

# Patient's Knowledge and Use of Sublingual Glyceryl Trinitrate Therapy in Taiping Hospital, Malaysia

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**Abstract**—Background: The objectives of this study were to assess patient's knowledge of appropriate sublingual glyceryl trinitrate (GTN) use as well as to investigate how patients commonly store and carry their sublingual GTN tablets. Methodology: This was a cross-sectional survey, using a validated researcher-administered questionnaire. The study involved cardiac patients receiving sublingual GTN attending the outpatient and inpatient departments of Taiping Hospital, a non-academic public care hospital. The minimum calculated sample size was 92, but 100 patients were conveniently sampled. Respondents were interviewed on 3 areas, including demographic data, knowledge and use of sublingual GTN. Eight items were used to calculate each subject's knowledge score and six items were used to calculate use score. Results: Of the 96 patients who consented to participate, majority (96.9%) were well aware of the indication of sublingual GTN. With regards to the mechanism of action of sublingual GTN, 73 (76%) patients did not know how the medication works. Majority of the patients (66.7%) knew about the proper storage of the tablet. In relation to the maximum number of sublingual GTN tablets that can be taken during each angina episode, 36.5% did not know that up to 3 tablets of sublingual GTN can be taken during each episode of angina. Fifty four (56.2%) patients were not aware that they need to replace sublingual GTN every 8 weeks after receiving the tablets. Majority (69.8%) of the patients demonstrated lack of knowledge with regards to the use of sublingual GTN as prevention of chest pain. Conclusion: Overall, patients' knowledge regarding the self-administration of sublingual GTN is still inadequate. The findings support the need for more frequent reinforcement of patient education, especially in the areas of preventive use, storage and drug stability.

**Keywords**—Glyceryl trinitrate, knowledge, adherence.

## I. INTRODUCTION

CORONARY heart disease, also known as coronary artery disease or ischemic heart disease is highly prevalent worldwide. In Malaysia, this disease remains the top cause of death in the Ministry of Health hospitals in 2012.

Angina, is a common symptom of ischemic heart disease, and is self-managed with sublingual glyceryl trinitrate (GTN) tablets. It still remains first-line drug therapy for many patients [1]. GTN dilates arteries, increasing the coronary artery blood flow. It is used to control symptoms by either relieving angina, or preventing it when undertaking activities known to provoke angina [2]. Sublingual GTN tablets are both heat and light

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sensitive. They should therefore be stored in a tightly capped original bottle (amber glass bottle) in a cool dry place [3].

Kimble &Kunik (2000) suggested that patient's access to the medication& confidence in ability to use it, DO NOT assure appropriate use [4]. The study found that 65% of the subjects lacked knowledge on the proper use of SL GTN, plus a significant 32% used the drug for other symptoms. In another study done by Gallagher et al. (2010) involved a total of 89 cardiac patients in Australia, only 43% claimed that they have received related instruction before [5]. In the same study, they found that although majority knew the importance of the medication, only 46% have the tablets with them at all time.

In one local study done by Nor Halisa et al. (2008), among outpatients in a minor specialist hospital in Terengganu, Malaysia, the researchers found that although 85% of the studied population claimed that they had received GTN counseling before, only 10% knew how to store and use the tablets correctly [6]. Another local study done by Saeidah et al. (2011) in a minor specialist hospital in Perak, Malaysia, reported that 62% of the respondents, reported low-level of knowledge on the GTN therapy [7].

Therefore, the aim of this study was to assess the knowledge and use of sublingual GTN tablets in cardiac patients. Our specific objectives were; (1) to assess patients' knowledge of sublingual GTN, (2) to assess patients' use of sublingual GTN, and (3) to determine factors associated to the level of knowledge and use.

## II. METHODS

### A. Study Design, Sampling, Sample Size

This was a cross-sectional study using a validated researcher-administered questionnaire. All cardiac patients receiving SL GTN from in-patient and out-patient pharmacy, from April to May 2010 were included in this study. Patients who did not understand Malay or English, as well as those who did not give written consent were excluded in this study.

Based on the number of patients received sublingual GTN in the previous two months of 120 patients, the minimum effective sample size calculated was 92. However, a total of 100 patients were conveniently approached but only 96 patients consented to participate.

### B. Questionnaire Development

As for data collection tool, we used a validated questionnaire, which was translated into Malay Language, and content validity was done by 2 clinical pharmacists. Reliability tested with Cronbach's alpha value of 0.75.

Knowledge was assessed using 8 questions, adapted from previous study [8]. There were eight items in the questionnaire used to calculate individual knowledge score. If respondents answered each question correctly, they received a score of 1 for each question, and a score of zero (0) if they answered wrongly or they answered “do not know”. The possible range of scores in relation to the respondents’ knowledge ranged from 0 to 8. An arbitrary scoring system was used to categorized total scores into 3 categories that were; poor knowledge for scores 0-3; moderate knowledge for scores 4-6; and high knowledge for scores 7-8.

Use of GTN was assessed using 6 questions, adapted from Pharmacy Pack Audit Form, which is available on the Royal Pharmaceutical Society of Great Britain website. Permission to use the form was obtained from the Administrator of the society. Total scores of 0-4 considered as “poor” adherence and 5-6 considered “good” adherence to “the patient education guidelines on sublingual GTN therapy”

#### C. Ethical Consideration

This study is approved by the Medical Research Ethics Committee. The data collection procedure was adhered to the Good Clinical Practice Guidelines. An informed consent form was handed to the subjects before proceed with the survey questionnaire. Permissions to use the questionnaire were obtained from the original authors.

#### D. Data Collection Procedures

Patients were identified from the prescriptions with sublingual GTN. Then, they were conveniently approached and handed an informed consent form. After that, the researchers interviewed the patients and completed a guided questionnaire. Data were collected for 8 consecutive weeks in April and May 2010.

#### E. Data Analysis

Data was analysed using IBM SPSS Statistics 18 and Microsoft Excel® (Version 2007). Participant characteristics were summarized using means and standard deviations or counts and percentages as appropriate. Categorical variables were analyzed by cross tabulation methods and presented as percentages with 95% CI using the Chi-square test or the Fisher’s Exact Test. A P-value of <0.05 was considered to be statistically significant.

### III. RESULTS

A total of hundred patients from the medical and surgical ward were approached and ninety six patients met the inclusion criteria, which gives a response rate of 96%. More than 2/3 of the respondents were male, between the age of 50-69, had been prescribed GTN tablets for more than 3 months, and had used the tablet at least once per month (Table I).

Among the patients 41% (39/96) were having poor to moderate knowledge scores, followed by 37% (36/96) having poor knowledge score and 22% (21/96) having high knowledge score. In regards to patients’ knowledge, many did not know how the drug works, stability of the drug, use of the

tablet as prophylaxis as well as the potential adverse effects of the drug (Table II).

TABLE I  
RESPONDENTS’ CHARACTERISTICS

Characteristics (n = 96)	n	%
Gender		
Male	59	61.5
Female	37	38.5
Age (year), mean 59.9 ± 10.3		
30 – 49	15	15.6
50 – 69	65	67.7
70 – 89	16	16.7
Race		
Malay	55	57.3
Chinese	19	19.8
Indian	22	22.9
Education		
Primary	43	44.8
Secondary	34	35.4
Tertiary	19	19.8
Duration on therapy		
<3 month	33	34.4
≥3 months	63	65.6
Frequency of use		
< 1 x per month	37	38.5
≥1 x per month	59	61.5

TABLE II  
PATIENTS’ KNOWLEDGE OF SUBLINGUAL GTN

	Frequency( % )			
	Correct		Wrong	
Indication for SL GTN	93	(97 %)	3	(3 %)
Mechanism of action of SL GTN	23	(24 %)	73	(76 %)
Proper storage of SL GTN	64	(67 %)	32	(33 %)
Max. no. of tablet per episode	61	(64 %)	35	(36 %)
Time sequencing of SL GTN	57	(60 %)	39	(40 %)
Stability of SL GTN	42	(44 %)	54	(56 %)
Use of SL GTN as prevention	11	(12 %)	85	(88 %)
Potential adverse effects	27	(28 %)	69	(72 %)

In our study, we found that more than 50% of the patients were having poor adherence to the therapy (Fig.1). In this study, majority of patients (80.2%) bring along their sublingual GTN all the times. We also noted that more than 1/3 carried the tablets in an inappropriate manner, which did not protect the tablets from heat and light. Although most patients (66.7%) stored the sublingual GTN in the original container or an amber glass bottle, some (4.2%) stored it in a plastic container while 29.2 percent stored in a PVC envelope supplied by the pharmacy. Apart from getting a prescription or refill of their medication only 52.1% of the patients know when they should seek doctor’s consultation.

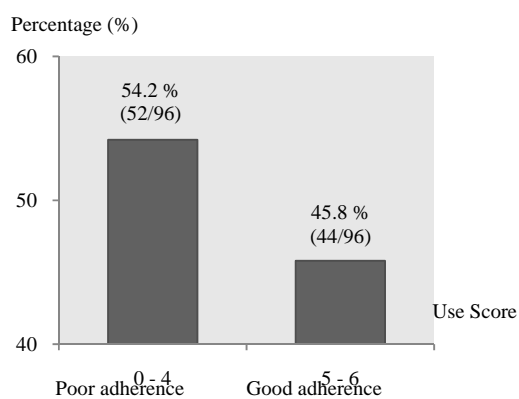


Fig. 1 Total use score

#### IV. DISCUSSION

##### A. Knowledge of Sublingual GTN

The mean score of the knowledge on sublingual GTN was  $5.04 \pm 1.7$ , suggesting that patients had moderate knowledge of the therapy. Our findings were consistent with results from other studies [4], [6], [7].

It is recommended to replace sublingual GTN tablets every 8 weeks after sublingual GTN container has been opened in order to maintain drug potency [3]. However, very few of the patients claimed that they checked the expiry date of the medicine regularly. Therefore, sublingual GTN that they been using might already reduce in their potency.

In regard to patients' knowledge on the mechanism of action of the GTN, more than 2/3 of the respondents did not know how the drug works. We believed, further education on how a drug works in the body will improve patients' understanding, subsequently improve adherence. This is also one of the strategies suggested by the American Society of Consultant Pharmacists to enhance medication adherence [9].

Another concern is that a high majority of patients reported lack of information on the use of the tablet to prevent activity-related angina. As a result, respondents were incapable of self-management of their angina, and they may have avoided activities that they knew would precipitate their angina, such as sports and exercises that may keep them fit and healthy. Thus, the patient's quality of life and symptom control might have affected. We found that one of the reasons contributed to this problem was that the standard GTN label provided by the pharmacy, does not mention about its use to prevent angina. Therefore, appropriate patient education of sublingual GTN use for prevention as well as the use of a clear, comprehensive drug label, should be crucial strategies in improving this area.

##### B. Use of Sublingual GTN

Consistent with other studies, this study found that approximately 80% of patients kept their sublingual GTN with them at all time [10]. In our study we found that men were more likely to carry their sublingual GTN in a manner that was not protected the tablets from body heat, where 49% of male respondents reported that they carry the sublingual GTN

bottle/envelope inside their clothes pockets. This gender difference was significant, with Pearson Chi-squared test  $p$ -value = 0.007.

A significant no. of patients (35%) carried their sublingual GTN tablets in an inappropriate container such as plastic bottle, pill box or plastic envelope. A study done by Marty et al. (1983) reported a rapid loss of sublingual GTN from tablets stored in plastic container. Therefore, the use of plastic container or envelope to carry GTN tablets should be strongly discouraged. Patient education strategy should focus on strategies for patients especially men to appropriately carry and transport their medications.

Apart from regular follow-up, or having their prescription refilled, only 52.1% of the respondents reported correct attitude on when to seek medical consultation. This attitude may lead to delay of appropriate treatment modification and thus will worsen the symptoms control. Based on our references, patient should seek for medical consultation if: (1) the sublingual GTN usage had increased recently, (2) the frequency or severity of angina was increased and (3) if angina occurred with slight exercise or occurred at rest.

#### V. CONCLUSION

These results show that patients need to know more about the self-administration of sublingual GTN. The findings of this study support the need for more frequent reinforcement of patient education, especially in the areas of preventive use of sublingual GTN, side effect management, storage, and stability of the tablets. We therefore recommend that greater care should be taken in dispensing glyceryl trinitrate tablets to ensure that the containers conform to the manufacturer's recommendations.

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