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Short Communication

Knowledge of Quality Use of Medicine Among Rural Communities Involved in KPT Prihatin Komuniti Sejahtera (KRIS) Health Clinic: A Pilot Study

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ABSTRACT

Background: Quality use of medicines (QUM) entails the appropriate utilization of medications, ensuring their safety and effectiveness. **Objective:** This study aims to investigate the knowledge of quality use of medicines in rural communities of Sabah, Malaysia, and explore its relationship with socio-demographic factors. **Method:** During the KPT Prihatin Komuniti Sejahtera (KRIS) health clinic in Sabah, a total of 130 participants completed the NSUM (National Survey on Use of Medicine) 2012 questionnaire. Participants receive 1 point for each correct answer, and their total scores will be adjusted using the number right scoring method to correct for guessing. **Results:** The result shows that the mean score for QUM knowledge among the participants was 68.67% (moderate level). The univariate analysis shows significant differences in knowledge scores when it comes to location, education levels and monthly household income ($p < 0.05$). In the multivariate analysis, the overall model lacks statistical significance, as evidenced by an F-value of 1.88 with a p-value of 0.06. However, there was a significant association between education level with knowledge scores ($p < 0.05$), with one unit corresponding to an increase of 0.703 units in knowledge scores and a standardized coefficient of 0.243. This supports the idea that education level is a factor that can play an important role in predicting knowledge of QUM among this population. Additionally, the disposal of expired or damaged medicines was the aspect where the fewest participants demonstrated accurate knowledge (61.38%). **Conclusion:** The information gathered from this study can be used to inform future efforts to effectively improve the rural population's quality use of medicines. Further studies utilizing a more extensive and heterogeneous sample would be valuable to corroborate and extend these findings

INTRODUCTION

Knowledge of quality use of medicines is defined as understanding as well as awareness of proper and safe utilization of medicines [1]. It covers various aspects of medicines such as indications, route of administration, adverse effects, interactions and dose. The scope of knowledge covers conventional medicines and also the use of alternative and complementary medicines, to prevent safety and efficacy issues [2,3,4]. We can improve the safety and efficacy of medicines by enhancing education and research on the use of medicines [5,6,7].

Knowledge of proper medication use ensures patient safety and drug efficacy. When faced with a lack of information,such as the patient's concurrent medications and organ function, adverse drug reactions can occur [9]. This will lead to mortality and morbidity10 as well as decreased quality of life [11],

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increased healthcare costs [10], and greater length of hospital stay [10]. Research also suggests that patients with poor knowledge of their medications will be less likely to be adherent to their medication regimen [8].

Quality use of medicines (QUM) entails the proper selection of medications [12] and their safe and effective utilization to attain optimal health outcomes [1]. The practice of QUM is essential for universal health coverage and ensuring medicine efficacy [13]. However, implementation of QUM can be challenging in various healthcare settings [12]. Some of the challenges can include a low level of attention politically, weak capacity of the regulatory system and poor access to facilities [14]. Hence, the national medicine authority usually plays a major role in ensuring the practice of QUM [15]. In Malaysia, studies have been conducted to measure the public understanding of QUM. An initial study in 2008 disclosed that 55.6% of individuals lacked understanding regarding the appropriate use of their medications [16].

Knowledge of the proper use of medications may be influenced by socio-demographic and socioeconomic factors such as age, gender, race, education level and income. According to Vatcharavongvan & Puttawanchai 2022, lifestyle, attitude and knowledge impacted medication adherence among the elderly in Pathum-Thani, Thailand [17]. In their analysis of the AHEAD study population of older adults in the United States, Dunlop et al. (2002) found notable gender and ethnic disparities in healthcare utilization among adults [18]. Torres-Avilez et al. (2016) reported through their meta-analyses, that there was no significant difference in gender regarding knowledge of medicinal plants in a population spanning 26 countries across four continents: Africa, the Americas, Asia, and Europe [19].

Alassaf et al. (2023) found that gender disparities are evident in the diagnosis and management of type 1 diabetes among newly graduated medical professionals in Jordan, with females exhibiting higher knowledge scores [20]. CY Osborn et al. revealed in their study that in the United States, African Americans exhibit lower medication adherence among diabetic adults. This discrepancy is partly attributed to health literacy levels [21]. According to a study done by Marsigit J et. al, higher education levels lead to a better knowledge of HIV medications among patients and TB officers in Pulogadung Sub-District Primary Health Care, Indonesia [22]. Thandar et al. also found a significant association between educational level and the level of knowledge regarding medication use and practices among Type II Diabetes Mellitus patients at the Medical Outpatient Department (MOPD) of Hospital Tengku Ampuan Afzan (HTAA), Kuantan, Malaysia [23]. Bains et al., M.D. (2011) discovered that in a cohort of patients diagnosed with type 2 diabetes mellitus (T2DM) at the Medical University of South Carolina, diabetes knowledge and perceived health status were identified as the primary factors linked to glycemic control. Health literacy appeared to exert its influence on glycemic control indirectly by affecting diabetes knowledge rather than directly impacting self-care or medication adherence [24].

The univariate analyses of the NSUM (National Survey on Use of Medicine) 2015 data reveal statistically significant differences among socio-demographic subgroups in their knowledge of various aspects related to medicines [25]. These aspects include trade/generic names, proper use and storage of medicines, awareness of side effects and shelf life, understanding of food-medicine and modern-traditional medicine interactions, practices of medication disposal, the registration of modern and traditional medicines with the Ministry of Health, awareness of the availability of Meditag®, and adherence to medication [25].

For instance, urban residents of Malaysian states, especially those who are younger, employed in government positions, living independently, female, and with higher levels of education and income, tend to excel in their ability to identify medicines by their trade and generic names [25]. In NSUM 2012, participants exhibited varying levels of correct answers with the highest percentage in Section 3 (knowledge of Quality of Medicines) (96.23%) and the lowest in Section 8 (knowledge of Medicines Disposal) (68.14%) [26].

While research on the quality use of medicines exists, there's a notable gap in studies specifically targeting the rural population of Malaysia. Data regarding their level of knowledge of quality use of medicine (QUM) remains scarce, as thorough searches on databases like Scopus, PubMed, and Google Scholar using relevant keywords such as "quality use of medicines," "Malaysia," "rural population," and "Sabah" have yielded no published research on this topic.

Considering the unique socio-demographic data of this population, such as ethnicity, there is an opportunity during KPT Komuniti Prihatin Komuniti Sejahtera (KRIS), a healthcare outreach program by Hospital Universiti Malaysia Sabah (HUMS) [29] to gather valuable data that can inform good insight towards future interventions aimed at improving the quality use of medicines among the residents.

General Objective

To study the level of knowledge of the quality use of medicines in rural communities of Sabah and its relationship with socio-demographic factors.

Specific Objective

Primary Outcome: Determining the level of knowledge of the quality use of medicines in rural communities of Sabah and the relationship of knowledge of quality use of medicines scores to socio-demographic data, including:

a) Age
b) Ethnicity
c) Sex
d) Education level
e) Income
f) Occupation
g) Co-morbidities

MATERIAL AND METHOD

A prospective questionnaire study design was utilized, collecting data from July 2022 to June 2023 at various locations in rural Sabah during KRIS health clinics. The sampling method utilized was convenient exponential discriminative snowball sampling and a sample size of 377 is calculated by taking into account the margin of error of 5%, confidence interval of 95%, population of 20,000 and 50% response distribution. The questionnaire was disseminated to participants for independent completion. However, individuals requiring assistance or unable to read were provided with explanations of the questionnaire contents and questions in a face-to-face interview format. 130 questionnaires were successfully collected.

To collect the data, a validated questionnaire sourced from the National Survey on Use of Medicines (NSUM) 2012 was utilized [26]. This questionnaire has been adopted and is designed to assess participants' medication knowledge. It consists of a series of questions that evaluate their understanding of the quality use of medicines. The questionnaire had been previously validated and proven to be effective in measuring knowledge of the quality use of medicine [26].

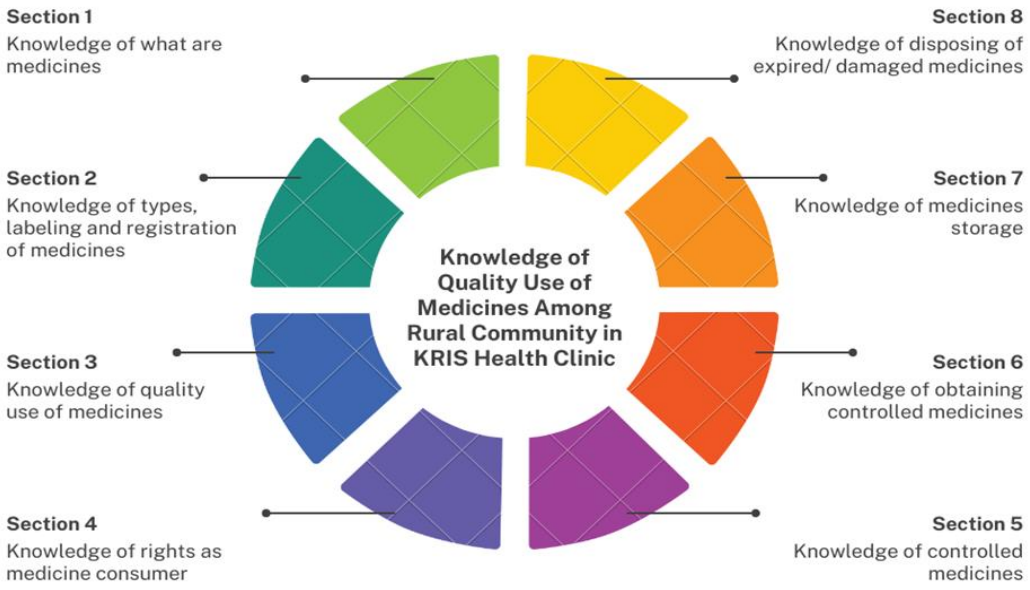

Figure 1: The Sections within the NSUM 2012 Knowledge of Quality Use of Medicines Questionnaire (this figure is structured according to the sections outlined in the NSUM 2012 questionnaire)

Participant scores will be calculated based on their responses to the questionnaire. Each correct answer will be assigned a score of 1. To account for guessing, the total score will be adjusted using the number right scoring method. The formula used for scoring will be as follows:

$$FS = \frac{R - W}{C - 1}$$

Where FS = Full Score,
R = Right answers
W= Wrong answers,
C = Number of choices per item

Participant's knowledge scores will be classified according to the Table I. Data will be analyzed using SPSS Version 26 (2018) to find the relationship between socio-demographic factors and knowledge scores.

Table I. Knowledge score classification

Percentile	Interpretation
0-25	Poor Knowledge
25-50	Poor-Moderate Knowledge
50-75	Moderate Knowledge
>75	Excellent Knowledge

Table II. Knowledge level of participants

Level of Knowledge	Number of participants (%)
Low	1 (0.8%)
Moderate-Low	10 (7.7%)
Moderate	75 (57.7%)
Excellent	44 (33.8%)

RESULT

130 participants have completed the questionnaire. Table II summarizes the number and percentage of participants with low, moderate-low, moderate and excellent levels of knowledge. 44(33.8%) of participants show excellent knowledge, 75(57.7%) shows moderate knowledge, 10(7.7%) shows moderate-low knowledge and 1(0.8%) shows low knowledge.

Table III reports the percentage of correctly answered questions in each section of the questionnaire. Sections 3 and 4 had the highest percentage of correct answers, with over 98% of participants answering correctly. Sections 1, 2, 5, 6, and 7 had moderate percentages of correct answers, ranging from 78.46% to 89.01%. Section 8 had the lowest percentage of correct answers, with only 61.38% of participants answering correctly.

Table IV shows the percentage of sections and statements of the questionnaire answered either correctly or incorrectly by the participants. The mean score for the population was 68.67% indicating a moderate level of knowledge.

Table V shows a univariate analysis of socio-demographic variance in knowledge of quality use of medicines. The p-values indicate that there is no statistically significant difference in knowledge scores among different age groups, genders, ethnic groups, living statuses and comorbidities (which include high blood pressure, diabetes, gout, dyslipidemia, heart disease, chronic gastritis, and hyperthyroidism). No statistical analyses were done on "occupation" due to small numbers in some observed values. There are statistically significant differences in knowledge scores based on location, education levels and monthly household income. A previous study conducted by Ng Shi Hui et al. at villages in Kuala Nerus, Terengganu yielded results consistent with our findings regarding living status, but contradicted it when it comes to age, education levels and monthly household income [33]. This may imply that there are differences in the correlation between demographic factors and knowledge scores across different geographic locations or localities.

Table III. the percentage of correctly answered questions in each section of the questionnaire

Sections	Topic	Correctly Answered (%)
1	Knowledge of what are medicines?	83.85%
2	Knowledge of types, labelling and registration of medicines	82.88%
3	Knowledge of quality use of medicines	98.21%
4	Knowledge of rights as medicine consumer	98.92%
5	Knowledge of controlled medicines	78.46%
6	Knowledge of obtaining controlled medicines	89.01%
7	Knowledge of medicines storage	82.50%
8	Knowledge of disposing of expired/ damaged medicines	61.38%

Table VI shows a multiple regression analysis of knowledge of quality use of medicine in terms of age, location, gender, education, occupation, living status, comorbidities (which includes high blood pressure, diabetes, gout, dyslipidemia, heart disease, chronic gastritis, and hyperthyroidism), monthly household income and ethnicity.

The Unstandardized B demonstrated a direct change in the outcome (knowledge scores) associated with changes in each predictor while Standardized B demonstrated a comparison of effect magnitudes across the different predictors, irrespective of their measurement scales. The result shows that a one-unit increase in Education level corresponds to a 0.703-unit change in the knowledge scores. Additionally, Education's standardized coefficient of 0.243 indicates its relatively greater influence on the knowledge scores compared to other predictors.

There is a weak positive correlation between the predictor variables and dependent variables (R=0.124). The overall model (F-value of 1.88 with 9 and 120 degrees of freedom) is not statistically significant (p-value of 0.06) although it is slightly higher than the significance level.

However, education level has a significant value of p=0.016, which indicates that it is the only significant predictor variable in this analysis. Age, location, gender, occupation, living status, comorbidities, monthly household income, and ethnicity do not seem to have a significant impact on the knowledge scores. Studies conducted by Mekonnen & Gelayee (2020) [27] and Fallatah et al. (2023) [28] similarly demonstrated the statistical significance of education level in relation to patients' medication knowledge. Marfo et al. (2013) conducted a study to assess patient understanding of how to take medications received from community pharmacies in Ghana. The research aimed to examine how education, location, and sex impact patient knowledge. The results showed that only the level of education had a notable impact on patient awareness (chi-square = 48.483, df = 15, p = 0.000) [34].

Table IV: The percentage of sections and statements of the questionnaire answered either correctly or incorrectly by the participants.

Sections	Statement	Correct Answer, n(%)	Wrong Answer, n(%)
Knowledge of what are medicines?	Substances used to treat diseases	83.85%	16.15%
	Substances used to prevent diseases	79.23%	20.77%
	Substances used to control diseases	88.46%	11.54%
Knowledge of types, labeling and registration of medicines	Generic name of the medicines	67.69%	32.31%
	Brand or trade name of the medicines	69.23%	30.77%
	You should read the label before taking any medicines	97.69%	2.31%
	All medicines should be registered with the Malaysian Ministry of Health	96.92%	3.08%
Knowledge of quality use of medicines	Right medicines	99.23%	0.77%
	Right dose	97.69%	2.31%
	Right administration time	97.69%	2.31%
Knowledge of rights as medicine consumer	Rights to know the name of the medicines	97.69%	2.31%
	Rights to obtain information on the indication of the medicines	100.00%	0.00%
	Rights to obtain the information on how to take medicines	100.00%	0.00%
	Rights to obtain the correctly labeled medicines	98.46%	1.54%
	Rights to obtain the information on safety and interaction of medicines supplied	98.46%	1.54%
Knowledge of controlled medicines	Medicines that can be obtained from medical doctors	93.85%	6.15%
	Medicines that can be obtained from pharmacists	66.92%	33.08%
	Medicines that can be obtained from traditional medicine practitioner	74.62%	25.38%
Knowledge of obtaining controlled medicines	A government clinic/hospital	98.46%	1.54%
	Private clinic/hospital	89.23%	10.77%
	Community pharmacy	60.00%	40.00%
	Traditional medicines outlet/chinese medicines hall	88.46%	11.54%
	Grocery shop	90.77%	9.23%
	Night market	97.69%	2.31%
	Internet	98.46%	1.54%
Knowledge of medicines storage	In the bathroom	99.23%	0.77%
	Away from sunlight and heat	81.54%	18.46%
	In places reachable to children	60.77%	39.23%
	In the car	88.46%	11.54%
Knowledge of disposing of expired/ damaged medicines	Throw into the rubbish bin	30.77%	69.23%
	Flush down the toilet	90.00%	10.00%
	Burn	73.08%	26.92%
	Bury	74.62%	25.38%
	Return to the nearest pharmacy, clinic or hospital	38.46%	61.54%

Table V. Univariate analysis of socio-demographic variance in knowledge of quality use of medicines

Characteristics	Sample, n		Knowledge Score		P value
Age	**n**	**%**	**Mean**	**SD**	
Young adult	24	18.5	24	5.14	0.100
Middle age adult	44	33.8	24.5	4.21	
Old age adult	41	31.5	22.39	5.14	
Elderly	21	16.2	21.95	5.20	
Location					
Kg. Parapat Laut - Kudat	37	28.5	24.16	3.69	0.000
Kg Serinsim - Kota Marudu	25	19.2	19.48	5.57	
Kg. Moyog - Penampang	11	8.5	25.63	6.50	
Kg. Pimping - Membakut	14	10.8	24.57	2.87	
Kg. Matunggong, Kudat	16	12.3	21.00	3.50	
Kg Pukak, Kiulu	27	20.8	25.62	4.22	
Gender					
Males	65	50	22.95	4.51	0.370
Females	65	50	23.73	5.29	
Education					
No Education	18	13.8	20.61	6.37	0.012
Less Than / Incomplete Primary School	4	3.1	25.00	6.21	
Primary School	25	19.2	22.96	3.27	
High School Lower (PMR/SRP)	23	17.7	23.04	4.66	
High School Upper (SPM)	44	33.8	23.32	4.97	
Form 6	8	6.2	28.25	3.28	
Diploma	5	3.8	24.8	2.28	
Bachelor's Degree	3	2.3	28	0	
Living Status					
Alone	4	3.1	22.5	1	0.730
With family	126	96.9	23.37	4.99	
Co-morbidities					
No co-morbidities	102	78.5	23.49	4.51	0.530
Has co-morbidities	28	21.5	22.82	6.26	
Monthly Household Income					
None or uncertain	48	36.9	23.17	4.26	0.042
500 and below	20	15.4	24.4	5.53	
1000 and below	40	30.8	21.78	5.07	
1500 and below	17	13.1	24.94	4.85	
2000 and below	3	2.3	28	4	
2000 and above	2	1.5	28	0	
Ethnicity					
Kegayan	5	3.8	24.8	3.35	0.700
Bajau	16	12.3	23.88	4.10	
Bajau Benadan	2	1.5	23	1.41	
Benadan	2	1.5	27	4.24	
Melayu	3	2.3	21.33	2.31	
Dusun	62	47.7	23.40	5.99	
Rungus	21	16.2	21.81	3.40	
Ubian	2	1.5	28	5.66	
Sino Kadazan	1	0.8	18	0	
Brunei	9	6.9	25.56	2.96	
Kadazan	3	2.3	22	2	
Iban	1	0.8	24	0	
Rungus indo	1	0.8	18	0	
Kadazan Dusun	1	0.8	20	0	
Bajau-Suluk	1	0.8	24	0	

Table VI. Multiple regression analysis of knowledge of quality use of medicine

Predictor	Unstandardized B	Standardized B	P value
Age	-0.021	-0.068	0.519
Location	0.348	0.138	0.192
Gender	1.071	0.109	0.253
Education	0.703	0.243	0.016
Occupation	0.084	0.076	0.532
Living Status	0.024	0.001	0.992
Comorbidities	-0.08	-0.02	0.847
Monthly Household Income	-0.267	-0.146	0.145
Ethnicity	-0.07	-0.068	0.519

DISCUSSION

Socio-demographics of participants

The participants were from various villages in rural Sabah, with the highest representation from Kg. Parapat Laut, Kudat, and Kg. Pukak, Kiulu. The gender distribution was equal (50.0% males and 50.0% females). The age distribution showed the highest representation of middle-aged adults, followed by old-age adults and young adults. The largest ethnic group was Dusun, followed by Rungus and Bajau. In terms of education level, most of the participants had a high school education (upper and lower), while a smaller percentage had no formal education or primary school education. The majority of participants lived with their families and had various occupations, with the highest percentage being housewives and self-employed individuals. The monthly household income varied, with the highest percentage having none or uncertain income. Additionally, a notable percentage of participants had comorbidities.

Knowledge scores among rural area population

The majority of participants demonstrated moderate knowledge (57.7%), followed by excellent knowledge (33.8%). Only a small percentage showed moderate-low knowledge (7.7%), and a negligible percentage had low knowledge (0.8%). Overall, the mean score was ranked moderate (68.67%) indicating a moderate level of knowledge among the study participants.

In Table III, Sections 3 and 4, which are on the knowledge of quality use of medicines and knowledge of rights as a medicine consumer, had the highest percentage of correct answers, indicating a strong understanding of the topics. Therefore, participants showed an excellent understanding of the quality use of medicines and knowledge of their rights as medicines consumers. Section 1 (knowledge of what are medicines?), 2 (knowledge of types, labeling and registration of medicines), 5 (knowledge of controlled medicines), 6 (knowledge of obtaining controlled medicines), and 7 (knowledge of medicines storage) had moderate percentages of correct

answers, suggesting a reasonable level of knowledge in these areas. However, the lowest percentage of correct responses (61.38%) was found in Section 8, which deals with the disposal of expired or damaged medicines. This number is less than the results of NSUM 2012 (68.14%), indicating a need for improvement among rural participants in this particular area. This can be realized through mass media [31] and campaigns such as the "Kenali Ubat Anda" program conducted by the Pharmaceutical Services Programme, Ministry of Health Malaysia [30]. In the United States, drop boxes and take-back events for medication disposal have been successfully utilized to increase awareness among the public [32].

Socio-demographic characteristics and knowledge of quality use of medicines

The findings of Table V demonstrated the relationship between various socio-demographic characteristics and knowledge scores on the quality use of medicines. Age groups, genders, ethnic groups, living statuses, comorbidities, and occupations were observed for their relation to knowledge scores. The analysis revealed that there is no statistically significant difference in knowledge scores among different age groups, genders, ethnic groups, living statuses and comorbidities. This suggests that these socio-demographic characteristics do not predict an individual's knowledge of the quality use of medicines.

However, the analysis discovers statistically significant differences in knowledge scores based on location, education levels, and monthly household income. This implies that individuals residing in different locations, with varying levels of education, and income levels may have significantly different levels of knowledge regarding the quality use of medicines.

The analysis is further done using the multiple regression analysis in Table VI which examined the predictors of knowledge of quality use of medicines, including age, location, gender, education, occupation, living status, comorbidities, monthly household income, and ethnicity. The multiple R value of 0.124 indicates a weak positive correlation indicating a small, positive relationship between the socio-demographic variables and knowledge scores. The overall model is not statistically significant at a p-value of 0.06 (F-value of 1.88 with 9 and 120 degrees of freedom) which is slightly higher than the significance level. This means that the socio-demographic variables, as a whole, do not have a significant impact on knowledge scores.

However, in the context of individual predictor variables, education has a p-value of 0.016, which is less than 0.05. Therefore, education levels have a significant impact on knowledge scores. The analysis suggests a positive correlation between higher education levels and improved knowledge scores, as evidenced by the notably higher mean scores associated with Bachelor's Degree and Form 6 education levels compared to others. However, to confirm this finding, further investigation with a larger sample size is recommended for future studies.

Similar correlations can be found in previous studies such as a study conducted in the low-income country of Gondar, Northwest Ethiopia found that patients with higher education levels were more likely to have good knowledge of their medication, which was associated with higher medication adherence [27]. This implies that higher education levels result in a greater comprehension of medications and the importance of medication adherence. This finding is consistent with previous research such as a 2023 study by Fallatah et al. in Jeddah, Saudi Arabia, which found that various factors like age, location, gender, occupation, living status, comorbidities, monthly household income, and ethnicity did not have a significant impact on knowledge scores related to medication adherence. Education was identified as the only significant predictor variable for knowledge scores in this study [28].

Feasibility of the pilot study

In our research, we did not implement a protocol that required the collection of three distinct residential addresses to confirm the participants' locations. Instead, we opted for a single address and relied on verbal confirmation from the participants to establish their residency in the respective villages. It is important to acknowledge that this could potentially raise concerns about the reliability of our study findings. It is also important to consider the specific sample from rural Sabah, which may limit the generalizability of the findings. Further research with a larger and more diverse sample would be able to validate and expand upon these results.

Impact of this study

Overall, the findings indicate that the participants had a moderate level of knowledge, with variations across different sections of the questionnaire. Our results highlight the importance of education level as a predictor of knowledge of quality use of medicines. Moreover, the smallest percentage of respondents demonstrated accurate knowledge regarding the proper disposal of expired or damaged medicines. Therefore, enhancing awareness and understanding of this aspect should be the primary focus for educational campaigns and projects aimed at promoting the quality use of medicines (QUM). These findings can inform future interventions and educational programs aimed at enhancing QUM knowledge in similar populations.

Limitations of this study

This study can only establish a correlation and not causation between knowledge of the quality use of medicines (QUM) and socio-demographic factors. Moreover, because of time limitations, the research couldn't achieve the preferred sample size, thus affecting the overall applicability of the results.

It is crucial to recognize that the evaluation of participants relied on self-reported measures, leaving it susceptible to

potential biases and limitations. Self-reported assessments hinge on participants' subjective perceptions and may not consistently reflect true habits/activity. Social desirability bias or recall bias may have a potential impact on the result warranting caution in interpreting the result. To bolster the reliability of findings, future studies could contemplate integrating objective measures or observational methods to validate participant behavior.

CONCLUSIONS

Knowledge of the quality use of medicines is important to increase medication awareness and hence ensures the quality use of medicines. During this study, by using the validated NSUM 2012 questionnaire we found out that the mean score of the population was 68.67% (moderate level) and socio-demographic factors were a factor, but only education is a significant predictor of knowledge scores. This is important to consider in describing the population knowledge score concerning individuals' unique socio-demographic characteristics which can provide an insight into better intervention strategies. The study recommends developing informative medication knowledge related campaigns targeted specifically towards those with the following socio-demographic characteristics, the least educated living in rural Sabah. However, due to the smaller sample size, further research using a larger and more diverse sample would be advantageous to authenticate and build upon these findings.

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