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RESEARCH ARTICLE

# The KLiP Mobile: A model of community engagement programme

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## Abstract

**Background:** KLiP Mobile (Klinik pakar bergerak) is a mobile eye specialist clinic initiated by the state government of Negeri Sembilan and Universiti Sains Islam Malaysia (USIM). It is funded by the state of Negeri Sembilan and managed by USIM. **Objectives:** The four objectives of this programme are: 1) Providing essential eye services, 2) Enhancing public-private partnerships to support the programme, especially among the underprivileged community for cataract surgery, rehabilitation of vision, and glasses for children and elderly 3) Promoting awareness through knowledge transfer programme on eye disease 4) conducting research. This paper aims to describe the prevalence of common eye diseases among our target population in Negeri Sembilan. **Method:** This is a cross-sectional study consisting of referred or walk-in patients who visited the KLiP Mobile program between January 2016 to June 2022. **Results:** The result showed the prevalence of common eye diseases among the population and is comparable with our national eye survey. **Conclusion:** The KLiP Mobile is a model of community engagement programme and is expected to continue benefiting the community especially those who are unable to access specialist services.

## Introduction

The Klinik Pakar Mata Bergerak, or KLiP Mobile is a specialised ophthalmology mobile clinic providing services to the rural community in Negeri Sembilan (Mokhtar et al., 2021). The vehicle is fully equipped with eye examination tools (Figure 1). The main reason for the innovation of the KLiP Mobile was to address the high disease burden of eye problems in the Negeri Sembilan population, which was about 30%, much higher than the national prevalence (Unpublished data). It was estimated that the prevalence would increase over time due to the increasing number of non-communicable diseases that are highly correlated with eye complications (Bourne et al., 2017; Flaxman et al., 2017; Fricke et al., 2018). Previous studies also reported that the prevalence of chronic eye diseases was higher in rural communities than in urban

populations (Thevi et al., 2012; Hashemi et al., 2017; Mokhtar et al., 2021).

The KLiP mobile was officially launched in November 2015 in Kampung Labu Negeri Sembilan. Currently, it only covers the state of Negeri Sembilan. Negeri Sembilan is situated approximately 50 km away from Kuala Lumpur with a land area of 6686 km<sup>2</sup> (Department of Statistics Malaysia, 2021).

It has seven districts: Seremban, Kuala Pilah, Jelebu, Tampin, Port Dickson, Jempol and Rembau consisting of a multiracial population including Orang Asli. The total population of Negeri Sembilan is 1.13 million contributing to 3.5% of the Malaysian population (Department of Statistics Malaysia, 2021). Our first KLiP Mobile programme was held in January 2016 at Kampung Panchor Seremban.

There are four main objectives for the KLiP Mobile. Firstly, to provide essential eye care services, for

cataracts among the elderly, refractive error in children, early detection of diabetic retinopathy and other eye conditions in the rural community.

The second objective is to encourage collaboration between the public-private agencies to support the programme financially among the underprivileged community for surgery, rehabilitation of vision, and glasses for children and the elderly. Our collaborators are the State government of Negeri Sembilan, State Health of Departments, local councils, Non-Governmental Bodies (NGOs) local health community, optometrists and ophthalmologists/lecturers from USIM. For each visit, our core team consists of an ophthalmologist, assistant nurses trained in eye screening, an optometrist, technical staff and a driver.

The third objective is to promote awareness among the community and staff through knowledge transfer, and the training of trainers. Education on eye diseases is taught to the community as well as local health care workers, and our medical and optometrist students through activities during the programme. As an academic institution, the KLIP Mobile programme is also designed for research, the fourth objective of the programme. Based on this fourth objective, this paper aims to describe the prevalence of common eye diseases among our target population in Negeri Sembilan.

## Methods

### Design

A cross-sectional study was conducted under the initiative of the KLIP Mobile program. The population in this study consisted of referred or walk-in patients in rural areas in Negeri Sembilan between January 2016 to June 2022. All seven districts in Negeri Sembilan were included in the study.

Participants were recruited from the KLIP mobile sites which are determined by the State Health Department. The criteria for the site selection were 1) the distance from the nearby healthcare facility, 2) areas with limited healthcare access, 3) areas with low socioeconomic background, and 4) areas with basic community facilities such as community hall and good community cooperation.

A universal sampling method was used. All patients attending KLIP Mobile were included in the study. Patients attended the KLIP Mobile via two pathways: The first pathway was through a referral from the nearby health clinic, and the second pathway was through a volunteer screening programme. The patients were attended to by an optometrist and an ophthalmologist during the visit. Patients who needed

further treatment and were medically fit for cataract surgery were referred for surgery at the nearest hospital.

### Ethics

The ethics applications were approved by the USIM Research Ethics Committee.

### Data collection

Data were collected through face-to-face interviews and physical examinations. In addition, information on the sociodemographic background, and past medical and eye history were collected using a standardised data collection form. These data were collected after the registration process. Following that, data on the vision test, visual acuity and anthropometric measurements were taken through physical examination. The ophthalmologist also conducted an eye examination using a slit lamp and a non-mydratic fundus camera in certain cases.

### Data analysis

All data were entered and analysed using SPSS version 24. Descriptive analysis was conducted to determine the prevalence and sociodemographic factors of the study population. For categorical data, results were presented as frequency and percentage.

## Results

A total of 4023 patients from rural areas had been screened, whereby 83% (n=3349) of them were more than 40 years old. Out of the 4023 patients screened, 1301 (32.3%) needed referral of which 862 (21.4%) patients were seen by the ophthalmologist and 439 (10.9%) were referred to optometrists for subsequent reviews. A total of 2535 (63.0%) patients had ophthalmic conditions with the majority of them diagnosed with cataracts (n=889, 35.0%), followed by refractive error (n=695, 27.4) and Diabetic Retinopathy (n=209, 8.2%).

The lowest prevalence of ophthalmic conditions detected was Diabetic Maculopathy (n=76, 3.0%) and Pterygium (n=116, 4.6%). Among the patients with Diabetes Mellitus who come for Diabetic Retinopathy assessment (n=1247), 10 (0.8%) had Advanced Diabetic Eye Disease, and 17 (1.4%) had Proliferative Diabetic Retinopathy. Meanwhile, nine (0.7%), 82 (6.6%) and 91 (7.3%) had Severe, Moderate and Mild Non-Proliferative Diabetic Retinopathy respectively, and 1038 (83.2%) had no apparent Diabetic Retinopathy. The results of this study were presented in Table 1 below.

**Table 1: Socio-demography and clinical characteristics of patients**

Parameters	Options	N (%)
Age	>40	3349 (83.0)
	<40	674 (17.0)
Referral	Ophthalmologist	862 (21.4)
	Optometrist	439(10.9)
	None	2722(67.7)
Diagnosis (n=2535)	Diabetic retinopathy	209 (8.2)
	Cataract	889 (35.0)
	Refractive error	695(27.4)
	Diabetic maculopathy	76(3.0)
	Pterygium	116(4.6)
	Others	550(21.7)
Type of Diabetic Retinopathy Changes in Diabetes Mellitus Patient (n=1247)	Advanced diabetic eye disease	10(0.8)
Age	Proliferative diabetic retinopathy	17(1.4)
	Severe non-proliferative diabetic retinopathy	9(0.7)
	Moderate non-proliferative diabetic retinopathy	82(6.6)
	Mild non-proliferative diabetic retinopathy	91(7.3)
	No apparent diabetic retinopathy	1038(83.2)

**Figure 1: KLiP Mobile external view and interior view**

## Discussion

The current study showed the prevalence of diabetic retinopathy in our population is comparable with the National Eye Survey (Chew *et al.*, 2018). However, the prevalence of cataracts is lower in our population, possibly because most cataract patients have been referred to hospitals, and we are detecting patients who have not had the means to go.

The KLiP Mobile provides many benefits to patients and healthcare services by reducing waiting time and raising patient satisfaction in government hospitals. Patients have the opportunity to seek free ophthalmology and optometry services within their resident area without the hassle of travelling miles away to a hospital or clinic. The KLiP mobile has allowed

high-risk individuals to be screened for eye diseases compared to the long waiting time at facility-based health centres for screening services (Li *et al.*, 2021; Biya *et al.*, 2022).

This initiative has also resulted in timely diagnosis and referral for related medical procedures to the patients. The KLiP mobile has also synergistically worked with the community health clinic to minimise the workloads and help to delegate the task between healthcare providers from the Ministry of Health and health facilities provided by the public university.

KLiP Mobile has been proven effective in reaching vulnerable populations who do not otherwise have a reliable source of eye healthcare (Mokhtar *et al.*, 2021). This reduces traditional barriers to access such as

geographic isolation, transportation issues, time constraints, financial costs, fear, and distrust of the eye healthcare system (Elam *et al.*, 2014). This mobile clinic successfully identified people suffering from cataracts and facilitated their early treatment, especially cataract surgery at the nearest hospital. It improved their vision and improved their quality of life. It has also had a big impact on rural young adults who have an undiagnosed refractive error.

The KLIP Mobile has significantly contributed to reducing health costs by reducing outpatient ophthalmology department visits and represents a cost-effective care delivery model to improve eye health outcomes in out-of-reach communities. As a result of the successful innovation of this programme, KLIP Mobile received several national awards as well as international recognition as a finalist in the Western Pacific World Health Organisation (WHO) challenge (Western Pacific WHO Challenge, 2021).

The outreach programme is having a positive impact on the health system in Malaysia. This initiative serves as an extension of facility-based health care, especially primary health care, as it is designed to help, uplift and support the underserved population to receive medical attention. It facilitates timely diagnosis and referral for the population, thereby significantly reducing the development of clinical sequelae and thus minimising the financial impact of treating late-stage diseases for providers and patients. This initiative has the potential for expansion as a nationwide programme as part of the efforts to achieve Universal Health Coverage (UHC) and reduce health inequalities in Malaysia.

## Conclusion

The KLIP Mobile programme represents a successful quintuple helix model of a community engagement programme and is hoped to continue to serve our community.

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