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Malaysia has made significant progress over the past several decades in improving health care services. However, providing rural populations with quality and accessible health care remains a challenge, leaving Malaysia to investigate new solutions in health care delivery to rural populations. This article examines the current state of rural health care in Malaysia and suggests possible solutions to bridge the health disparities between urban and rural populations.

Introduction

Malaysia faces numerous hurdles for providing health care services to rural communities, including differences between East Malaysia and Peninsular Malaysia in population density, accessibility, and available service types. East Malaysia is much more rural, with terrain that is difficult to navigate, making it difficult to develop proper infrastructure to accommodate medical needs. Therefore, residents in rural areas typically travel large distances through rugged terrain to reach medical facilities. A 2011 study reported that only about 69% of those in rural areas live within 3 kilometers of clinics or other (often small) health care facilities, whereas 92% of urban residents are within 3 kilometers of any facility (Jaafar et al., 2012). Not only are those in rural areas farther away from any sort of health care facilities, but also the terrain makes it more difficult to reach those facilities. Similarly, a study from the Ministry of Health found that the average time to reach a hospital for rural residents was 43 minutes compared to 28 minutes for urban residents. The study also found that hospitals in rural areas were on average more than double the distance away compared to urban hospitals, 36 km for rural residents versus 17 km for urban residents (Institute for Public Health, *Vol. III*...). These differences in distance and travel time hinder the rural population's access to health care services in Malaysia.

Another barrier to good health care for rural communities is quality of services provided. As explored later, in order to overcome the gaps in health care for rural areas, Malaysia implemented various organizations and programs to provide basic health services to villages. These programs use volunteers and nurses, who are less qualified to accommodate the complex health needs of the rural population. The primary health care providers in rural areas also are government funded rather than funded by the private sector.

Typically, in Malaysia, doctors prefer working in the private sector, resulting in fewer public hospitals, fewer available doctors, and fewer specialists in rural health care facilities. Given Malaysian aims for a high-income economy, improving health care for rural populations should be a priority.

Health Disparities Experienced by Rural Populations

One consequence of decreased accessibility to health care facilities is lack of quality in health care delivery. Most rural services are provided by public hospitals, whereas in urban areas, most health care is covered by the private sector, causing inherent differences in delivery between urban and rural areas. While the public system provides care to most of the population, it only accounts for 45% of the doctors and 25% of the specialists (Quek), due to a general movement of doctors from the public to the private health care sector (see article by Panichella in this volume). This movement causes the rural population to be underserved; moreover, the available doctors are usually younger, hence less experienced than those in urban settings. In Sabah and Sarawak, the two rural states in East Malaysia, the doctor-to-patient ratios are, respectively, 1:1357 and 1:957, whereas the average doctor-to-patient ratio in all of Malaysia is 1:633 (Bahardin). Without as many doctors, rural populations have less access to quality care, and doctor burnout becomes more common, particularly for specialists.

The effects of inaccessibility of health care facilities and practitioners for rural residents are evident when comparing the health of urban and rural populations. While the prevalence of many noncommunicable diseases between urban and rural populations is similar, often rural settings have much higher rates of undiagnosed cases. For example, the prevalence of hypercholesterolemia is 34.3% in the urban population and 37.0% in the rural population. However, the percentage of diagnosed cases in urban areas is only 9.1% compared to 6.6% for rural residents, and the percentage of undiagnosed cases is 25.3% and 30.4% for urban and rural residents, respectively (Institute for Public Health, *Vol. II...*). These undiagnosed cases can lead to more health complications and widening disparities in health for the rural population.

What Malaysia Has Done So Far

To accommodate the medical needs of rural populations, the Ministry of Health introduced the Flying Doctor Service (FDS) in 1973. FDS flew doctors to remote areas to provide services on a monthly basis and to deliver supplies to clinics (Koshy et al.). The service used eight helicopters to reach rural residents who needed medical attention (Iwamoto). FDS was effective for reaching citizens in states such as Sabah and Sarawak, where the terrain makes it nearly impossible to reach villages by land or water (Koshy et al.). However, the FDS service was terminated in 2016 due to low funding, pushing Malaysia to find a new way to provide health care to remote areas (Goh).

By contrast, the Primary Health Care Volunteer program, sponsored by the Ministry of Health, serves villages in Sabah. The program began in 1987, aiming at preventing malaria by selecting volunteers in hundreds of communities to teach healthy behaviors that prevent disease. This program has since expanded to teach communities in Sabah how to promote healthy habits that prevent sickness and disease (Mustapha et al.).

By 2001, the World Health Organization started mobilizing volunteers to travel to rural villages and deliver primary care, teach communities about health care practices, and promote better health behaviors relating to dengue through a program called Communication for Behavioural Impact (COMBI) (Jaafar et al., 2012). Volunteers are trained through media programs to search for mosquito breeding sites as well as to instruct residents how to inspect their homes, prevent disease, and understand the signs of dengue (Ismail et al.). The overall goal of the program is to educate the masses on proper health practices to prevent dengue and to change the health behaviors and norms of the community.

Currently, most rural health care comes from public sector facilities and small community clinics, as the private sector generally finds little benefit offering health care

services to rural areas because it is difficult to serve enough citizens to generate profits. In an attempt to cover populations that public sector hospitals cannot reach, 1Malaysia Clinics were established starting in 2009 (Mahadeva et al.). These clinics, now called Community Clinics, were originally intended to provide health care services to lower-income groups in urban areas, but they have expanded to rural areas (Nordin et al.). Provided by the government, these clinics are run almost entirely by Assistant Medical Officers (AMOs). More than 3,000 clinics have opened, giving health care services to over 95% of the population (Koshy et al.). Operations have also gone mobile; for example, the 1Malaysia Mobile Bus Clinics and the 1Malaysia Mobile Boat Clinic were added to reach patients in inaccessible areas, such as Sarawak and Sabah (Sebastian et al.).

AMOs, trained for only 3 years, can perform basic medical assessments, such as monitoring blood pressure, giving shots, and providing basic checkups. They also assist doctors, carry out minor procedures, educate about diseases, and provide routine primary care. AMOs function much like physician assistants or nurse practitioners and therefore cannot perform major surgeries and have minimal knowledge in specialized fields of health care. A major limitation is in what prescription medications they can offer patients, making AMOs less than ideal for patients who need more serious assistance. Individuals with more specific needs must travel much farther to receive treatment, creating a large barrier to those who suffer from serious or non-routine health conditions (Jaafar et al., 2012).

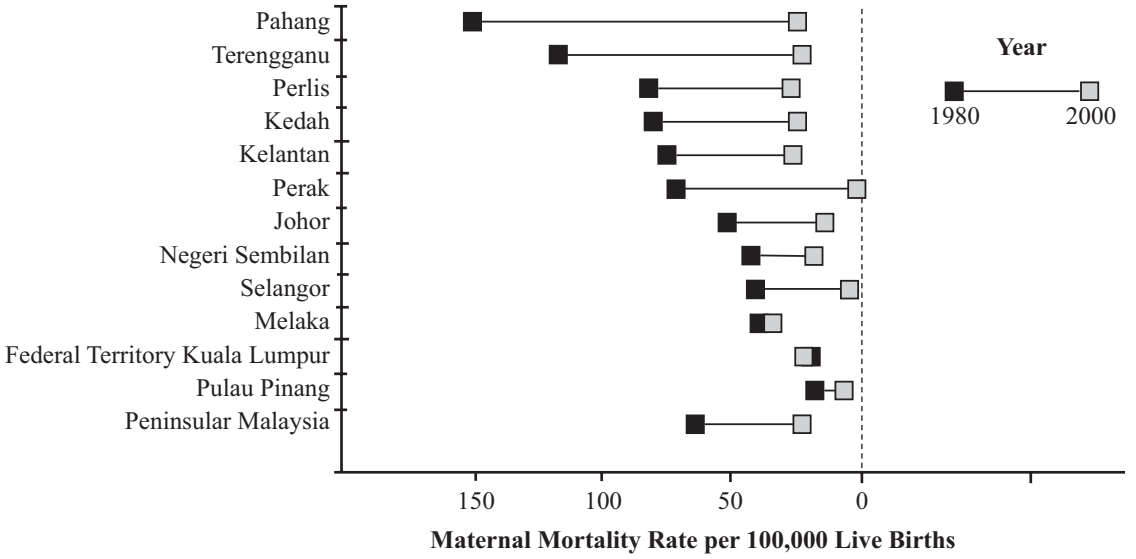
Beyond direct health services, Malaysia is also prioritizing health-related infrastructure, such as expanding access to clean water. While nearly 94% of rural Malaysia has access to a clean water source, the government is hoping to expand this coverage. Polluted and untreated water can carry typhoid, cholera, and other infectious diseases. It can also lead to heart and nervous system damage, poor circulation, diarrhea, vomiting, and other problems (Afroz et al.). One study looked at the prevalence of intestinal parasitic infections (IPIs) in Peninsular Malaysia. The study found that there was a 73.2% prevalence of IPIs among 8 villages, and those at greatest risk were those living in rural and remote areas, those without treated water, and those under 12 years old (Ngui et al.). While treating water can reduce the incidence of these health problems, due to its low cost, the technology used by the Ministry of Health does not completely purify the water (Afroz et al.). Nevertheless, water treatment can be a large step toward improving the health of rural and impoverished populations in Malaysia. An examination of the prevalence of IPIs found that those living in rural areas of Peninsular Malaysia without treated water suffered 2.1-times higher risk of contracting an IPI (Ngui et al.). Untreated water is one of the leading causes of death in adults across the globe, so expanding coverage to most of the remaining rural population should have major health benefits.

Outcomes of Malaysia's Previous Policies

The implementation of these programs in Malaysia has left mixed results for rural communities. For example, COMBI, which began in 2009, lowered dengue fever rates within the first year of implementation. Compared to 2008, 72% of the areas where COMBI was implemented showed fewer dengue cases, whereas only 6% showed more cases in 2009 (Jaafar et al., 2012). The improvements in dengue cases in 1 year, however, might have occurred due to other factors, such as changes in weather. One study found that COMBI has been successful mostly in the short term. The program seems to be implemented during crucial seasons for the spread of dengue. Unfortunately, there appears to be little political commitment, lack of monitoring, and only sporadic and inconsistent inspections. As a result, COMBI has not shown any statistically significant long-term health benefits for communities in Sabah (Ismail et al.).

COMBI notwithstanding, there have been improvements in numerous long-term health variables in rural populations over the past few decades. The infant mortality rate, maternal mortality rate, life expectancy, and fertility rate have all seen improvements (Jaafar et al., 2012). There has also been a decrease in

Figure 1
Changes in Maternal Mortality Rates by State, Peninsular Malaysia 1980–2000



Source: Jaafar et al., 2007.

malaria cases since the implementation of the Primary Health Care Volunteer program (Mustapha et al.). Between 1980 and 2000, Pahang and Terengganu, the most rural states in Peninsular Malaysia, saw a drop in maternal mortality rates from roughly 151 and 118 per 100,000 live births to 24 and 21 per 100,000 live births, respectively. Other states such as Kuala Lumpur saw much smaller improvements, illustrating that by comparison rural areas are seeing dramatic improvements in mortality statistics, putting them more or less on par with urban regions (Figure 1) (Jaafar et al., 2007). The efforts to improve the health care in rural areas have brought the health outcomes of these populations much closer to the figures seen in urban populations.

Possible Solutions to Overcome the Rural Health Care Gap

Micro–Health Insurance Schemes

To expand access to rural populations, a micro–health insurance scheme could be implemented. Micro–health insurance targets low-income groups who cannot afford standard private insurance by offering coverage with low premiums, but with limited coverage and a low cap. These low-income citizens pay a small yearly premium, which opts them into the insurance scheme. Depending on what the insurance covers, they are reimbursed up to a determined amount for surgeries, consultations, procedures, and so forth, when receiving care at an approved hospital or clinic. Micro–health insurance can be self-sustaining but relies heavily on enough healthy citizens choosing to opt into the insurance to counterbalance the cost of the sick enrollees in the scheme. In this way, low-income individuals receive health insurance at an extremely low cost, allowing them to obtain otherwise expensive procedures.

Yeshasvini Health Insurance Scheme

In India, the Yeshasvini Health Insurance Scheme was introduced by the Karnataka state government in 2003. This scheme is self-funded and works by allowing rural farmers to opt into this insurance policy and pay Rs300 ($7) a year (Kuruvilla and Liu). The insurance plan allows

rural farmers to access mostly private hospitals for surgeries and treatment at no cost. A farmer who needs cardiac surgery can travel to any of the 10,000 hospitals that operate under the scheme, meet for a consultation, undergo heart tests, and receive surgery at no cost, assuming the case is approved by the scheme's administrator (Kuruvilla and Liu). Within the first 7 months of being implemented, more than 5,000 farmers had operations, with another 23,500 farmers receiving consultations (Faizli). These statistics reveal a demand for accessible health care in rural areas. On top of that, there was a Rs18.7 million profit in the first year of implementation in India (Faizli). Therefore, the scheme not only benefits the rural populations but also is profitable for the country, allowing the insurance plan to be self-sustaining.

Community-based health insurance in Rwanda

Similar to India, Rwanda implemented a micro–health insurance scheme to expand health care coverage in 1999, called community-based health insurance (CBHI). Prior to the CBHI scheme, most Rwandans could not afford private health insurance, and the government offered little support to cover the expenses of health care. CBHI made health care much more accessible, allowing citizens to pay a small yearly premium of RWF1,000 ($1.68) plus 10% co-pays for hospital services and only RWF200 for health centers. The scheme was largely successful in Rwanda, with about 35% of the population covered by 2006 and 86% of the population by 2008. While it was largely funded by the US Agency for International Development, the success of CBHI has allowed it to become nearly self-sustaining. The large increase in coverage exemplifies the attractiveness of the scheme and how well received it is among the population (Woldemichael and Shimeles).

Implementation in Malaysia

Under a similar scheme, Malaysia could expand health coverage to allow rural residents to receive health care at a very low cost. A CBHI scheme would benefit Malaysia in multiple ways. First, it would extend private health insurance to allow rural populations to receive higher-quality care in private facilities without paying expensive fees. Second, because the plan utilizes private hospitals and clinics, it would incentivize the private sector to expand coverage outside of urban areas. Given that more doctors are funneling into the private sector, rural populations would gain access to more specialists. This also would take a load off the public sector, meaning shorter wait times, higher patient satisfaction, and less stress for the providers in government facilities.

Outside of helping make health care more accessible, the experience in India suggests that the model has the potential for profitability. In addition, the payments create a market push for clinics to upgrade their equipment and bring more physicians to rural areas, which could help improve the population-to-doctor ratio and quality of services. Overall, the scheme has promise in balancing the public and private sectors, making health care more accessible to rural populations, and improving the Malaysian economy.

Infrastructure Improvement

Another avenue toward closing the health care gap is for Malaysia to better fund the Ministry of Health so it can equip current facilities with improved technology and build hospitals in rural areas, efforts that would improve accessibility and facility quality. With more hospitals, people would no longer need to rely on small clinics and AMOs unable to accommodate specialized needs. More hospitals would also mean less travel time for rural patients.

The problem is that while building more hospitals creates more accessible places to receive treatment, it does not change the attitudes of doctors, specialists, and patients. As described in a 2010 study, most doctors do not want to relocate to a rural facility and give up the luxuries of city life (Ibrahim et al.), which means that rural hospitals will continue to be understaffed unless providers are given enough incentive to relocate. Furthermore, if the government wants to build more hospitals, it also needs to find more doctors to staff them.

A way to deal with the lack of physicians is to train more medical graduates, but that remains a problem, as there are only 44 training hospitals in the country, limiting the possible number of graduates (Faizli).

For this reason, the Malaysian government should consider providing more incentives for physicians to remain in the public sector and assist in rural areas. The Medical Act 1971 (Act 50) requires all doctors in Malaysia to serve in the public sector for at least 3 years. Perhaps Malaysia should make this period longer or expand benefits for serving in rural areas, thereby hopefully retaining some of the talent in the public sector, thus staffing more clinics and hospitals.

Telemedicine

Among the most promising next steps for addressing the gaps is that Malaysia is turning to a new model to provide the rural population with health care: telemedicine. With telemedicine, the rural population can access health care through use of technology, allowing them to get checkups without traveling (Mung). Telemedicine is also advantageous because it can connect patients to specialists, who are not always available in medical clinics. For example, patients can download an application on cellular devices, connect with a doctor for a consultation at a low and fixed co-pay, and receive immediate medical assistance from a distance. Telemedicine not only benefits rural areas but also can improve urban health care by diminishing referrals and alleviating crowding of medical facilities (Zailani et al.).

As evidence of the technology's potential for Malaysia, Brazil is already incorporating telemedicine in hospitals. Brazil is a developing country with similar challenges in making health care accessible to rural populations. A study conducted by Universidade Federal de Minas Gerais in 2016 found teleconsultation services were widely used by nurses. Of 30,258 teleconsultations, 76.5% were for medical subspecialties, and most of the requests came from underserved and poorer cities. The results show that the implementation of telemedicine services seems to benefit rural and low-income populations the most. It also improves the access to more specialized services typically more difficult to distribute to rural areas (Santos et al.).

In Malaysia, similar models are beginning to be implemented in hospitals. On April 13, 2017, the first telemedicine service was launched for a RM20 co-pay (Bernama). The service can be used by anyone with Internet access. It promises safe and secure services to the population and connects users with specialists if necessary, allowing citizens in rural areas to access specialization lacking in clinics. Since the first implementation, more telemedicine apps for smartphones have become available, demonstrating interest in telemedicine in the country.

Recent studies indicate that telemedicine in Malaysia already has a general acceptance among physicians and patients. The University of Technology Malaysia examined the acceptance of telemedicine services and found that physicians currently using the services are highly satisfied with the technology. Physicians in referring (primary) hospitals tend to have a higher degree of acceptance of teleconsultation than physicians in referral hospitals, probably due to the intention to give patients access to specialists at referring hospitals. However, no other factors, such as emergency versus non-emergency physicians, had statistical differences in acceptance of telemedicine services. Overall, physicians seem to accept the technology, offering hope if Malaysia intends to expand these services (Maarop and Win).

In order to utilize telemedicine, however, Malaysia needs to overcome a few barriers. First, telemedicine requires adequate bandwidth to have videoconferences and access the technology. Many rural areas do not even have access to electricity, let alone the bandwidth to utilize telemedicine, so improvement is needed in this infrastructure (Zailani et al.). As of January 2019, the Internet reached about 80% of the population, compared to 95% coverage in the United States and 84% in Singapore. While the Internet penetration is impressive compared to the average 63% in Southeast Asia, there is still approximately 20% of the population without Internet, thereby unable to utilize telemedicine services ("Digital 2019..."). A majority of these individuals without Internet also are found in rural areas, which

could exacerbate the health disparities between rural and urban populations.

To overcome these barriers, the Tenth Malaysian Plan (2011–2015) focused on expanding roads, electricity, and water to rural areas. Between 2011 and 2014, road coverage increased by 11.7%, electricity increased to 97.6%, and water supply increased to 93.8% in rural areas. There also were 1,122 telecenters established to increase accessibility to digital media. The Eleventh Malaysian Plan (2016–2020), pushed by the new government, hopes to continue these improvements, and there is a projected increase to 99% accessibility for both treated water and electricity coverage by 2020. These improvements could expand telemedicine service accessibility in rural areas in the coming years ("Transforming Rural…").

Telemedicine infrastructure in medical facilities would also need development, which requires funding and support for change. There have been moves to develop the industry and bring in stakeholders, such as the annual Malaysia Telemedicine Conference, which was initiated in 2015 by Monash University Malaysia to discuss research and innovation in telemedicine. However, patient and provider satisfaction are two key indicators of whether telemedicine services can be developed. A 2017 systematic review assessed patient attitudes for telemedicine in Malaysia. The study determined that the factors most associated with patient satisfaction are whether the services can improve health outcomes, can serve as a preferred method of health care delivery, are easy to use and inexpensive, decrease travel time, and can improve patient-provider communication. Differences in these factors explain about 61% of variability in patient satisfaction in the study. Also, older and more traditional groups are much less willing to accept telemedicine services. If Malaysia plans to invest in telemedicine, these factors should be heavily considered when developing the infrastructure for the services (Kruse et al.).

Similarly, a 2010 study examined provider attitudes toward telemedicine. According to this study, only 39% of providers would use telemedicine to work in rural areas if given incentives, and 34% said they would not work in rural areas even with incentives. To further complicate telemedicine implementation, more than two-thirds of doctors at the time lacked experience in telemedicine technology. The study conveyed that doctors have little desire to use telemedicine to engage with rural communities, creating a large barrier to implementing the technology in Malaysia (Ibrahim et al.).

Conclusion

What are the next steps for Malaysian rural health care? Providing better access to health care in rural areas presents numerous challenges but needs attention as Malaysia seeks to become a high-income nation. The gaps in accessibility contribute to poorer health outcomes and wealth inequalities between rural and urban populations. These rural populations are holding back Malaysian economic growth, so better health programs should be developed to bridge these health care disparities. As Malaysia weighs the possible options for improving rural health care, there are numerous aspects to consider.

The microinsurance scheme offers potential to expand health care access to rural populations while balancing inequalities between the public and private sectors. A load could be taken off the public sector, thereby improving the quality of service provided to rural populations, and the private sector could expand into rural areas. However, there are potential drawbacks of this plan. First, there is no guarantee that the profit-seeking private sector would want to expand into rural areas because it could be a risky investment due to the sparse population. Second, rural citizens would have to see the benefit of opting into micro–health insurance, or else the scheme would not be self-sustaining or successful. Given that other countries have been successful in implementing similar models, success seems feasible but by no means assured. Third, if it were a successful model, there would likely be a larger incentive for doctors to move into the private sector, which is concerning because pulling more doctors from the public sector could further hurt low-income groups in Malaysia. These risks should be addressed before trying to implement a microinsurance scheme.

Similarly, expanding the infrastructure of Malaysia could improve overall access to health care, especially when paired with another project such as microinsurance or telemedicine. Because clean water accessibility is an important determinant of health, Malaysia should continue to expand access to purified water while improving the current water treatment technologies to ensure it is safe. Malaysia also should consider providing financial or compulsory incentives for physicians to stay in the public system. The major issue with expanding infrastructure and staffing might be pushback from physicians or the population. Lengthening the compulsory service period, for example, may upset many physicians who wish to work in the private sector. Furthermore, providing doctors a financial incentive to work in rural areas may not be economical. Hence, developing better infrastructure and staffing should be implemented alongside another plan and done slowly over time to prevent large backlash from the public.

Finally, telemedicine shows promise in making health care more accessible even without building more hospitals or relocating doctors against their preference. It enables rural populations to meet with specialists without expensive traveling fees, improves communication between physicians, promotes better record keeping, and encourages private sector doctors to reach rural populations without building more costly rural hospitals. The main challenges include changing cultural ideas and reaching areas without Internet access. If telemedicine is considered an option, Malaysia needs to convince the population that mobile consultations with doctors are an effective way to access health care services. Changing the cultural norm of seeing doctors in person could be a major challenge. So too, Malaysia should improve the infrastructure for the Internet penetration in rural areas.

In the end, a combination of these three options may be most beneficial for closing the rural health care gap. A micro–health insurance scheme may be the best short-term solution but may hurt the health care system in the future by pulling more doctors into the private sector instead of fostering balance between the two systems. Telemedicine seems the most promising long-term option, but the infrastructure and cultural norms would take time to develop and change. Overall, the holes in rural health care are not amenable to a single fix; rather, Malaysia needs a comprehensive approach to improve health care access for rural populations.

References

Afroz, Rafia, Muhammad Mehidi Masud, Rulia Akhtar, and Jarita Bt Duasa. "Water Pollution: Challenges and Future Direction for Water Resource Management Policies in Malaysia." *Environment and Urbanization ASIA*. Vol. 5, 2014, pp. 63–81.

Bahardin, Afif. "Suturing the Gap - The Urban-Rural Health Dilemma." *Malaysiakini*. June 17, 2016.

Bernama. "First Telehealth Service Debuts in Malaysia." *Free Malaysia Today News*. April 13, 2017.

"Digital 2019 Global Digital Overview (January 2019) v01." SlideShare. January 30, 2019.

Faizli, Anas Alam. "Satu Ukuran Sistem Penjagaan Kesihatan Malaysia: Adakah Kita Bakal Gagal?" ["A Measure of Malaysia's Healthcare System: Will We Fail?"]. *Astro Awani*. October 12, 2016.

Goh, Jenny Maganran. "Flying Doctors Help Bridge the Urban-Rural Healthcare Divide in Malaysia." MIMS Today. October 28, 2016.

Ibrahim, Mohamed Izham Mohamed, et al. "Evaluation of Knowledge and Perception of Malaysian Health Professionals about Telemedicine." *Journal of Clinical and Diagnostic Research*. Vol. 4, No. 1, 2010, pp. 2052–56.

Institute for Public Health. *National Health and Morbidity Survey 2011. Vol. II: Non-Communicable Diseases*. Kuala Lumpur: Ministry of Health Malaysia, 2011.

Institute for Public Health. *National Health and Morbidity Survey 2011. Vol. III: Healthcare Demand and Out-Of-Pocket Health Expenditure*. Kuala Lumpur: Ministry of Health Malaysia, 2011.

Ismail, Aniza, Azmawati Muhammed Nawi, and Ali Mohamed. "Communication for Behavioural Impact (COMBI) Program in Dengue Prevention Evaluation: Mixed Methods Approach." *International Medical Journal*. Vol. 22, No. 5, 2015, pp. 367–70.

Iwamoto, Kenaro. "Telehealth Apps Rise in Southeast Asia Due to Doctor Scarcity." *Nikkei Asian Review*. September 11, 2018.

Jaafar, Safurah Hj, et al. "Malaysia Health System Review." *Health Systems in Transition*. Vol. 3, No. 1, 2012.

Jaafar, Safurah Hj, Mohd Raili Hj Suhaili, Kamaliah Mohd Noh, Fauziah Zainal Ehsana, and Lee Fuei Siong. "Malaysia: Primary Health Care Key to Intersectoral Action for Health and Equity." World Health Organization. August 30, 2007.

Koshy, Rachel, KM Noh, K Juval, K Agamutu, and M Nazimin Shamsuddin. "Flying Doctor Service in East Malaysia." *European Journal of Public Health*. Vol. 23, No. 1, 2013.

Kruse, Clemens Scott, Nicole Krowski, Blanca Rodriguez, Lan Tran, Jackeline Vela, and Matthew Brooks. "Telehealth and Patient Satisfaction: A Systematic Review and Narrative Analysis." *BMJ Open*. Vol. 7, No. 8, 2017.

Kuruvilla, Sarosh, and Mingwei Liu. "Health Security for the Rural Poor? A Case Study of a Health Insurance Scheme for Rural Farmers and Peasants in India." *International Social Security Review*. Vol. 60, No. 4, 2007, pp. 3–21.

Maarop, Nurazean, and Khin Than Win. "The Interplay of Facilitating Conditions and Organizational Settings in the Acceptance of Teleconsultation Technology in Public Hospitals in Malaysia." 22nd Australasian Conference on Information Systems, Sydney, Australia, 2011, pp. 2–10.

Mahadeva, Sanjiv, Hematram Yadav, Simon M Everett, and Khean-Lee Goh. "Economic Impact of Dyspepsia in Rural and Urban Malaysia: A Population-Based Study. *Journal of Neurogastroenterology and Motility*. Vol. 18, No. 1, 2012, pp. 43–57.

Mung, Tan Siew. "Telemedicine Set to Take off Here." *Edge Financial Daily*. August 12, 2016.

Mustapha, Feisul Zainal Ariffin Omar, Omar Mihat, Kamaliah Md Noh, et al. "Addressing Non-Communicable Diseases in Malaysia: An Integrative Process of Systems and Community." *BMC Public Health*. Vol. 14, Suppl. 2, 2014.

Ngui, Romano, Saidon Ishak, Chow Sek Chuen, Rohela Mahmud, and Yvonne A. L. Lim. "Prevalence and Risk Factors of Intestinal Parasitism in Rural and Remote West Malaysia." *Public Library of Science Neglected Tropical Diseases*. Vol. 5, No. 3, 2011.

Nordin, Jennifah, Nur Afisha Yusuf, and Zaherawati Zakaria. "1Malaysia Clinic Service Quality and Patient Satisfaction Case Study: 1Malaysia Clinic Taman Samarindah Kota Samarahan," in *The 6th International Conference on Public Policy and Social Science*. Kedah, Malaysia: Universiti Teknologi MARA Cawangan Keda, 2017, pp. 127–39.

Quek, David. "The Malaysian Health Care System: A Review." ResearchGate. July 2014.

Santos, Julia PA, Maria Beatriz M. Alkmim, Izabella O. Antunes, Camila G. Ferreira, and Milena Soriano Marcolino. "The Use of Teleconsultations by Nurses in Primary Care in Minas Gerais, Brazil." *Journal of the International Society for Telemedicine and EHealth*. Vol. 4, 2016.

Sebastian, Andrea, Mohamed Ali Azain, Collins Otieno Asweto, Gehenra Mahara, Xiuhua Guo, Manshu Song, Youxin Wang, and Wei Wang. "The Malaysian Health Care System: Ecology, Plans, and Reforms." *Family Medicine and Community Health*. Vol. 4, No. 3, 2016, pp. 19–29.

"Transforming Rural Areas to Uplift Wellbeing of Rural Communities." Economic Planning Unit, Prime Minister's Department, Putrajaya, Malaysia. Strategy paper no. 4.

Woldemichael, Andinet, and Abebe Shimeles. "Measuring the Impact of Micro-Health Insurance on Health care Utilization: A Bayesian Potential Outcomes Approach." Africa Development Bank Group Working Paper Series. Report no. 225. July 2015.

Zailani, Suhaiza, Yuserrie Zainuddin, and Azizah Omar. "Telemedicine in the Malaysian Public Hospitals: Are We There Yet?" *International Conference on Business, Finance and Tourism Management*. June 2009.