

Home Medication Management and Practices among Post-stroke Patients: A Cross-sectional Study in a University-based Primary Care Clinic in Malaysia

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ABSTRAK

Amalan pengurusan ubat (MMP) yang bagus boleh membantu meningkatkan pematuhan terhadap pengurusan penyakit kronik serta mengurangkan kadar kesilapan pengubatan untuk mencapai hasil klinikal yang lebih baik. Ini adalah penting untuk pesakit strok yang mempunyai pelbagai komorbiditi dan komplikasi selepas strok. Kajian ini bertujuan untuk menentukan tahap MMP di rumah di kalangan pesakit strok dan faktor-faktor yang mempengaruhinya. Kajian rentas ini melibatkan seramai 120 pesakit strok di sebuah klinik penjagaan primer di Kuala Lumpur di antara bulan Januari dan Mac 2021. Tahap MMP dinilai melalui beberapa soalan kaji selidik samada diisi secara bersemuka, secara atas talian atau temu bual telefon. Purata umur peserta ialah 65.1 (SD 11.7) tahun. Kadar MMP di rumah yang tidak bagus adalah sebanyak 55.8%. Kebanyakan peserta (86.3%) tidak mengemas kini senarai ubat mereka, 75% tidak menghafal nama ubat dan 63.3% tidak memulangkan lebihan ubat ke farmasi. Jantina perempuan (AOR: 2.74, 95% CI: 1.18-6.35, p-value: 0.019), pendapatan isi rumah (> RM4850) (AOR: 2.82, 95% CI: 1.03-7.69, p-value: 0.043) dan bilangan temujanji klinik (>2) (AOR: 5.27, 95% CI: 1.44-19.24, p-value: 0.012) dikaitkan dengan kadar MMP di rumah yang bagus. Kesimpulannya, amalan pengurusan ubat di rumah di kalangan pesakit strok adalah rendah. Jantina perempuan, status sosioekonomi yang tinggi dan bilangan temu janji klinik yang banyak merupakan faktor kepada MMP di rumah yang baik. Pendidikan kesihatan secara bersepadu perlu dititikberatkan

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terutamanya berkaitan dengan pengurusan ubat-ubatan untuk menambah baik MMP di rumah dalam kalangan pesakit strok seterusnya meningkatkan tahap kesihatan mereka secara keseluruhan.

Kata kunci: Amalan pengurusan ubat; kesilapan ubat; klinik penjagaan primer; post strok

ABSTRACT

Effective medication management practice (MMP) improves compliance of chronic conditions management and reduces medication error for better clinical outcomes. This is important for stroke survivors with multiple comorbidities and post-stroke complications. This study aimed to determine appropriateness of home MMP and its associated factors among post stroke patients. This was a cross-sectional, single-centre study involving 120 stroke patients of a primary care medical centre in Kuala Lumpur between January and March 2021. The assessment of MMP appropriateness relied on scores obtained through a set of questions administered via face-to-face, online or telephone interview. The mean age of participants was 65.1 (SD 11.7) years. 55.8% of participants had inappropriate home MMP; where the majority did not update their medication list (86.3%), did not memorise the medication's name (75%), and did not return the leftover medication to the pharmacy (63.3%). Female gender (AOR: 2.74, 95% CI: 1.18-6.35, p-value: 0.019), household income (> RM4850) (AOR: 2.82, 95% CI: 1.03-7.69, p-value: 0.043), and number of clinic appointments (>2) (AOR: 5.27, 95% CI: 1.44-19.24, p-value: 0.012) were significantly correlated with better home MMP. The MMP among post-stroke patients was poor. Better home MMP were associated with female gender, higher socioeconomic status, and more frequent clinic appointments. Concerted health education should be provided, particularly focusing on medication management to improve home MMP in post-stroke patients and ultimately improving their overall health outcomes.

Keywords: Medication error; medication management practices; primary care clinic; post-stroke

INTRODUCTION

Stroke remains a public health burden in Malaysia, with 1.1% of the Malaysian population ever having a stroke (GBD 2016 Stroke Collaborators 2019). Population study in 2019 reported

a total of 33,628 new cases of stroke (GBD 2016 Stroke Collaborators 2019), with prediction increment annually by 29.5% for ischemic stroke and 18.7% for haemorrhagic stroke (Aziz et al. 2015). Post-stroke patients who are in the community suffer from

multiple post-stroke complications and comorbidities (Donkor 2018). Two-thirds of post-stroke patients experienced permanent disabilities such as paralysis and hemiplegia (Donkor 2018), that make them dependent on others for their routine daily activities including managing their daily medications (De Simoni et al. 2015). This may result in non-adherence to their prescribed medication and management. A local study in the outpatient neurology clinic at Hospital Kuala Lumpur found that the main reasons for non-adherence were lack of confidence in handling own medicine and medication-management issues, which accounted for 75% and 45% respectively (Appalasamy et al. 2019).

Medication management is the process of overseeing the medications prescribed to the patient to ensure that they are safe, effective and taken as directed to achieve the desired therapeutic outcome and minimise medication error (Stowasser et al. 2004). It is a key component in determining medication adherence. Although the term “medication management” was first used in 2003 (De Oliveira et al. 2020), pharmacists have been providing similar services since 1990, when the term “pharmaceutical care” was introduced. Studies have shown a positive relationship between medication management and medication adherence. These include the use of medication storage devices to store the prescribed medications (Bushnell et al. 2011), having someone else taking care and involved in a patient’s medication management

(Cheiloudaki & Alexopoulos 2019; Jamison et al. 2017), a good understanding of own’s medications (Appalasamy et al. 2019; Praska et al. 2005), and effective communication between patient and prescriber in managing the medication (Cheiloudaki & Alexopoulos 2019; Dowell & Hudson 1997; Jimmy & Jose 2011). All these factors collectively have shown a good correlation towards medication adherence.

The evidence on the aspect of medication management, especially to post-stroke patients is scarce. This research aimed to assess the medication management practices (MMP) status and its association with sociodemographic, clinical characteristics and medication background, and dependency level among post-stroke patients in university-based primary care clinic. Information obtained from this study could be used as a platform to improve medication adherence among post-stroke patients and reduce the disease burden among them.

MATERIALS AND METHODS

Study Design

This is a single centre cross-sectional study that was conducted at the Long-Term Stroke Clinic (LTSC), a primary care service dedicated to post-stroke service which runs under the Primary Care teaching institution for the National University of Malaysia which is based in Kuala Lumpur, Malaysia. The study was done between January and March 2021 during the enforcement

of the COVID-19 lockdown measures. This LTSC provides specialised post-stroke care for stroke patients in the Cheras locality, managed by a team comprised of a family specialist and two nurses. Based on the 2019 registry, the total number of stroke patients was 157.

Universal sampling method was used in this study where all post-stroke patients attended LTSC (≥ 18 years) with a history of stroke of more than 6 months were invited to enrol in this study. For participants with significant disabilities and who were dependent on a caregiver, the questionnaires were answered by the main caregiver who had been taking care of the patient for more than 6 months. For participants with difficulties in reading, the investigator would help in reading the questions to the participants and document the answers. Those with significant cognitive impairment from routine clinical assessment or established dementia were excluded from the study.

The sample size was calculated using Green SB formula for testing the multiple regression (Green 1991). Since there were 16 variables in this study (age, gender, ethnicity, marital status, education level, monthly income, type of stroke, duration of stroke, living arrangement, background medical problem, number of clinics appointments, types of medication, total number of oral medications, person managing medication, disability level and adherence level), the calculated minimum sample size was 120 to reach a precision of 0.05 with a 95% confidence level.

The main investigator conducted data collection using a combination of questionnaire administered through face-to-face, online or telephone interview. All post-stroke patients who came for their clinic visit were screened for eligibility by staff nurses. Those who met the study criteria were recruited to participate in this study after obtaining written consent. Whereas those who did not have an appointment during the study period were approached using phone call and smartphone messaging application where they can choose to answer the questions either by online questionnaire or telephone interview. The investigator adhered only to read and wait for the answer method to reduce response bias.

Study Instrument

This study used newly developed questionnaires as there was no existing validated questionnaire available during the study period. The questionnaire underwent three phases of questionnaire making namely development, content validation and measurement evaluation.

It was designed based on published literature on keywords search on medication handling, medication errors and medication management (Australian Pharmaceutical Advisory Council 2006; Fialová & Onder 2009; Mager 2007; Salmasi et al. 2015; Zhi-Han et al. 2017) which was later discussed and verified by a team of experts consisting of family medicine consultants, pharmacologist and clinical pharmacist on the factors that influence the MMP. The questionnaires

consisted of five sections on participants' socio and medical demographic data, functional status, medication list, management practices and adherence. The functional level was assessed using the Barthel Index questionnaire (Wade & Hewer 1987). Adherence was measured using objective and subjective methods; by reviewing patient's electronic medication records and measuring Medication Possession Rate (MPR) and Proportion of Days Covered (PDC). MPR was the sum of the days' supply of medication in a particular period, divided by the number of days in the period, while PDC was the ratio of days in the period "covered" over the number of days the prescription was in the patient's possession (Bernard et al. 2019). Cut-off point of 80% was taken as the cut point for adherence (Karve et al. 2009; Sjölander et al. 2016). The participant was labelled as adherence if both MPR and PDC were 80% and higher. Polypharmacy was defined as the routine use of at least five medications (World Health Organisation 2019).

In section C, there were 14 different items to assess participant's MMP which were (i) medication list update, (ii) memorising the medication's name, (iii) following the medication dose, (iv) following the medication frequency, (v) remember the medication's expiry date, (vi) know the purpose of the medication, (vii) medication storage, (viii) use of medication container, (ix) remove original medication packaging, (x) tendency to keep unprescribed medication, (xi) over the counter medication, (xii) return of

leftover medication, (xiii) confusion with prescriber's instructions and (xiv) medication reviewed by the health-care team. These items were developed based on published literature using the keyword search for medication handling and medication management (Australian Pharmaceutical Advisory Council 2006; Fialová & Onder 2009; Lavan et al. 2016; Mager 2007; Salmasi et al. 2015; Zhi-Han et al. 2017). Content of the items was checked and revised by a panel of experts consisting of two family medicine consultants, one senior pharmacist and one pharmacologist to determine the relevance and importance of each item before applying it to a group of 10 diabetic patients for the face validation process. Construct validity and internal consistency were tested among 15 post-stroke patients from November to December 2020 at a Neurology Outpatient Clinic HCTM. The internal consistency, Cronbach's alpha of section C was 0.71. The questionnaire was not proceeded with test-retest and interrater reliability testing due to time limitations.

The response was on a five-point Likert scale with options ranging from 'never' (score of 1), 'almost never' (score of 2), sometimes (score of 3), fairly often (score of 4) to 'often' (score of 5). Questions 9,10,11 and 13 were all negative statements, and they were scored in reverse order. The correct answer was either fairly often or often, and either never or almost never for negative statement items. The total score ranged between 14 and 70, where higher scores represent better MMP. Furthermore, the categories were

intended to group these items based on a specific subject and not intended to measure a specific domain. The participants were labelled as having appropriate home MMP if the score was 54 (70%) or higher (Mariani et al. 2020).

The functional status was measured using the Barthel Index questionnaire, which assessed dependency level on the activity of daily living within 24 hours of assessment. It consisted of ten items with total scores ranging from 0 to 20 in one-point increments. Patients were divided into five groups according to their score; 0-4 “very severely disabled”; 5-9 “severely disabled”; 10-14 “moderately disabled”; 15-19 “mildly disabled”; and 20 independents. Permission to use it was obtained from the Maryland State Medical Society. Previous large-scale studies had demonstrated the usefulness of the Barthel Index in assessing the functional status of post-stroke patients (Wade & Hewer 1987).

This study used several definitions in MMP. These were medication reconciliation and review, medication dispensing and administration, medication storage and medication disposal.

(i) Home medication reconciliation and review

Medication reconciliation and review assessed on tendency on updating the medication list, memorising medication names, taking over the counter medication, reviewing medication with the healthcare team and confusion with prescriber

instruction.

(ii) Medication dispensing and administration

Dispensing and administration of medication assessed whether participant knew the purpose of each medication they took, remembered the medication’s expiry date, and followed the medication dose and frequency.

(iii) Medication storage

Storage was assessed considering the place of storage, use of medication container and tendency to keep no longer prescribed medication. Storing in a cool and dry place with a single place of storage of all medication unless otherwise instructed was appropriate. Medication easily assessable to children such as a table or low shelf was inappropriate.

(iv) Medication disposal

Medication disposal was assessed on a tendency to return the leftover medication to the pharmacy.

Data Analysis

The results of the study were analysed using the IBM Statistical Package for Social Science Version 25. Descriptive statistics were used to compare the baseline data and the association between MMP with other study variables was assessed using the Independent *t*-test, Chi-square test and Mann-Whitney test where appropriate. Among all variables, age and duration

of stroke were the only numeric variables with duration of stroke did not pass the normality test (Shapiro-wilk test $p < 0.05$). Independent t -test was used to compare means difference of age across two categories of MMP (appropriate and inappropriate) while Mann-Whitney test was used to compare median duration of stroke and the two categories of MMP. The association of each potential risk factor were examined through multivariable analysis. The significant factors were identified by fitting all independent factors with p -value of less than 0.05 in univariable analysis into multiple logistic regression. Adjusted ORs with 95% CI were reported and a p -value of < 0.05 was considered statistically significant.

Ethical Approval

Ethical approval of this study was obtained from Research Ethics Committee of Universiti Kebangsaan Malaysia (UKM) (FF-2020-391) and written consent was obtained from each participant. Participants' anonymities were maintained throughout the research process. All patients with poor medication adherence and medication management were briefly counselled about the importance of adherence to medication and practising proper medication management. Referral to the treating team for further management was also done.

RESULTS

Participants' Characteristics and Medication Background

A total of 122 out of 157 patients registered under LTSC participated in the study with a 96.8% response rate. A total of 11 patients were uncontactable, 15 patients died before the research period, five patients were no longer under LTSC follow up and four patients not consented. Out of 122 participants, two participants were excluded from analysis due to incomplete responses. Among the study respondent, 51.7% were obtained from self-administered questionnaire, 28.3% from telephone consultation and 20% from online questionnaire.

The mean age of participants was 65.1 (SD \pm 11.7) years, ranging from 24 to 94 years old. There were Male predominant (65.0%) with the majority from the Malay and Chinese race; 48.3% and 47.5% respectively. Participants either stayed with their spouse (51.3%) or with family members (40.3%). Based on the Department of Statistic Malaysia (2020) category, majority of the participants fall under lower income group (79.8%) (B40) (Table 1).

Table 2 showed the clinical characteristics and medical background of patients attending LTSC. The median duration of stroke was 54 months (IQR 70). Only a small proportion was independent (23.3%) with 20% of them was either severe or very severely disabled. Majority were suffering from chronic conditions such as hypertension (92.5%) and dyslipidaemia (87.5%) with more than half of respondents having diabetes mellitus (58.3%) hence the majority had polypharmacy. However, majority (70.8%) had good medication

Table 1: Association between sociodemographic and medication management practices (n=120)

Characteristics	All patients (n=120)	Medication management practices		p-value
		Appropriate (n=53)	Inappropriate (n=67)	
Age (years), Mean (SD)	65.1 (11.7)	65.0 (12.2)	65.1 (11.4)	0.937
Gender				
Male	78 (65.0)	29 (37.2%)	49 (62.8%)	0.036
Female	42 (35.0)	24 (57.1%)	18 (42.9%)	
Ethnic				
Malay	58 (48.3)	29 (50.0%)	29 (50.0%)	0.155
Chinese	57 (47.5)	21 (36.8%)	36 (63.2%)	
Indian *	3 (2.5)	1	2	
Other *	2 (1.7)	2	0	
Marital status				
Single	11 (9.2)	5 (45.5%)	6 (54.5%)	0.740#
Married	84 (70.0)	36 (42.9%)	48 (57.1%)	
Divorced	11 (9.2)	4 (36.4%)	7 (63.6%)	
Widow	14 (11.7)	8 (57.1%)	6 (42.9%)	
Education level				
None *	4 (3.4)	3	1	0.044
Primary	25 (21.0)	8 (32.0%)	17 (68.0%)	
Secondary	59 (49.6)	22 (37.3%)	37 (62.7%)	
University/ College	31 (26.1)	19 (61.3%)	12 (38.7%)	
Missing		1		
Currently staying				
Alone	7 (5.9)	1 (14.3%)	6 (85.7%)	0.267 #
Spouse	61 (51.3)	29 (47.5%)	32 (52.5%)	
Family members	48 (40.3)	20 (41.7%)	28 (58.3%)	
Nursing home *	3 (2.5)	2	1	
Missing		1		
Household income/ month (RM)				
≤4850	91(79.8)	35(38.5%)	56(61.5%)	0.021
>4850	23(20.2)	15(65.2%)	8(34.8%)	
Missing		3	3	

Independent t-test was used to compare means, Mann-Whitney test was used to compare median, chi-squared test was used to compare categorical variables. *Analysis was not done due to the small number, #Fisher's Exact Test. SD = standard deviation; IQR = interquartile range.

adherence.

Home Medication Management Practices

Details on MMP among respondents were shown in Figure 1. Half of the participants (55.8%) had inappropriate home MMP; where the majority did not update their medication list (86.3%), did not memorise the medication's

name (75%) and did not return the leftover medication to the pharmacy (63.3%). However, majority of the respondents still took their medication according to the specified dose (90%) and frequency (86.6%), were aware of the purpose of their medications (85%) and stored the medication in the proper place (81.6%).

TABLE 2: Association of clinical characteristics and medication background with medication management practices (n=120)

Characteristics	All patients (n=120)	Medication management practices		p-value
		Appropriate (n=53)	Inappropriate (n=67)	
Stroke type				
Haemorrhagic	17 (14.2)	11 (64.7%)	6 (35.3%)	0.130
Ischemic	45 (37.5)	27 (60.0%)	18 (40.0%)	
Unsure	58 (48.3)	25 (43.1%)	33 (56.9%)	
Duration of stroke (Months), Median (IQR)	54 (70)	53.0 (83.0)	57.0 (69.0)	0.571
Missing			5	
Number of clinic appointments				0.015
≤2	105 (87.5)	42 (40.0%)	63 (60.0%)	
>2	15 (12.5)	11 (73.3%)	4 (26.7%)	
Types of medication				0.934
Oral medication only	91 (75.8)	40 (44.0%)	51 (56.0%)	
Injection medication only	0 (0.0)	0 (0.0%)	0 (0.0%)	
Both	29 (24.2)	13 (44.8%)	16 (55.2%)	
Number of oral medications taken in a day (Pills)				0.408
1-4	27 (22.5)	11 (40.7%)	16 (59.3%)	
5-9	68 (56.7)	28 (41.2%)	40 (58.8%)	
≥10	25 (20.8)	14 (56.0%)	11 (44.0%)	
Person responsible				0.075#
Self	65 (54.2)	23 (35.4%)	42 (64.6%)	
Partner	24 (20.0)	13 (54.2%)	11 (45.8%)	
Family member	25 (20.8)	12 (48.0%)	13 (52.0%)	
Maid	6 (5.0)	5 (52.5%)	1 (16.7%)	
Dependency level, (Barthel index)				0.523#
Very severely disabled	13 (10.8)	7 (53.8%)	6 (46.2%)	
Severely disabled	11 (9.2)	6 (54.5%)	5 (45.5%)	
Moderately disabled	14 (11.7)	7 (50.0%)	7 (50.0%)	
Mildly disabled	54 (45.0)	19 (35.2%)	35 (64.8%)	
Independent	28 (23.3)	14 (50.0%)	14 (50.0%)	
Adherence level				0.320
Good adherence level	85 (70.8)	40 (47.1%)	44 (52.9%)	
Poor adherence level	35 (29.2)	13 (37.1%)	22 (62.9%)	

Independent t-test was used to compare means, Mann-Whitney test was used to compare median, chi-squared test was used to compare categorical variables. *Analysis was not done due to the small number, # Fisher's Exact Test. SD = standard deviation; IQR = interquartile range

Relationship between Home Medication Management Practices and Predictors

Table 1 and Table 2 showed the analysis of the association between socio-demographic, clinical characteristic

and medication background, with home MMP. The bivariate analysis showed that gender (p=0.036), education level (p=0.044), household income (p=0.021) and number of clinic appointments (p=0.015) were the significant determinants for home

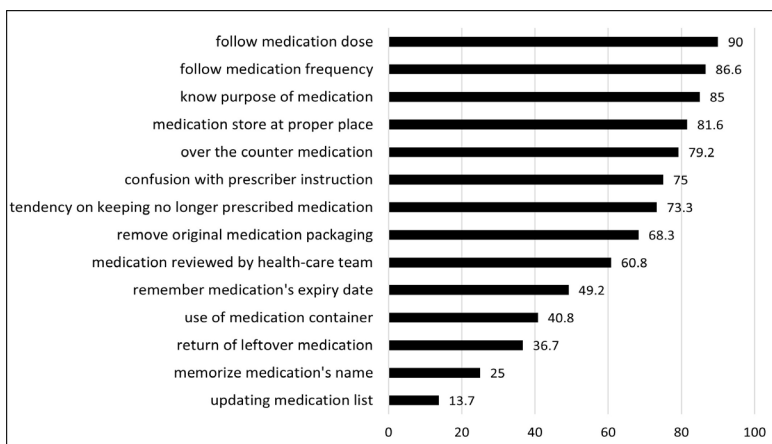


FIGURE 1: Proportion of respondents based on the correct answers on home medication management practices (%)

MMP.

After adjusting the cofounders, we found that the female gender, higher household income and number of clinic appointments were significantly associated with good medication management practice (Table 3).

DISCUSSION

MMP is an important aspect of holistic patient care intended to improve medication handling, reduce

medication errors and improve compliance among patients. The respondent’s practices were assessed on medication reconciliation and review, medication dispensing and administration, medication storage, medication disposal and medication adherence using PDC and MPR. Proper MMP is vital to ensure optimum medication adherence among patients and at the same time minimise prescribing medication errors from health providers (Tariq et al. 2021;

TABLE 3: Multiple logistic regression for prediction of appropriate home medication management practices among gender and number of follow up (n=120) and household income (n=114)

Variable	Crude OR	Adjusted OR	95% CI	p-value#
Gender				
Male	1.00	1.00	Reference	0.019
Female	2.25	2.74	1.18 - 6.35	
Income				
≤4850	1.00	1.00	Reference	0.043
>4850	3.00	2.82	1.03 – 7.69	
Number of clinic appointments				
≤2	1.00	1.00	Reference	0.012
>2	4.13	5.27	1.44 – 19.24	

#The model was adjusted for the gender, income and number of clinic appointments

Wittich et al. 2014). This study revealed that the MMP among post-stroke patients managed in the community was poor, where only a minority number in this group were practising proper medication reconciliation, medication storage and medication disposal.

The prevalence was relatively lower compared with another Malaysian study among post-stroke patients receiving care under hospital (Appalasaamy et al. 2019). Appalasaamy et al. (2019) found that 55% of post-stroke patients who were still in hospital reported having no issue in managing their medication. This has led to better adherence to medication. Nevertheless, despite a poorer MMP, our study population showed better adherence to medication when compared to the study by Appalasaamy et al (2019). There have been other studies on MMP across the world which showed similar findings to ours. In Nepal, a high number (80%) of participants have inappropriate home MMP (Shrestha et al. 2019). This was similar among the Australian population which has also been noted as substandard (Sorensen et al. 2005).

One of the causes identified was the lack of education and counselling given by the healthcare providers during pre-dispensing process (Neoh et al. 2011). A study on pharmacists' practice in Malaysia reported that most pharmacists were too focused on the instruction on taking the prescribed medication (in terms of dose and frequency) and less on counselling patients on the indication, side effects, storage, expiry date and possible drug

interaction of medications (Neoh et al. 2011). This may cause uncertainties in the management and result in non-compliance (Manley et al. 2003; Stewart & Lynch 2012). Other reasons for inappropriate MMP were due to the use of non-prescribed medications and lack of communication between the prescriber and patients (Stewart & Lynch 2012). Patients are often confused by the various names and forms of the different brand names which made them non familiarised with the medications they are prescribed (Sorensen et al. 2005).

There have been many reports of poor MMP among elderly patients with multiple chronic conditions and polypharmacy such as in the case of our post-stroke patients (Shrestha et al. 2019). This includes a lack of medication container use and not being aware of medication expiry dates (Shrestha et al. 2019). Poor medication understanding and belief about medicine have been an issue among post-stroke patients (Appalasaamy et al. 2019). Zhi Han et al. (2017) in their study reported only 1% of their respondents planned to return the leftover medication to the pharmacy. Sanders et al. (2014) and Chavan et al. (2015) demonstrated a relationship between a person's educational background and their health literacy which may influence their MMP. Our study population of post-stroke patients may find it difficult to manage their medication as majority had only primary education level and a complex polypharmacy regime.

Another complication of stroke that may affect MMP is cognitive impairment especially since majority

managed their medications. The prevalence of post-stroke cognitive impairment is high in our study setting (Al-Qazzaz et al. 2014; Mohd Zulkifly et al. 2016). Post-stroke patients with cognitive impairment may have problems in planning, organising and executing medicine-related tasks which results in poor MMP which eventually relies on their carer to manage their medication as the disease progresses (Lim & Sharmeen 2018).

Female gender, higher socioeconomic status and higher number of clinic appointments were good predictors for a high MMP score in this study. Females had more than two times higher odds of appropriate home MMP. Females tend to be more cautious about the medication they are taking (Klemenc-Ketiš et al. 2011), however this is not the case in other study findings as what was reported by Waldrop-Valverde et al. (2009) on HIV patients. Socioeconomic status is aligned with MMP (Wamala et al. 2007). MMP score increases with a higher income. Higher socioeconomic status was associated with better knowledge (Wang & Geng 2019) and better lifestyles (Adler et al. 1994). Home MMP also improved with more clinic appointments as more contact with the health care provider may improve the patient's knowledge and health literacy (Darvishpour et al. 2016).

Although the current study had highlighted several important findings on proper MMP, there were some limitations that may have influenced the overall findings. This was only a single center study where the practice

policy and procedure may be depicted in the findings. A multi-center study could make this study representative of community stroke patient in Malaysia. The study did not include the use of non-prescribed medications, traditional and complementary medicine and supplements which may affect the overall medication management practice. Due to the COVID-19 pandemic lockdown and movement restriction, we had to use various modes of data collections which could cause recall bias or possibility of misinformation especially through telephone interview and google form.

CONCLUSION

The home MMP among post-stroke patients managed in the primary care setting is non-satisfactory. There were inappropriate practices in the areas of medication reconciliation, medication storage and medication disposal. Gender, higher socioeconomic status and higher number of clinic appointments were the predictors of appropriate MMP among post-stroke patients. Therefore, healthcare providers including physicians, pharmacists and nurses should play more active roles in ensuring these aspects of care are not disregarded and should be looked into. Future studies should explore other aspects of home MMP to improve adherence and ensure a better outcome.

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DISCLAIMER

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