susu orang perempuan)*	Contains the proteins that provide better protection to the tear film and enhance its stability (Mudgil et al., 2022).
Key lime juice *(*Air limau nipis;* [ǂ]*Citrus aurantifolia)*	Act as an anti-inflammatory agent (Fuentes & Granda, 1988; Piccinelli et al., 2008).
Lesser celandine/ pilewort *(*Ma mayrān;* [ǂ]*Ficaria verna)*	No scientific report has been found.
Pearl (**Mutiara;* [ǂ]*Pinctada)*	No scientific report has been found.
Rock sugar/ rock candy (**Gula batu*)	No scientific report has been found.
**Shib Yamani*	The material cannot be identified.
**Ithmid Iṣfahāniy*	The material cannot be identified.
For Eye Pain Intervention	
Zinc *(*Timah sari;* [ǂ]*Zinc)*	No scientific report is found.
Opium poppy/ bread seed poppy *(*Afyūn;* [ǂ]*Papaver somniferum)*	Able to relieve eye pain (Hamarneh, 1972).

**Original words written in the MMM of Pahang;* [ǂ]*Scientific name*

Pharmaceutical Prospect

Using the SAKTI iPharmaprospect, the interventions for blurred vision and eye pain scored greater than nine out of 12 (Table 4). This indicated that these two interventions have high bio-prospect of being developed as a pharmaceutical product. To develop a pharmaceutical product that has commercial value and is viable, the formulation must contain locally sourced materials, have high efficacy even if it is singly formulated, have low complexity of the administration route, and be able to be consumed immediately or applied topically (Shafri, 2021).

The formulation for blurred vision intervention met all the above criteria. Tiger bile is a local source that can be applied immediately and topically as eyeliner. However, the efficacy of the described formulation is questionable, as no modern scientific report has been found for this material to reduce blurred vision; therefore, a future study is warranted.

For eye pain intervention, the materials of the formulation are a mixture of zinc and opium poppy, which are also available locally and can be applied topically to the eye. Nevertheless, the preparation requires more than one step within a day.

For dry eye intervention, the SAKTI-iPharmaprospect score was six over 12. The formulation is mixed between local and foreign sources of nine materials, two of which cannot be identified; the preparation involves more than two steps and is applied as eye drops (Table 4). In terms of pharmaceutical prospects, this formulation is difficult to manufacture and may have low potential to become a commercial and viable pharmaceutical product (Jaganath & Ng, 2020; Shafri, 2021).

Table 4 Pharmaceutical prospect of formulation for ocular pathology interventions the MMM of Pahang using the SAKTI-iPharmaprospect

Ocular Pathology Intervention	Score of the SAKTI-iPharmaprospect Criteria				Total Score
	Origin of Material	Complexity of Formulation	Simplicity of Preparation	Simplicity of Administration Route	
Blurred Vision	3	2	4	3	12
Dry Eye	1	1	2	2	6
Eye Pain	3	1	3	3	10

No comparison was made between the materials or formulations written in the MMM of Pahang and other MMMs, which is a limitation of this study. Thus, this study did not address any consensus that might exist with other MMMs. Despite this inconclusiveness, to the best of the authors' knowledge, the MMM of Pahang is the only MMM collection in Pahang ("Pahang Museum Acquisition Record: Kitab," 1983).

CONCLUSION

The MMM of Pahang is a medium-quality manuscript. It contains 80 entries describing medical content, including four ocular pathological interventions. Nearly 50% of the materials have been scientifically proven to treat the targeted ocular pathologies. The materials or formulations described in this manuscript for the interventions of blurred vision and eye pain have good bio-prospects of being developed as a commercially viable pharmaceutical product. Therefore, further research is warranted to evaluate the efficacy of the materials and formulations that may provide alternative ocular intervention from the MMM of Pahang in the future.

DECLARATION OF INTEREST

The authors declare that there is no conflict of interest.

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