ORIGINAL ARTICLE

Effectiveness of native language prescription in improving medication knowledge

Harshani Ranasinghe[1], Deepthi Kumari[2], Nimeshika Mahaarachchi[2], Dumindu Rathnayake[2], Vishva Mohottala[2], Tonia Soundaram[2], Heshani De Silva[2], Praveen Weeratunga[1], Upul Senarath[3], Panduka Karunanayake[1], Godwin Constantine[1]

[1] Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

[2] Ministry of Health, Sri Lanka

[3] Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

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Author responsible for correspondence:
Harshani Ranasinghe
Department of Clinical Medicine,
Faculty of Medicine,
University of Colombo, Sri Lanka
Email: harshaninr@yahoo.com

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https://orcid.org/0000-0002-4552-7557

Abstract

Background

Knowledge on medication is a crucial factor for medication adherence and minimizing medication errors. The objective of the present study was to analyze differences in medication knowledge before and after provision of a native language prescription.

Methods

A convenient sample of 200 patients (age >18 years) was invited for the study. All the participants were provided with a prescription in their native language. Knowledge on medication was assessed before and 2 months after the intervention using an interviewer administered questionnaire. Mean knowledge scores before and after the intervention were compared.

Results

Follow up data were available for 161 patients. Majority (61.5%, n=99) were females. Sinhala was the primary language of 73.9% (n=119) of participants, followed by Tamil 25.4% (n=41). A statistically significant difference was observed in the mean knowledge scores on prescribed medications before and after provision of native language prescription ($p < 0.001$). Furthermore, a statistically significant increase in predetermined categories of 'adequate' and 'good' knowledge was also noted. Significant associations were noted between the patients' education level and knowledge of prescribed medications (p=0.031).

Conclusion

This indicates the effectiveness of native language prescriptions to improve medication related knowledge.

Background

Medication adherence is directly linked with the patients' knowledge on prescribed medications [1,3]. A study among hypertensive patients reported that compliance had a significant correlation with provision of information to the patients on dose, the right time to take medications and the properties of the medications prescribed [4]. The ability to state or identify the medication by name, dose and frequency is important for patients to interact with health care personnel, especially those who are not their usual care providers. This is more important for patients with chronic disease states who frequently require multidrug regimens. Using medications depending on pill shape, size, or color is unreliable and may lead to medication errors [5]. It is therefore plausible that the

inability to name one's medications could increase the chance of medication errors or non-adherence.

A medication error is defined as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is under the control of the health care professional, patient, or consumer. Among the cases reported to the US Federal Drug Authority (FDA) most common causes of medication error resulting in patient death were performance and knowledge deficits (44%) and communication errors (15.8%) [1].

Sri Lanka is a multiethnic country, with Sinhala or Tamil being the primary language in a large majority of the population. Only 17 % of the population can read and write English despite a high literacy rate [6]. However, prescribing and dispensing is still done in English. In prior studies 65% of out-patients and 54% of in-patients were not able to read a single English name from a list containing commonly used medications [7]. A study on the knowledge of prescribed medications in Sri Lanka, showed that the overall knowledge (in terms of name, indication, dose and frequency) was 'poor' (score less than 20/60) in 46% of the participants. Furthermore, only 55.0% of the participants in this study were able to read the medication dose and frequency of administration and 1.0% of patients were able to read medication names [8].

Although counseling on prescribed medications has been shown to improve the knowledge, such discussions occur infrequently and are often quite limited in resource poor settings. In addition, it is highly likely that most of the patients will not retain the information provided following at such consultations [9].

Using simple, everyday language and supplementing oral teaching with written materials are effective strategies for patient education [10]. This study is a new approach to improve the understanding of the medications the patients' use, which could be done with minimal interference to practice, where information regarding a medication (name, dose, frequency and duration) is presented legibly in all three languages used in Sri Lanka for guidance.

Methods

Study population and sampling

This was conducted as a prospective cohort study involving 200 patients over a period of 3 months in the medical clinics of National Hospital of Sri Lanka (NHSL). At NHSL patients attending outpatient clinics receive a treatment card and a clinic book on which the clinical notes and prescription notes are handwritten in English by the consulting doctor. Medication containers used to dispense this medication contain names and instructions in English. Convenient sampling was used for recruitment. Three clinic days were attended and the first patient on each day was selected randomly from patient numbers 1-10. Thereafter, every third patient was invited for the study. Data were collected from patients who are aged more than 18 years and whose primary language was Sinhala or Tamil. The patients' basic reading skills and visual acuity were clarified by their ability to read three words in the respective primary language before recruitment.

Study instrument and data collection

A pre-tested expert-validated interviewer-administered questionnaire containing questions to assess the patients' socio-demographic data (age, gender, marital status, level of education and present employment status) and knowledge about prescribed medications (name, doses, frequency and indications) was used as the study instrument.

Following recruitment of eligible participants, they were asked to write down/mention the name, dose and frequency of the medications he/she is on in a language preferred by the participant. The patients' Treatment Card and Clinic Book were used as the reference to cross check the validity of information given by the patients.

Native language prescription and medication information

At the end of the consultation all the participants were provided with a sheet containing the names, doses and frequency of the medications in all three languages. Medication knowledge and clarity of information were assessed in the same methodology, 3 months after the intervention. All the interviews were conducted in patients' native language ('Sinhala' or 'Tamil').

Statistical analysis

Calculation of knowledge scores for the purpose of analysis was performed in a stratified manner. Each of the 4 components determining knowledge on prescribed medication i.e. name, dose, frequency and indication, was given a score out of 100. The maximum values for each category among the above variables were adjusted based on the number of medications in the prescription. For example, a patient who has been prescribed 5 different medications and correctly knows the name of only 2 medications, the score was calculated as follows: (100×2)/5=40 marks. Following this, a cumulative score out of 100 was obtained for each patient using the four combinations of the components described above. To calculate this cumulative score (total=100) each component was given a differentially weighted score depending on relative difficulty in memorization, re-call, and importance as assessed by two independent experts (name=30 points,

indication=30 points, dose=20 points and frequency=20 points). A cumulative score of >70 marks was classified as 'good knowledge' on prescribed medication, while 40-70 marks as 'adequate knowledge' and <40 marks were considered as 'poor knowledge'.

Age, gender, level of education, monthly income, age of the first child and education level of the first child were analyzed as associated factors with knowledge status using SPSS version 20 with paired sample testing and a level of significance set at $p<0.05$. Socio-demographic characteristics were analyzed using measures of central tendency and dispersion.

Results

Socio-demographic characteristics

The socio-demographic characteristics of the study population are presented in Table 1. Majority was females and mean age was 62.5±9.4 years. Sinhala was the primary language in 73.9% (n=119) of participants, followed by Tamil 25.4% (n=41).

Table 1. Distribution of Socio demographic characteristics of the study population

Characteristic	Frequency	Percentage
Age		
31-40	1	0.6
41-50	14	8.7
51-60	48	29.8
61-70	57	35.4
71-80	38	23.6
81-90	3	1.9
Gender		
Female	99	61.5
Male	62	38.5
Race		
Sinhala	119	73.9
Tamil	26	16.1
Muslim	15	9.3
Other	1	0.6
District		
Colombo	130	80.7
Gampaha	25	15.5
Other	6	3.7
Educational level		
Illiterate	4	2.5
Primary education	34	21.1
Secondary education	119	73.9
Tertiary education	3	1.9
Monthly income (LKR)		
Dependent	56	34.8
<10,000	9	5.6
10,000-25,000	66	41.0
25,0000	30	18.6
Occupation		
Professional	3	1.9
Businessman	2	1.2
Self-employed	17	10.6
Manual worker	24	14.9
Retired	45	27.9
Unemployed/ housewife	70	43.5

Knowledge status of the study population on prescribed medication

The knowledge status of the study population was categorized by their cumulative score (out of 100). Before provision of native language prescription, majority of the study population had a 'poor knowledge' (<40 marks) (n=118, 73.3%), while 13.7% (n=22) had 'adequate knowledge' (40 - 70 marks) and only 21 (13%) participants had 'good knowledge' (>70 marks) of prescribed medication. After 3 months of follow up majority of the study population had 'good knowledge' (>70 marks) (n=93, 57.7%), while 19.3% (n=31) had 'adequate knowledge' (40-70 marks) and only 37 (23%) participants had 'poor knowledge' (<40 marks) of prescribed medications. The comparative frequency distributions of patient knowledge scores before and after intervention is presented in Figures 1 and 2.

The mean total score of the cumulative score before the intervention was 36.8, (males - 37.3, females - 36.5) and after the intervention it was 67 (males - 63, females - 69.7). A significant difference of means was noted with a p value of <0.001. A power calculation based on the final analyzed sample provides an effect size of 1.01 with a power of 0.923 at a significance of 0.05.

Further analysis was conducted based on the knowledge on individual medication before and after provision of native language prescription. A mean score for each medication was calculated and it is summarized in Figure 3. Twenty-five percent of the patients had read the prescription before the intervention, while 78% of patients had read the prescription at the end of 3 months follow up. The main reasons for not reading prescriptions are presented in Table 2.

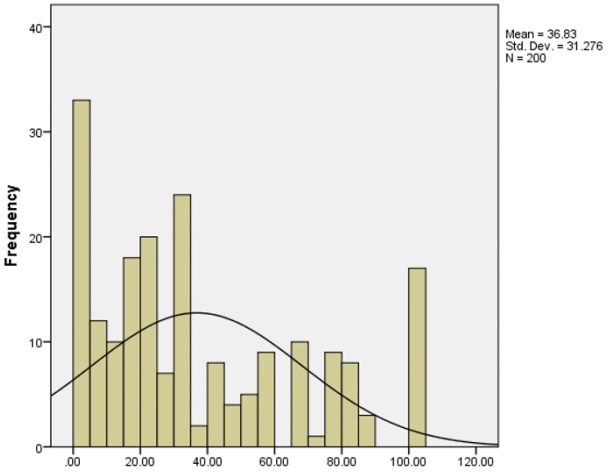

Figure 1. Frequency distribution of knowledge score before the intervention.

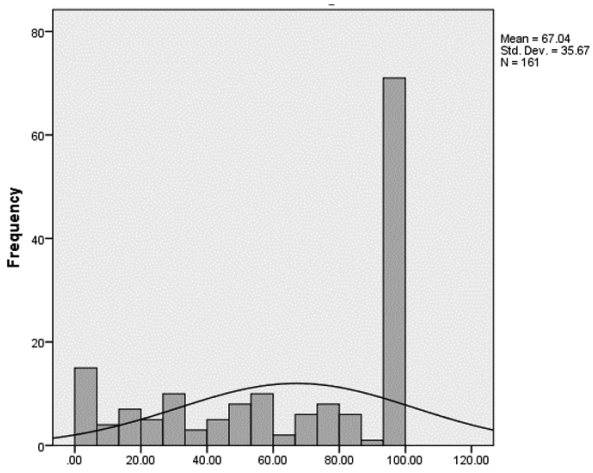

Figure 2. Frequency distribution of knowledge score after the intervention.

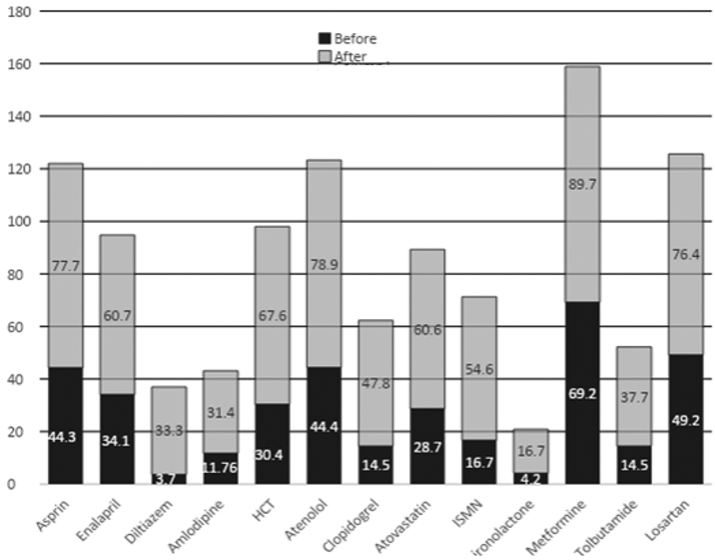

Figure 3. Mean knowledge score for each drug before and after the intervention.

Table 2. Associations of poor knowledge scores

Characteristics	≤ median score (37)	> median score (37)	Significance
Age in years			$\chi^2 = 2.939$
37-63	68 (34.0%)	39 (19.5%)	Df = 1
63-85	57 (28.5%)	36 (18.5%)	P=0.568
Gender			$\chi^2 = 1.913$
Males	46 (23.0%)	30 (15.0%)	Df = 1
Females	79 (39.5%)	45 (22.5%)	P= 0.384
Education level			$\chi^2 = 6.939$
Primary/Illiterate	38 (19.1%)	11 (5.5%)	Df = 1
Secondary and above	86 (43.2%)	64 (32.2%)	P= 0.031
Age of the first child			$\chi^2 = 1.189$
10-35	56 (31.3%)	40 (22.3%)	Df = 1
36-62	55 (30.7%)	28 (15.6%)	P= 0.276
Education level of the child			$\chi^2 = 5.484$
Primary/Illiterate	15 (8.4%)	2 (1.1%)	Df = 1
Secondary and above	96 (53.6%)	66 (36.9%)	P=0.019
Monthly income			$\chi^2 = 5.835$
<25000/=	106 (53.3%)	63 (31.7%)	Df = 1
>25000/=	18 (9%)	12 (6.1%)	P= 0.054

Factors associated with knowledge of prescribed medication

The study sample was dichotomized around the mean into two groups using the median cumulative score before the intervention for evaluating associations with poor knowledge. The participants who had 'adequate knowledge of drugs' was used as the dependent variable and independent variables used are shown in Table 2. Associations between knowledge score before provision of native language prescription and socio demographic characteristics, patients' education level and the education level of the eldest child in the family were statistically significant.

Discussion

Based on the results of this study, an intervention using a native language prescription and medication information in the native language, significantly improved medication knowledge as evidenced by a significant increase in mean knowledge scores and increase in the number of patients with 'adequate' and 'good' knowledge scores. These findings are consistent with findings in other studies conducted in the United States, where multi-lingual prescription instructions were found to improve understanding, regimen dosing and regimen consolidation in a multiethnic population [12]. Another similar study demonstrated higher levels of understanding on prescription information among patients provided with bilingual medication dispensing labels in UK residents with poor English proficiency [13]. The development of bilingual medication labels is also described by Mohan *et al* and the national language commission, Sri Lanka [14, 21]. To the best of our knowledge, our study is one of the first formal evaluations of multi-lingual prescriptions in the region, and in lower middle-income settings.

A previous study from Sri Lanka [20] compared a discharge summary that had the diagnosis and prescribed medication listed in either English (usual practice) or with that of the patient's native language, and found a significant improvement in the latter group in recalling the names of their medicines (and disease). This demonstrates the need of urgent health policy decisions on implementing these strategies in the healthcare system. The most evident reason for not having adequate knowledge on prescribed medication in our study population was inability to understand the medication information which is written in the English language. Seventy-five percent of the study population had not read their prescription before provision of native language prescription. Sixty-five percent of them attributed it for limited English proficiency, 24% of them due to negligence and 11% of them due to illegible hand writing of the prescriber. The study by Perera T *et al*. revealed similar findings where majority of their study population was unable to read and understand the

information written in the prescription card or clinic note book. The main reason for this was patients' inability to read the information written in English [8]. Another randomized study was conducted at the seven medical units of National Hospital of Sri Lanka which investigated the patients' knowledge of illness and medications of the discharge summary by providing an English discharge summary to the control group and a supplementary native language discharge summary to the intervention group. This study found that a higher proportion in the intervention group read the discharge summary to gain the knowledge of diagnosis and medications than in the control group [20].

Limited English proficiency being a barrier for health literacy is prevalent in other countries whose first language is not English. A study done in a purely Spanish speaking population, showed similar findings to the Sri Lankan setting where only 29% of the population were able to understand routinely dispensed written medication instructions [17]. This study also notes that even in the subjects who were proficient in English, only 50% were able to mention their medications correctly.

A study conducted in the US hospitals to examine adverse events between English speaking patients and patients with limited English proficiency found that 49.1% of limited English proficient patients' adverse events involved some physical harm whereas only 29.5% of adverse events for patients who speak English resulted in physical harm [18]. In a telephone survey done in California it was found that patients with limited English proficiency were more likely to report problems in understanding a medical situation, trouble understanding medication labels and adverse reactions [19]. Both the studies concluded that limited English proficiency is a barrier to medical comprehension and increases the risk of adverse reactions.

Risk of adverse reactions and patient compliance with knowledge of prescribed medication were not extensively analyzed during our study which we see as a major limitation.

Conclusion

An intervention based on a native language prescription and medication information in the native language was shown to improve medication knowledge. Thus, interventions are needed to improve comprehension of medication using the native language especially in patients with limited English proficiency.

This study describes a health communication and documentation intervention in a multi-ethnic; resource limited setting as a modality for improving medication knowledge.

Abbreviations

NHSL: National Hospital, Colombo, Sri Lanka, SPSS: Statistical Package for the Social Sciences, SD: Standard Deviation and US: United States.

Declaration

Ethical clearance

Ethical clearance for the study was obtained from the Ethics Review Committee (ERC), Faculty of Medicine, University of Colombo, Sri Lanka (EC/15/147) and the National Hospital of Sri Lanka, Colombo, Sri Lanka.

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This is a prospective cohort study with a minimal cost and expenses. Costs associated with this study include duplication of questionnaires, consent forms and information sheets. These had been provided by the Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka. There are no external funds for the study.

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Consent for publication

Not applicable.

Competing interests

Not applicable.

Author's contributions

Study concept and design: GRC, APK and PNW. Data collection and carried out the research: HNR, DSR and VSM. Qualitative analysis and interpretation of data: JUS, PNW, HNR, DSR and VSM. First draft of manuscript: PNW, HNR, DIK and NCM. Critical revision of the manuscript for important intellectual content and interpretation: GRC and PNW. Administrative, technical and material support: TVS and HEDS. Review and approval of the manuscript: GRC, PNW, APK and JUS. All authors read and approved the final manuscript.

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