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EDITORIAL

Medical Education and Practice in Malaysia, Quo Vadis?

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As of June 2016 there are 28 medical schools [1] in both private and public sectors in Malaysia offering more than twice as many programs [2] with yearly graduates of about 4500 including those that graduated from overseas. This magnitude is beyond the usual capacity of Ministry of Health (MOH) that is entrusted to accord preregistration training posts to the graduates as the whole process of allocation to available places in public hospitals nationwide is painfully slow. It is already a tragedy having to wait 6 months on average for a placement but words that a delay for up to a year can occur is totally unacceptable when the actual training places available at grade DU41 preregistration house officers is said to be more than the graduate number [3]. Delay can be detrimental to the training itself because waiting is a waste of talent and potential, a disincentive to a young aspirant, tacitly is a testimony of system failure and deprives the public of highly trained graduates to serve in our healthcare system that ironically suffers from chronic and ever growing wait but yet we have excess medical graduates. Some of them have taken a simple and quick route out of the mess by migrating to our neighbours near and far, not entirely their faults, but their thresholds to despair seem very low indeed. The need for a speedy and right solution to the delay is long overdue and this is nothing more than what the public and the young doctors deserve.

How did we get to this? Not unexpectedly but the magnitude stemmed from the unusually large number of *Sijil Pelajaran Malaysia* (SPM; Malaysia Certificate of Education) leavers that opted to study medicine, in part made easy by the many medical schools in the country and those that have been accredited abroad. This was augmented by the constant reminder of the need for more doctors, parental or hype pressure perhaps for whatever reasons, and also the ease with which scholarships were available to study medicine. The principle driver for the whole mess was money initiated by those who wish to make profits under these "fortunate" circumstances [4]. The resulting deluge of medical graduates clogged the system up and unfortunately created many of the unnecessary challenges that we face today. Paradoxically despite this excess our doctor population ratio is still lower than the Organization for Economic Cooperation and Development (OECD) average and our more prosperous neighbour in the south. These veiled and unscrupulous drivers are addressing the gap in ratio with such a speed that it strains the system to almost breaking point and had somewhat ruffled both Ministry of Higher Education (MOHE) and MOH.

The doctor number that we need should ideally be planned or rather managed at this point and this can only be done by addressing all the factors that had led us to this. For a start we should look at the basic question of what the country needs in the future (2020 and beyond) and then work backwards. This sounds simple enough but in practice this is where the challenge lies. Two ministries MOH and MOHE are both looking at the issue albeit with different focus but inevitably with some overlapping jurisdiction. The MOH concerns with the nation's health issues and MOHE deals with medical education and consequently doctor number, although seemingly separate but in actual fact they will converge. Whatever the number of medical students approved at Malaysian Qualifications Agency (MQA) / Malaysian Medical Council (MMC) or sponsored by *Jabatan Perkhidmatan Awan* (JPA; Public Services Department) /MOHE the final tally in five years will be the medical graduates that will have to be allocated to training places. Too many medical

graduates too soon appear to be the main problem and therefore it is high time that we try to regulate the number that goes into training. Immediate actions are required too to restore public confidence in the light of unsympathetic media comments. This includes policies that require hard choices such as derecognizing some foreign medical schools in the archaic list of schedule 2 and introducing the right to practice examination for those who have graduated from abroad. Both can regulate number and consequently emphasize quality.

The next challenge is the specialist number now that doctor number at lower grades will address the gap in ratio in time. Although a lot has improved but by most estimates the number of specialists must double to take up the challenges of a developed nation status and we need to add to this the question of disparity (uneven number by specialty) and geographical mal-distribution, unfortunately the issues remain despite numerous incentives introduced by MOH over the years. An easier question of churning up specialist number can be addressed rather immediately because we have a robust, economical, and internationally respected system within our midst that is the Master in Medicine (MMED). But when the issue of increasing the specialist number is debated, the discourse mystically takes a pathetic course to the times when postgraduate medicine began in the country in the 60s, a return to our colonial ancestry for training opportunities and supervision. When postgraduate medicine first started we indeed relied heavily on the hospitals in the United Kingdom (UK) and their college exams but these are things of the past. Except for stated and specific niche areas for training and education, or occasional exception, by and large we have existed and trained our specialist independently from the system in the UK for more than three decades. For the record, to date more than 8000 specialists have graduated from MMED system and for a rapidly growing Malaysia this number is huge. Especially so for the surgical based specialties that are the most challenging to train and in all domains the surgeons have been at par with the very best in the world. In fact from our own survey, MMED trained specialists are the backbone of doctors that service the public hospitals and clinics in Malaysia.

Despite this apparent regression, the universities that offer MMED are in the process of institutionalizing the training pathway and system to maintain the quality and improve the process further. Steps are taken to formalize the training pathway via MQA and MOHE to reinforce public perception of the system and in preparation for soon to be implemented trade and economic liberalization in ASEAN. For practical purposes the MMED system essentially has two types; one that is based on the presence of the faculty's own teaching hospital and the other on the absence of one and thus reliance on the state hospital as the faculty's affiliated teaching hospital. Both models have achieved success and maintained the quality and competency required by a robust comprehensive assessment system that includes standardized examinations attended by a wide selection of examiners in the country and abroad. In the next 5 years or so, the training environment to some extent the MMED will undergo a significant change with the completion of another 7 teaching hospitals and the incorporation of a consortium of university teaching hospitals. With an estimated number of nearly 10000 tertiary care beds at peak activity this will provide an excellent opportunity to train more specialists and partake in subspecialty training. This includes research and teaching activities that will enhance the return on investment to the public.

Based on the cumulative years of experience and a much more organized MQA the future of medical education for both undergraduate and postgraduate looks very promising indeed but the main lingering issues in both must be addressed. For undergraduate medicine the need to maintain a robust and stringent control on quality is paramount and data shows that the emphasis of this is mainly on graduates from some foreign medical schools because the local ones are subject to very stringent accreditation exercise and compliance audit, therefore quality is assured. Another strategy to achieve this is the introduction of fitness to practice examination for foreign medical school graduates. Both will help control number. The main issue that is affecting postgraduate education is the need to institutionalize the MMED for the future and the creation of teaching hospitals consortium by working closely with MQA and MOHE. This will ensure the best deal for the public. The future is in our hands.

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ORIGINAL ARTICLE

Functional Dependence and Nutritional Status among Leprosy Survivors in Sungai Buloh, Malaysia

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ABSTRACT

Introduction: Leprosy is a chronic granulomatous disease which also known as Hansen's disease caused by *Mycobacterium leprae*. The social rights and health requirements should not be neglected among the remaining survivors. Although nutritional status and leprosy invasion has been studied in the past, there is still an unclear relationship between these two. The aim of this study was to assess the relationship between nutritional status and disability among the leprosy survivors. **Methods:** A community based, cross-sectional study using convenience sampling was conducted at Sungai Buloh, Selangor area from June 2014 to July 2014. The degree of disability was assessed using Barthel's Index and the nutritional status assessment was assessed using Mini Nutritional Assessment. The data was analysed using SPSS version 20. **Results:** A total of 73 patients were involved in the study (60.3% were male and 89.0% were Chinese). The prevalence of disability was 56.2% (95% CI: 44.5 – 67.8) with walking up-stair was the highest item that need help (50.7%). There were 9.6% malnourished and 49.3% were at risk of malnutrition. There was a negative strong correlation between Nutritional score and the Barthel's index score (Spearman rho, $\rho = -0.714$, $p < 0.001$). **Conclusions:** Measures must be taken to improve their nutritional status in order to increase their ability to be more independent particularly those who are very old. The degree of disability increases with malnutrition.

KEYWORDS: Functional dependence, nutritional status, leprosy

INTRODUCTION

Leprosy is one of the oldest diseases in the world. This entity is known since 600BC in several oldest civilizations in China, India and Egypt [1]. Leprosy also known as Hansen's disease is a chronic granulomatous disease caused by *Mycobacterium leprae* that was discovered by G.A Hansen [2]. Leprosy causes skin sores, peripheral nerve damage and muscle weakness that progressively become worse over time. It also affects the mucosa of the upper respiratory, eyes and other superficial parts of the body such as ear lobes. Transmission of this infection is directly related to overcrowding and poor hygiene. It occurs by direct contact and aerosol inhalation [2].

The prevalence of leprosy in the Western Pacific Region has declined by nearly 90% over the past 10 years [1]. In 2010, a total of 8386 cases were registered with a prevalence rate of 0.05 per 10,000 populations. Five countries (China, Malaysia, Papua New Guinea, the Philippines and Vietnam) contributed to 86% of the total prevalence [1]. In 2010, the incidence of leprosy was 0.3 per 100,000 populations [1] and there are about 250,000 new cases being detected every year [3]. It was decreased by 5.8% when compared with 2009 and decreased by 66% when compared with 1991. Five countries (Cambodia, China, Papua New Guinea, the Philippines and Vietnam) contributed to 84% of the newly detected cases in the Region [4].

In Malaysia, leprosy is still a public health problem [5]. The history of leprosy in Malaysia started over 300 years ago and was probably brought in by the immigrants. In order to control the disease from spreading, the government at the early period has enacted laws to forcibly isolate those suffering from the disease of leprosy from the other inhabitants. In 1969,

the National Leprosy Control programme was launched with the objective of early case identification and decentralisation of treatment of leprosy [6]. The leprosy patients were relocated to four leprosy asylums which were *Pulau Jerejak, Pulau Pangkor, Tampoi, Pulau Seribun, Setapak* and *Kota Bharu* that was known as "Old segregation camps" [6]. In 1985, the multiple drug therapy for leprosy have been implemented and the prevalence of leprosy has reduced from 5.7 per 10,000 in 1983 to 1.7 per 10,000 in 1992 [5].

In developing country, leprosy continues causing challenges through physical and social disabilities to the affected patients [7]. Leprosy can lead to a permanent disability. The World Health Organization (WHO) estimated that leprosy related disability occurs in approximately 25% of the infected patients (WHO, 2012). Study by Chvan and Patel [8] found that the WHO grade-II disability among leprosy patients was 12.4 % and hands and feet disabilities were found in 38.1 % while nobody had eye related disability. The study showed that most patients developed deformities and disabilities were due to lack of health education, delay in diagnosis and treatment [9].

Patients with leprosy are at increased risk of undernutrition. An increase in body mass index (BMI) was the cause of moderate to severe grades of malnutrition [10]. The presence of disability made the incidence of undernutrition more likely in these patients [11]. However, the relationship between nutrition and leprosy invasion is still unclear [7].

The objectives of this study were to determine the prevalence of disability; to evaluate the nutritional status and; to correlate the functional dependence and the nutritional status among leprosy survivors' in Sungai Buloh, Malaysia.

METHODS

Study Design

A community based, cross-sectional study was conducted at Sungai Buloh, Selangor from June 2014 to July 2014. The leprosy survivors were invited to participate in the study. We excluded those who did not understand English and Malay languages. A convenience sampling was used in this study.

Method of Data Collection

Data was collected by using face-to-face interview and anthropometric measurement. Face to face interview was conducted to collect information about the patients' demographic, assessment for functional dependence using Barthel's Index [12] and assessment for nutritional status using Mini Nutritional Assessment (MNA) [13]. Some of the assessments of MNA need anthropometric measurement such as height, weight, mid upper arm and calf circumferences.

Study Instruments

There were two instruments used in this study which were Barthel's Index (12) to assess the functional dependence and Mini Nutritional Assessment (MNA) (13) to assess the nutritional status of the patients.

Assessment for Functional Dependence

The functional dependence status was assessed using Barthel's Index (BI) questionnaire [12]. BI consisted of ten questions measuring basic activities of daily living (ADL) such as feeding, dressing, grooming, bathing, control of urinary bladder, control of bowel, transfer to bed, using toilet, mobility and climbing stair. There were two answers in each question: "yes" when the patients can do the activities by themselves and "no" when the patients cannot do the activities by themselves and need help. All the scores for each question were summed together. The higher the score means the better the activities of daily living. The patients were categorized as having 'normal function' in doing an activity when they could perform all 10 activities independently and were categorized as having 'functional disability' when they had difficulty or needed help in performing one or more of the activities.

Assessment for Nutritional Status

The overall nutritional status was assessed by using Mini Nutritional Assessment (MNA) [13]. It was provided by Nestle HealthCare Nutrition, Sri Lanka. It consisted of 18 questions where each question gave points. Some questions were given score from 0 to 1; 0 to 2 and 0 to 3. The assessment was classified into 4 categories: anthropometric assessments (4 questions); general assessment (6 questions); dietary assessment (6 questions) and self-assessment (2 questions). For the anthropometric assessment, it measures the body mass

index, mid arm circumference, calf circumference and weight loss for the past three months. The classification of nutritional status was based on score. Score more than 24 points was considered well nourished; 17 to 23.5 was considered as at risk of malnutrition; and less than 17 was considered malnourished [13].

Anthropometric Measurement

The height was measured using a portable stadiometer. The patients stood with their back against the board. The arms hang freely by the side of the body with palms facing the thighs. The legs were positioned such that the knees and ankles were brought together. The position of the head was in horizontal plane. Then the headpiece was pushed down to the upper most point on the head by compressing the hair. Three consecutive readings were taken for each patient and the average height was recorded to the nearest 0.1 cm.

The weight was measured using a digital weighing scale. At the beginning, the weighing scale was turned to 'zero". The patient was asked to remove extra layers of clothing or any items in his/her pockets. The arms hang freely by the sides of the body with the palms facing the thighs and the head facing straight ahead. Three consecutive reading were taken for each patient and the average weight was recorded to the nearest 100 g.

Mid upper arm circumference (MUAC) was measured at the mid-point between the tip of the shoulder and elbow. During measurement, the left arm was bent and the olecranon and acromion process were identified and marked. The distance between these two points were measured and the mid-point was marked. With the arm hanging, a non-stretchable measuring tape was used to measure the MUAC at the mid-point mark. The circumference was measured to the nearest 1 mm.

Calf circumference was measured at the level of the widest circumference of the calf by using a non-stretchable measuring tape. The patients stood straight with the feet 20 cm apart and the weight equally distributed on both feet. The circumference was measured to the nearest 1 mm.

Data Analysis

Data has been checked before ending each interview session and before final compilation to ensure the completeness of the questionnaire. Raw data obtained was recorded and entered into the Statistical Package for Social Sciences (SPSS) Version 20.0. Cleaning for double entry and outliers was performed before the analysis. The dependent variables were functional dependence and the score of nutritional assessment. Some independent variables were kept as continuous while others were categorized into nominal or ordinal data. The independent variables were also classified into socio-demographic variables, daily life activities and deformities of the limbs.

The frequency distribution, measure of central tendencies and measure of distribution were produced. The normality of continuous data checked via Kolmogorov-Smirnov testing and plotting the histogram with normal curve. The significant level was pre-set at $\alpha = 0.05$. When the Kolmogorov-Smirnov test has a p-value of less than 0.05, then the null hypothesis which tested for the data normality distributed was rejected.

The normally distributed continuous data presented in the form of mean values with the corresponding standard deviations. For the non-normally distributed continuous data, it was presented in the form of median values and inter-quartile range (IQR). The categorical data presented in the form of absolute number and their corresponding percentages values.

Bivariate analysis was used to determine the possible correlation of significant variables to the nutritional assessment and functional dependence. The statistical tests used in the analysis depend on type of data in the dependent and independent variables.

RESULTS

A total 73 leprosy patients were involved in this study. Table 1 shows the characteristics and anthropometric measurements of the patients. There were only 47 (64.4%) patients involved in the measurements of weight, height and body mass index (BMI). This was due to the problem of being bedbound and lower limb amputation in the remaining patients.

Nutritional Status among Leprosy Patients

The mean (SD) of the nutritional index score was 22.06 (SD: 4.05). Based on the classification of the

malnutritional status, patients were malnourished in 9.6%, at risk of malnutrition in 49.3% and well-nourished in 41.1% of the cases.

Table 1 Characteristics and anthropometric measurements of the patients

Variable	Frequency, n (%)	Mean (SD) [Median (IQR)]*	Range
Gender:			
Male	44 (60.3)		
Female	29 (39.7)		
Race:			
Malay	4 (5.5)		
Chinese	65 (89.0)		
Indian	4 (5.5)		
Age (years):			
Less than 69	24 (32.9)		
70 – 79	30 (41.1)		
More than 80	19 (26.0)		
Weight (n = 47)		56.14 (13.82)	36.00 – 106.00
Height (n = 47)		153.48 (8.67)	133.00 – 170.00
Body Mass Index (n = 47)		22.77 (5.78)	16.65 – 40.89
Arm circumference		26.34 (0.48)	18.00 – 37.00
Calf circumference		31.52 (0.47)	23.50 – 44.00

Prevalence of Disability among Leprosy Patients

The prevalence of disability among leprosy patients was 56.2% (95% CI: 44.5 – 67.8). The median (IQR) score for the Barthel's Index among leprosy patients was 9.00 (3.00). Table 2 shows the percentages of disabilities from the ten assessments in Barthel's Index.

Table 2 Percentages of disabilities of the 10 assessments of Barthel's Index

Barthel's Index	Frequency (%)
Walking up-stair (need help)	37 (50.7)
Mobility (needs help)	26 (35.6)
Bladder incontinence	12 (16.4)
Bowel incontinence	11 (15.1)
Transfer (needs help)	11 (15.1)
Toilet use (needs help)	8 (11.0)
Grooming (needs help)	6 (8.2)
Bathing (needs help)	6 (8.2)
Dressing (need help)	5 (6.8)
Feeding (needs help)	1 (1.4)

Correlation between Disability and Nutritional Status

Figure 1 below shows the scatter plot between Nutritional Index score and Barthel's Index score. There was a significant negative strong correlation between Nutritional Index score and the Barthel's Index score (spearman rho, $\rho = -0.714$, $p < 0.001$). It indicated that the risk of the disability among the leprosy survivors would increase if they suffered from malnutrition.

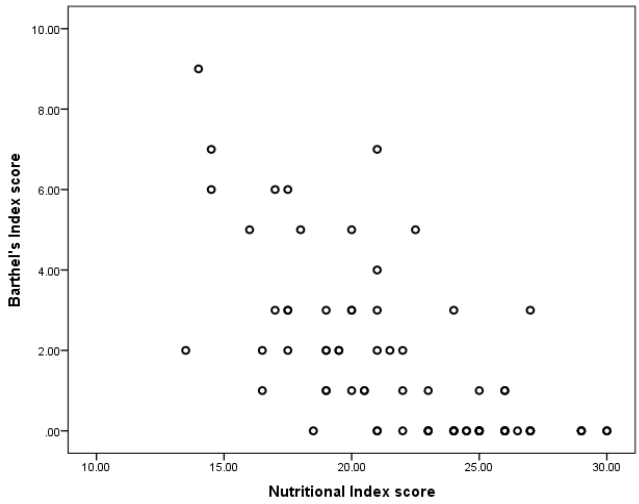

Figure 1 The scatter plot between Nutritional Index score and Barthel's Index score ($\rho = -0.714$, $p < 0.001$)

Correlation between Disability and Nutritional Status Stratified by Gender, Race and Age

Table 3 below shows the correlation between disability and nutritional status stratified by gender, race and age. Overall, there was a significant moderate to strong negative correlations except for Malay and Indian. This could be due to the small sample size.

Table 3 Comparison of the in between variables for the gender, race and age for nutritional assessment score

Variables	n	Nutritional Index score [Mean (SD)]	Barthel's Index score [Median (IQR)]	Spearman rho correlation, ρ
Gender:				
Male	44	22.73 (4.15)	9.50 (2.00)	-0.657**
Female	29	21.05 (3.71)	9.00 (3.00)	-0.770**
Race:				
Malay	4	18.25 (2.10)	7.00 (3.75)	-0.632 (ns)
Chinese	65	22.32 (4.11)	9.00 (2.50)	-0.734**
Indian	4	21.63 (2.69)	8.50 (4.00)	-0.400 (ns)
Age (years):				
< 69	24	23.21 (3.45)	9.50 (2.00)	-0.551**
70 – 79	30	22.32 (4.86)	10.00 (3.00)	-0.776**
> 80	19	20.21 (2.61)	8.00 (2.00)	0.491*

* significant at $\alpha < 0.001$
** significant at $\alpha < 0.001$
ns: not significant

DISCUSSION

With the implementation of multiple drug therapy in 1985, the prevalence rate of leprosy in Malaysia has reduced from 5.7 per 10,000 in 1983 to 1.7 per 10,000 in 1992 [5]. In our study, Chinese was found to be the highest ethnic group with leprosy compared to Malay and Indian. A collaborative study by Rees et al. [14] and an autopsy study done by Jayalakshmi et al. [15] found the same result. The majority of patients in our study were within the age range of 70 to 79 years old. However, study by Khandapani et al. [10] found the patients with leprosy were mainly in the age range of 51 to 60 years old (30.0%).

Leprosy is one of the most prominent causes of disability among the communicable diseases [16]. The disease causes 51.2 percent of disability worldwide [17]. The prevalence of disability among patients with leprosy in the current study was 56.2 percent. This was higher when compared to a study by Metts et al [18] who found the prevalence was only 20.1 percent. The prevalence was different because both studies used different tools to assess the degree of disability among leprosy patients. Our study found that walking up the stairs was the most difficult task accounting for 50.7 percent and feeding assistance was the least difficult (1.4 percent) using Barthel's Index for the disability assessment. Study by Sarkar et al. [18] found that bilateral feet were the most commonly involved site of the body. In addition, both sensory and motor nerve impairment were the commonest nature of disability. Furthermore, patients with leprosy with delayed diagnosis beyond 12 months had significantly higher grade-2 disabilities than diagnosed earlier [8]. Soomro et al. [9] found that the disabilities were due to lack of health education, delay in diagnosis and treatment.

In 2010, The Health Prevalence and Nutritional Status on Selected Leprosy Victims of Burla Town, Orissa, India reported that 90.1 percent of male and 88.6 percent of female patients suffered from severe malnutrition [4]. A study from Korea found that the nutrition and health status of ex-leprosy patients was marginal and their nutrient intakes were low [9]. In this study, it was found that there were around 10 percent of malnourished cases and almost 50 percent were at risk of malnutrition. However, the study by Khandapani et al. [10] found all leprosy patients in selected districts in India suffered from moderate to severe grades of malnutrition. The difference in these findings could be due to the large number of leprosy population were living in areas with improper sanitation due to low support from the government. Another study also concluded that the undernutrition (BMI < 18.5) was more common in people affected by leprosy than in those without leprosy [11].

The Nutritional Index score of patients more than 80 years old in our study was significantly lower compared to those aged less than 69 years old. These findings could be associated to difficulty in chewing secondary to tooth loss at old age. Secondly, we assumed that as a person ages, their sense of taste and smell would lessen, hence reducing their appetite. Thirdly, we suspected that as a person ages, they tend to suffer various diseases, which may reduce their choices of food and lead to malnutrition. Lastly, unemployment and loss of income may have reduced the expenditure on food. [9]. This finding was similar to the finding by Forster et al. [20] who concluded the increasing age was independently associated with poor nutritional status among older patients. Other factors such as gender and race showed no association.

The current study provided a link between physical disability and nutritional status. From the correlation between Nutritional Index status and the Barthel's Index score, we could observe that an increase in Nutritional Index score would increase the Barthel's Index score. Increasing score portrayed decrease in disability. The finding was similar to a study by Rao et al. [11] who concluded that the presence of disability made the incidence of undernutrition more likely. In Australia for instance, researchers discovered that the cured leprosy index case with physical deformity was more undernourished than index cases without deformity among leprosy patients [21]. Thus, we came to similar conclusion that one of the ways to reduce disability among this special group of population was by improving their nutritional status.

CONCLUSIONS

The prevalence of disability and the percentage of those with malnutrition and those at risk of malnutrition among leprosy patients were high. In addition, there was a strong positive correlation between the nutritional

status and the degree of disability. Measures must be taken to improve their nutritional status in order to increase their ability to be more dependent mostly among those who are of very old age. We promote public health nutritional intervention programmes to increase the awareness of leprosy patients, their carers, and the medical staff handling these patients.

Conflicts of Interest

Authors declare none.

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