MJIT 2023 Malaysian Journal of Industrial Technology

LEAN INITIATIVE TOWARDS IMPROVING WAITING TIME AT AMBULATORY PHARMACY HOSPITAL SULTAN ABDUL HALIM (HSAH)

Atisha Abdul Hanif[1,a], Siti Khadijah Che Ani[2,b], Norfarahana Khozi[3], Nur Fatin Munawwarah Mohtar[4]

[1,2,3,4] Pharmacy Department of Hospital Sultan Abdul Halim, 08000 Sungai Petani, Kedah, Malaysia.

[a]atishahanif@moh.gov.my, [b]sitikhadijahcheni@moh.gov.my

*Corresponding author's email: atishahanif@moh.gov.my

ARTICLE INFO

ABSTRACT

Introduction: One of the elements influencing patients' satisfaction and impression of service quality is their waiting time. The MoH HPIA criterion, which states that 95% of prescriptions (Rx) received must be filled within 30 minutes, has never been met by HSAH's ambulatory pharmacy.

Problem statement: The average performance from January to June 2022 was only 72.31%. Serving the high workload of mixed prescriptions during office hours with limited workstations equipped with IT infrastructure, especially during peak hours causes delays in prescription preparing processes hence long patient waiting time. HSAH Ambulatory Pharmacy serves two types of prescriptions which are new prescriptions i.e., for patients who come for clinic appointments or emergency cases and refill prescriptions i.e., for patients with long-term prescriptions who come to obtain medicine supplies monthly without any clinic appointment.

To enhance HPIA performance, the LEAN initiative was started in August 2022. The medication preparation processes for 4 categories of prescriptions from patient registration till the prescription is delivered were identified and examined using Value Stream Mapping (VSM) tools and touchpoint data obtained in December 2021. The lean metrics for each process were computed. In addition, 19 value-added and 29 non-value-added (waste) activities have been identified.

Results & Discussion: A total of 22 including five high-effort kaizen bursts, determined by an effort impact diagram were conducted to address the key contributing components identified by fishbone diagrams—man, method and machine related to the wastes. The implementations were focused on human resource empowerment, process restructuring and equipment enhancement. These kaizens were implemented internally and across departments from August through December 2022, with the support of the hospital's top management. The HPIA standard showed an increased trend after lean implementation from 65.19% in January 2023 to 80.80% in June 2023.

Conclusion: Even though the ambulatory pharmacy's lean initiative had helped to raise the HPIA, it was still far from the specified standard.

1.0   Introduction

One of the elements influencing patients' satisfaction and impression of service quality is the patient waiting time.[1] The Ministry of Health (MOH) has set a quality indicator to be met i.e. Hospital Performance Indicators for Accountability (HPIA) or Key Performance Indicators (KPI) of percentage of prescriptions dispensed within 30 minutes ≥ 95% of the total number of prescriptions received during office hours. However HSAH Ambulatory Pharmacy has never met this standard and shows a decreasing trend every year. The average performance from January to June 2022 was only 72.31%.

Serving the high workload of mixed prescriptions during office hours with limited work stations equipped with IT infrastructure and especially during the peak hours causes delay in prescription preparation processes and hence long patient waiting time[2,3,4].

This Lean improvement project centred around the issue of long waiting time due to large number of prescriptions received during office hours at Ambulatory Pharmacy, HSAH to improve HPIA performance and increase patients satisfaction towards service provided.

There were two types of prescriptions served at HSAH Ambulatory Pharmacy which are new prescriptions i.e. for patients who come for clinic appointments or emergency cases and refill prescriptions i.e. for patients with long term prescriptions who come to obtain medicine supplies on a monthly basis without any clinic appointment. Additionally, there were ten different sorts of work processes that went into getting the medication ready for prescription dispensing.

To enhance HPIA performance, Lean initiative was started in August 2022[5,10]. The medication preparation processes for 4 categories of prescriptions from patient registration till the prescription is delivered were identified and examined using Value Stream Mapping (VSM) tools and touch point data obtained in December 2021[2,6]. These categories were new prescriptions (without intervention), new prescriptions with intervention, refill prescriptions received at the pharmacy counter and refill prescriptions using Value Added Services (VAS) offered by pharmacy. The first three categories of prescriptions required patients to register at the pharmacy counter, receive token numbers, and wait while the medications were prepared. Due to pre-ordering and availability on the day of the scheduled visit, only VAS prescription refills did not require patients to wait for the preparation of their medications. [1,7,8,9].

2.0   Research Methodology

Pre Lean Value Stream Mapping (VSM)

Pre-lean metrics for each process were calculated and analyzed using e-VSM utilizing retrospective data acquired in July 2022[11]. The greatest inventory value (I) of 56 is for New Rx (without intervention), followed by Refill Rx at the counter (40), Refill Rx utilizing VAS (24), and New Rx with intervention (5). Lead Time (LT) of new prescriptions (without intervention) is maximum of 185.9 minutes, then new Rx with intervention is 148.3 minutes, and refill Rx at the counter is 132.7 minutes. These times represent the amount of time patients waited at the counter while their medications were being prepared and dispensed. On the other hand, the LT of refill Rx utilizing VAS represents the time required for the prescriptions to be prepared, packaged and ready for patients to collect on their appointment day.

The man power (MP), process time (PT), first time quality (FTQ) as well as non value added (waste), value added and value enabler activities at each work station where the processes took place were also calculated. In addition the wait time (WT) between each workstation were also determined. (**Figure 1**)
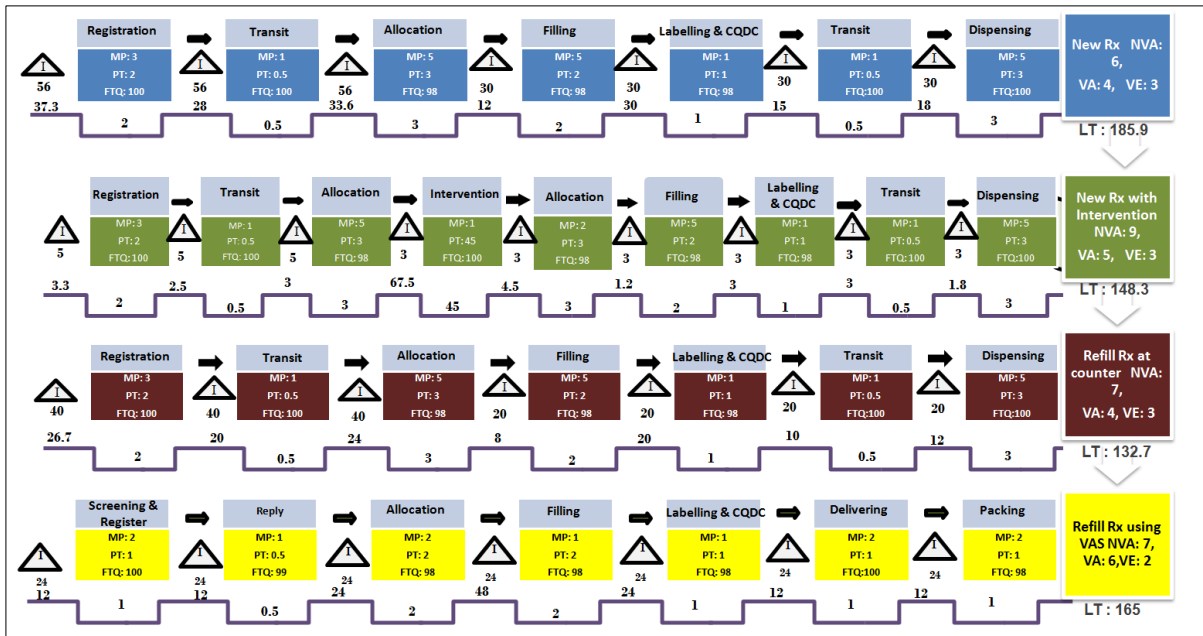

Figure 1 : Pre Lean VSM

Table 1 Pre Lean Non Value Added (Waste), Value Added and Value Enabler activities identified

Rx CATEGORIES	NUMBER OF ACTIVITIES INVOLVED AT WORKSTATIONS		
	Non Value Added (NVA)/ Waste	Value Added	Value Enabler
New Rx (without intervention)	6	4	3
New Rx with intervention	9	5	3
Refill Rx received at counter	7	4	3
Refill Rx using VAS	7	6	2
TOTAL	29	19	11

Referring to Table 1, at workstations, pre-lean analysis revealed a total of 19 value-added, 11 value enabler and 29 non-value added (waste) activities. All workstations, with the exception of labeling & CQDC and registration, had waiting waste. All workstations, with the exception of transit, had movement waste.

A root cause analysis were carried out using Fishbone Diagram - man, method and machine to address the key contributing components as shown in Figure 2.
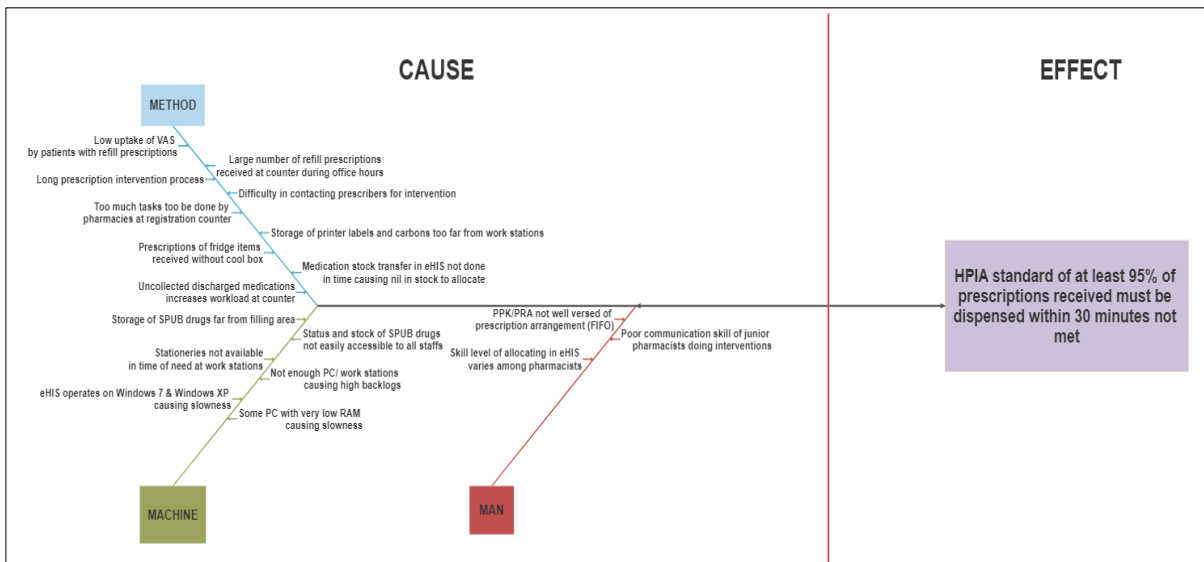
Figure 2 Root Cause Analysis using Fishbone Diagram

A total of 22, including five high effort kaizen bursts were carried out to counter the root causes determined. The implementations focused on human resource empowerment, process restructuring and equipment enhancement involving 7, 6 and 9 kaizen bursts respectively.

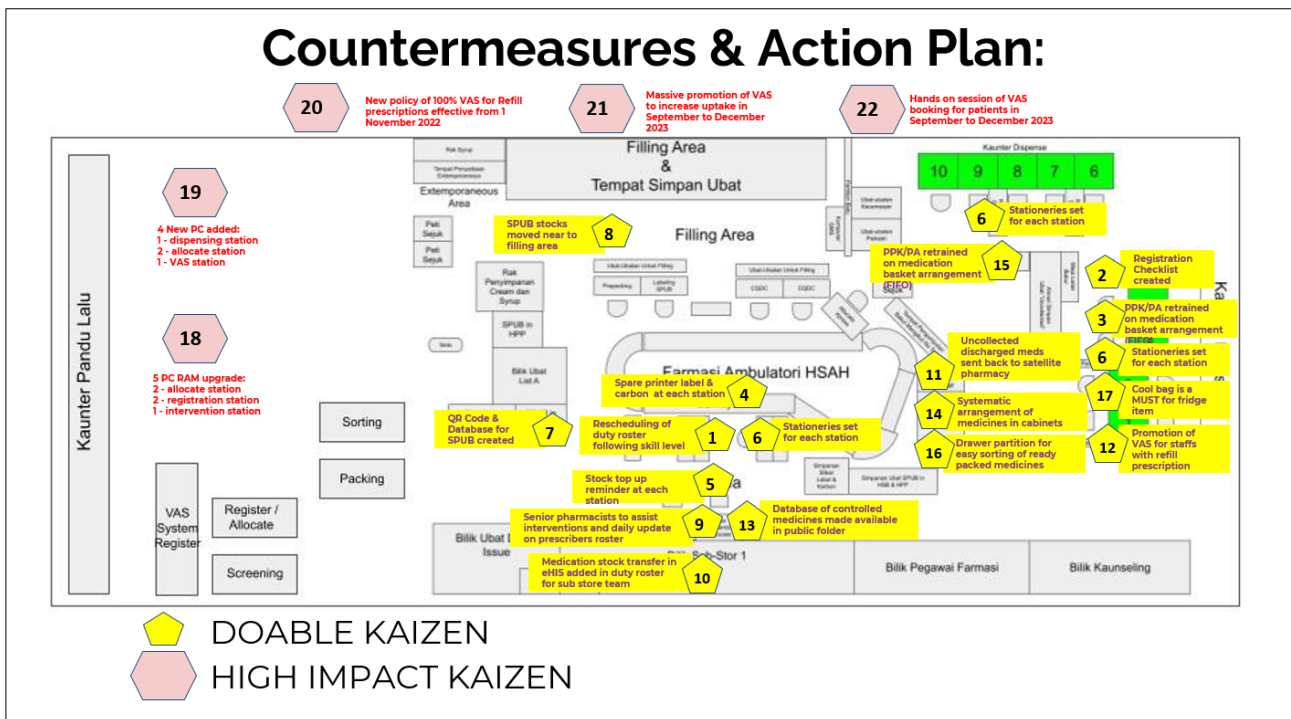These kaizens were implemented internally and across departments from August through December 2022, with the support of the hospital's top management (Figure 3)

Figure 3 Kaizen bursts implemented

3.0   Results and Discussion

A marked difference of VSM was observed after 6 months implementation of Lean iniatiative in Ambulatory Pharmacy HSAH. The Kaizen bursts had helped in balancing the workload between amount of Rx received at the counter and refill Rx using VAS. Referring to Figure 4, I of Refill Rx at counter has significantly decreased from 40 to 9 and I of Refill Rx using VAS has increased from 24 to 53.

PT of intervention workstation has significantly decreased from 45 minutes to 10 minutes following the targeted kaizen burst implemented hence the decrease of LT of New Rx with intervention.

LT for New Rx (without intervention), New Rx with intervention as well as Refill Rx has also decreased to 164.8 minutes, 74.3 minutes and 40.4 minutes respectively.
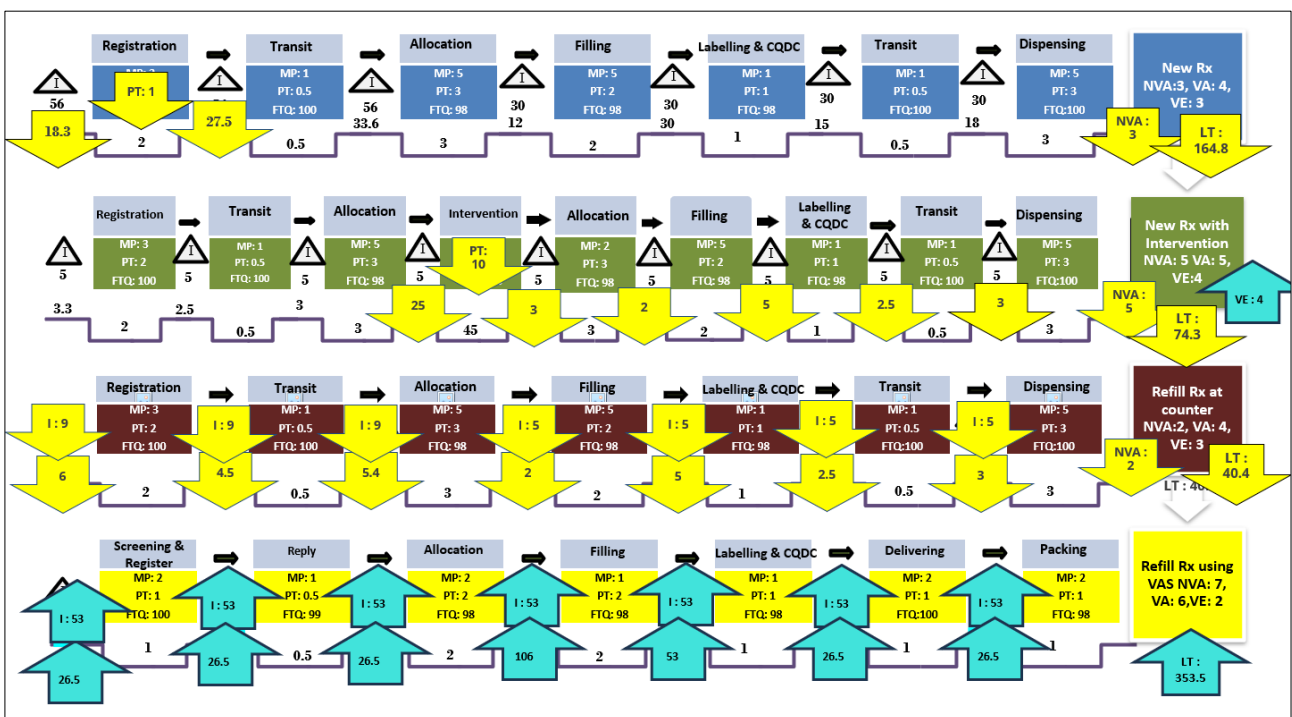

Figure 4 Post Lean VSM

The kaizen bursts also dealt with waste. Referring to Table 2, the total number of wastes had decreased from 29 to 17. Waiting wastes, which were mostly connected to backlogs brought on by lack of workstations with IT infrastructure, were the main wastes that were not eliminated.

As an effect confirmation HPIA has increased from 57.12% (August 2022) to 72.26% (December 2022) as a result of the reduction in LT for all processes after four months of applying LEAN. Table 3 shows the performance of HPIA is sustainable during January to June 2023.

Table 2 Post Lean Non Value Added (Waste), Value Added and Value Enabler activities identified

Rx CATEGORIES	NUMBER OF ACTIVITIES INVOLVED AT WORKSTATIONS		
	Non Value Added (NVA)/ Waste	Value Added	Value Enabler
New Rx (without intervention)	*3*	4	3
New Rx with intervention	*5*	5	*4*
Refill Rx received at counter	*2*	4	3
Refill Rx using VAS	7	6	2
TOTAL	*17*	19	*11*

Table 3 HPIA Performance in 2023 during Lean Iniatitive
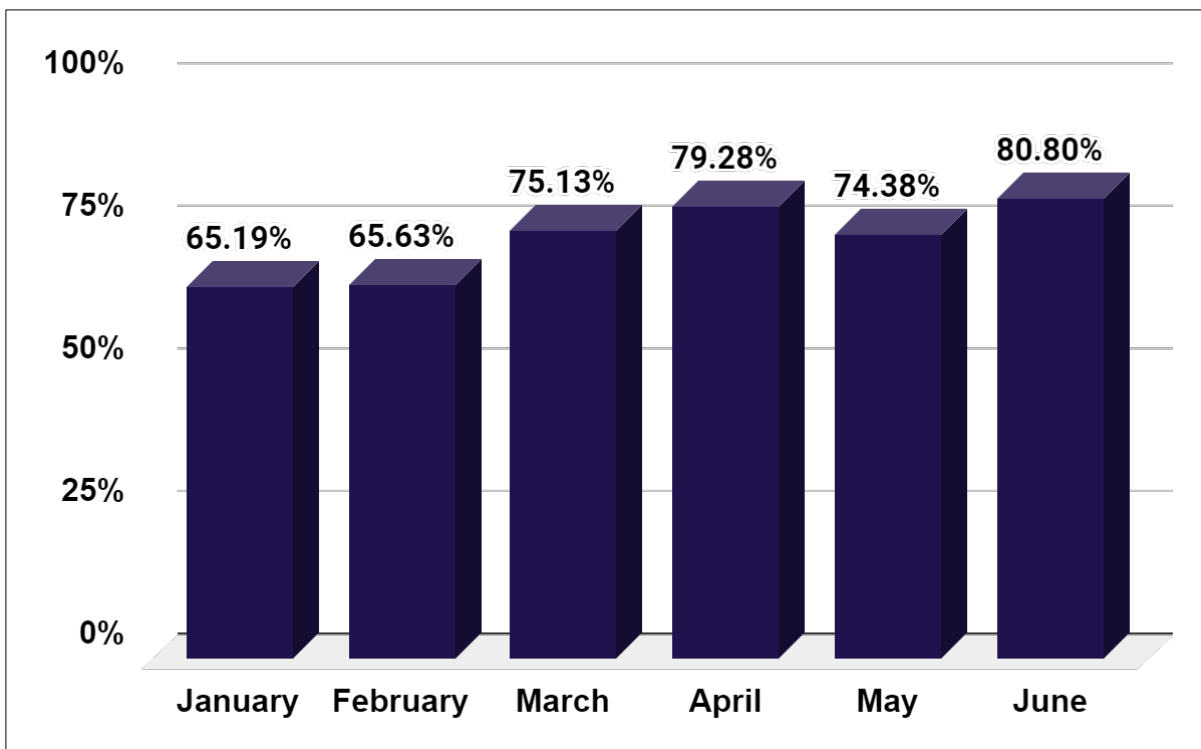
4.0 Conclusion

Even though the lean initiative had helped to raise the HPIA, it was still far from the specified standard. Wastes of waiting which are related to lack of workstations with IT infrastructure needs to be looked into further.

To eliminate waste, value analysis should be regularly evaluated. Some kaizen bursts were developed as new standard operating procedures and policies. The most significant kaizen burst was the new policy to deliver all refill prescriptions via VAS. By spreading lean awareness, the beneficial effects of the LEAN effort will be shared with others.

5.0   Acknowledgement

6.0   References

[1]   Dyani Kusumowardhani, Yaslis Ilyas. Waiting Time Of Pharmacy Service As An Indicator Of Patient Satisfaction: A Systematic Review

[2]   Koh Jing Hui[1], Atisha Abdul Hanif[1] Noor Farahin Haniza[1] Siti Khadijah Che Ani[1] Clinical Audit of time taken for prescription handling in a full IT based ambulatory pharmacy at district Major Hospital

[3]   Woan Shin Tan, Siang Li Chua, Keng Woh Yong, Tuck Seng Wu. Impact of Pharmacy Automation on Patient Waiting Time: An Application of Computer Simulation

[4]   Ndukwe Henry C.[1*], Fola Tayo[2] and Sariem Nanbam C. Factors Influencing Waiting Time In Outpatient Pharmacy Of Lagos University Teaching Hospital

[5]   Ahmad Nur Aizat Ahmad[1*], Md Fauzi Ahmad[1], Norhadilah Abdul Hamid[1], Nor Aziati Abdul Hamid[1], Lee Tee Chuan[1], Gusman Nawani[r2], Adnan Bakri[3], Mustaqqim Abdul Rahim[4]. Implementation of Lean Technique towards Reducing Waiting Time in a Public Healthcare using Arena Simulation

[6]   Andrew D. Racine, MD, PhD; A. Gregory Davidson, MBA. Use of a Time-Flow Study to Improve Patient Waiting Times at an Inner-city Academic Pediatric Practice

[7]   Garis Panduan Perkhidmatan Tambah Nilai Edisi 1:2016 https://www.pharmacy.gov.my/v2/sites/default/files/document-upload/gp-peny eragaman-perkhidmatan-tambah-nilai-nov2016.pdf

[8]   Lau BT, Nurul-Nadiah-Auni AR, Ng SY, Wong SN (2018). Satisfaction of patients receiving value added-services compared to traditional counter service for prescription refills in Malaysia. Pharmac y Practice, 16(1). https://doi- .org/10.18549/PharmPract.2018.01.- 1075

[9]   Loh BC, Wah KF, Teo CA, Khairuddin NM, Fairuz FB, Liew JE (2017). Impact of value added services on patient waiting time at the ambulatory pharmacy Queen Elizabeth Hospital. Pharmacy Practice, 15(1). https://doi.org/10.18549/Pharm- Pract.2017.01.846

[10]   NEJM Catalyst April 27, 2018. Brief Article - What Is Lean Healthcare?

[11]   Illiana Syahmun MR[1], Azrul Izzani Y[1], Nurul Ibnu K[1], Siti Salwa Y[1], Mohd Fahmi MKJ[1], Tan YH[1], Rafeeqa R[2], Goh HK[3]. E-VSM Make Easy