

**THE DEVELOPMENT OF A NON-
COMMUNICABLE DISEASE PREVENTION
TRAINING PROGRAM USING YOUTUBE AND
ITS EFFECT ON COMMUNITY HEALTH
VOLUNTEER'S SELF-EFFICACY**

ALIFF RIDZWAN BIN HAMIDUN

UNIVERSITI SAINS MALAYSIA

2022

**THE DEVELOPMENT OF A NON-
COMMUNICABLE DISEASE PREVENTION
TRAINING PROGRAM USING YOUTUBE AND
ITS EFFECT ON COMMUNITY HEALTH
VOLUNTEER'S SELF-EFFICACY**

by

ALIFF RIDZWAN BIN HAMIDUN

Thesis submitted in fulfilment of the requirements

for the degree of

Doctor of Public Health

August 2022

ACKNOWLEDGEMENT

Alhamdulillah, thanks to the divine blessings, I have completed the thesis writing for the Doctor of Public Health dissertation research project. The project faced various challenges, especially from the COVID-19 pandemic, making it challenging to collect data from health volunteers. Projects and writing will not be successful without help from many parties.

First, I would like to express my gratitude to my two supervisors, Prof Madya Dr Nor Azwany Yaacob and Dr Muhd Al-Aarifin Ismail. They never stopped answering my questions and provided guidance in carrying out this research and writing project. Their help was regardless of time. Indeed, only Allah can reward the services of these two supervisors of mine

I would also like to thank Dr Anees Abdul Hamid from the JKNK Primary Unit for helping me provide input into my research as well as helping to connect me with experts, health workers and community volunteers in the field. I would also like to thank Dr Jusoh Awang Senik, FMS from KKB Pasir Mas, for helping me recruit health volunteers in Pasir Mas. Dr Anees and Dr Jusoh are important individuals in COVID-19 pandemic management but are still willing to devote their time to my research project. Thank you, Dr Anees and Dr Jusoh.

I would also like to express my appreciation to the following individuals for their vast contributions in this research project. There are:

- Sister Rusmaini binti Rasid, Ketua Jururawat KK Penambang
- Encik Zainuddin Zakaria, Sukarelawan Kesihatan KK Penambang
- Puan Wan Noriza binti Wan Hassan, Sukarelawan Kesihatan KK Penambang
- Encik Enchek Mohd Zakri bin Che Omar, Sukarelawan Kesihatan KK Penambang

- Dr Ahmad Faris Awang, MOH PKD Tanah Merah
- PPKP Nazarudin bin Isa, Unit NCD PKD Tanah Merah
- Dr Hajah Faizan binti Ghazali, MOH PKD Tumpat
- PPKP Aziz bin Che Ali, NCD Unit PKD Tumpat
- PPKP Siti Rashidah binti Abdul Rashid, KOSPEN Unit PKD Tumpat
- Dr Najihah Mahfuzah binti Zakria, MOH PKD Pasir Mas
- Dr Rodziah binti Ali, FMS KKB Pasir Mas
- Dr Muhamad Farid bin Mohd Shahar, MO *Klinik Berhenti Merokok* KKB Pasir Mas
- Puan Siti Fatimah binti Abu Bakar, Psychological Officer JKNK
- Puan Junaidah binti Mustapha, PSP KKB Pasir Mas
- Cik Siti Farhanah Hanim binti Adzhar PSP KK Meranti
- Raja Noor Azlina Bt Raja Omar, Physiotherapist KK Meranti
- Norhanafazliza bt Adnan, Physiotherapist KKB Pasir Mas
- Tuan Muhamad Faris Bin Tuan Roslli, Physiotherapist KK Tendong

Finally, thank you to my wife, Eidlina Ahmad. She is the most important person in my life. She is the person who has always been supportive and has been the backbone to me throughout this project. Without the presence of my wife, of course, this project could not have run smoothly.

Thank you all.

جَزَاكَ اللهُ خَيْرًا

“May the Almighty recompense you with goodness.”

TABLE OF CONTENT

Contents

ACKNOWLEDGEMENT	ii
TABLE OF CONTENT	iv
LIST OF TABLES	viii
LIST OF FIGURES	xii
LIST OF SYMBOLS	xviii
LIST OF ABBREVIATIONS	xix
LIST OF APPENDICES	xx
ABSTRAK	xxi
ABSTRACT	xxiii
CHAPTER 1 : INTRODUCTION	1
Problem Statement and Study Rationale	4
Research Questions	4
Objectives.....	5
1.1 General Objective.....	5
1.2 Specific Objectives.....	5
Research Hypotheses	6
CHAPTER 2 : LITERATURE REVIEW	7
The Burden of Non-Communicable Disease	7

Importance of Community Health Volunteers in Non-communicable Disease Prevention	8
Training Needs for Community Health Volunteer.....	9
Training Approach and Content for Non-communicable Disease Prevention.....	10
Training Needs Assessment	13
CHV’s Training Evaluation	17
Measuring Self-efficacy	18
Self-efficacy and Empowerment.....	20
Self-efficacy in Non-communicable Disease Prevention	22
Digital Health in NCD Prevention	25
2.1 Satisfaction with Digital Health Intervention	27
The benefit of Video-Based Training and Video Engagement.....	28
Conceptual Framework	31
CHAPTER 3 : METHODS	32
Research Design.....	32
Part 1: Research Tools and Module Development.....	32
3.1 Self-Efficacy and Task Importance Rating Scale	32
3.2 Module Satisfaction Rating Scale	41
3.3 Participant’s activity sheet	46
3.4 Training Needs Survey.....	46
3.5 Development of YouTube-based Training Program.....	54

3.6 Study Flow Chart	60
Part 2: Interventional Study	60
3.1 Study design	60
3.2 Intervention duration	61
3.3 Source population	61
3.4 Study population	61
3.5 Sampling frame	61
3.6 Subject criteria	61
3.7 Sample size estimation	62
3.8 Sampling method and Subject recruitment	63
3.9 Research tools	63
3.10 Operational definition	63
3.11 The Intervention	64
3.12 Data collection method	64
3.13 Statistical analysis	64
3.14 Study Flow Chart	69
CHAPTER 4 : RESULTS	70
Part 1: Training Needs Survey and Module Development	70
4.1 Training Needs Survey	70
4.2 YouTube-based Training Program Video Validation	75
Part 2: Intervention	79

4.1 Intention to Treat Analysis.....	84
4.2 Per-Protocol Analysis	126
4.3 Module Satisfaction	172
CHAPTER 5 : DISCUSSION.....	178
5.1 Characteristic of CHVs	178
5.2 CHVs Self-Efficacy and Task importance score	178
5.3 Training Needs of CHVs.....	179
5.4 Video Validation	181
5.5 The Effect of the YouTube-based Training Program on the Self-Efficacy and Task Importance Score and the CHV’s Satisfaction.....	182
5.6 Strength of the study	187
5.7 Limitation of the study	187
CHAPTER 6 : CONCLUSION AND FUTURE RECOMMENDATION	190
REFERENCES.....	191
APPENDICES	205

LIST OF TABLES

Table 3.1: CHV's task in NCD Prevention Education.....	34
Table 3.2: Characteristics of senior CHVs (n=6).....	36
Table 3.3: Characteristic of Respondent (n=10)	38
Table 3.4: The Face Validation Index of Self-efficacy and Task Importance Rating Scale	41
Table 3.5: The Content Validity Index of Module Satisfaction Rating Scale	44
Table 3.6: The Face Validation Index of Module Satisfaction Rating Scale.....	46
Table 3.7: Comparison of Task Priority between Different Cut-off Points.....	52
Table 3.8: Preliminary module content of YouTube-based Training Program	55
Table 3.9: Module and The Content Experts	57
Table 3.10: The YouTube-based Training NCD Prevention Education Module.....	58
Table 4.1: Characteristics of the CHVs in the Training Needs Survey (n=78)	71
Table 4.2: The mean self-efficacy and task importance score in NCD prevention education among CHVs (n=78).	73
Table 4.3: Summary of Non-communicable Disease Prevention Education Training Needs.....	75
Table 4.4: Characteristics of CHVs for Video Validation (n=27)	76
Table 4.5: Percentage of CHVs agreed the video's objective achieved	77
Table 4.6: Characteristics of CHVs in the Interventional Study (n=45).....	81
Table 4.7: Comparison of CHVs Characteristics between Non-Drop Out and Drop Out (n=45).....	83

Table 4.8: Summary of RM MANOVA Multivariate Test for the Effects of the Intervention, CHV's Experience and Education on the CHV's Self-Efficacy and Task importance score (n=35)	85
Table 4.9: Summary of RM MANOVA Univariate Test for the Effects of the Intervention, CHV's Experience and Education on the CHV's Self-Efficacy and Task importance score (n=35)	88
Table 4.10: Summary of pairwise comparison on the effect of CHV's experience and education on the CHV's Self-Efficacy and Task importance score (n=35)	94
Table 4.11: Comparison between CHV with three experience and less with more than three years experience (n=35)	117
Table 4.12: Summary of Multivariate Test of RM MANOVA for the Effects of Intervention and CHV's education on the CHV's Task (Self-Efficacy and Importance) among the CHV with Three Years' Experience and Below (n=20)	119
Table 4.13: Summary of Univariate Test of RM MANOVA for the Effects of Intervention and CHV's education on the CHV's Task (Self-Efficacy and Importance) among the CHVs with Three Years' Experience and Below (n=20).....	121
Table 4.14: Summary of Pairwise Comparison on the Effect of Intervention and CHVs education on the CHV's tasks (Self-Efficacy and Importance) among the CHVs with Three Years' Experience and Below (n=20).....	123
Table 4.15: Summary of Multivariate Test of RM MANOVA for the Effects of Intervention on the CHV's Task (Self-Efficacy and Importance) among the CHVs with More than Three Years' Experience (n=15)	125
Table 4.16: Comparison between Participants that Completed and did not Complete the Module	127

Table 4.17: Summary of Multivariate Test of RM MANOVA for effects of Intervention, CHV's experience and Education on the CHV's Task (Self-Efficacy and Importance) (Per-Protocol Analysis) (n=27)	129
Table 4.18: Summary of Univariate Test of RM MANOVA for effects of Intervention, CHV's experience and Education on the CHV's Task (Self-Efficacy and Importance) (Per-Protocol Analysis) (n=27)	132
Table 4.19: Summary of Pairwise Comparison for CHV's experience on the CHV's Tasks (Self-Efficacy and Importance) (Per-Protocol Analysis) (n=27).....	138
Table 4.20: Comparison between CHV with three experience and less with more than three years of experience (Per-Protocol Analysis) (n=27).....	159
Table 4.21: Summary of Multivariate Test of RM MANOVA for the Effects of Intervention and CHV's education on the CHV's Task (Self-Efficacy and Importance) among the CHV with Three Years' Experience and Below (Per-Protocol Analysis) (n=17).....	161
Table 4.22: Summary of Univariate Test of RM MANOVA for the Effects of Intervention and CHV's education on the CHV's Task (Self-Efficacy and Importance) among the CHV with Three Years' Experience and Below (Per-Protocol Analysis) (n=17).....	163
Table 4.23: Summary of Pairwise Comparison of the Effect of Intervention on the CHV's tasks (Self-Efficacy and Importance) among the CHVs with Three Years' Experience and below (n=17)	165
Table 4.24: Summary of Multivariate Test of RM MANOVA for the Effects of Intervention on the CHV's Task (Self-Efficacy and Importance) among the CHV with More than Three Years' Experience (Per-Protocol Analysis) (n=10)	168

Table 4.25: Summary of Univariate Test of RM MANOVA for the Effects of Intervention and CHV's education on the CHV's Task (Self-Efficacy and Importance) among the CHV with More than Three Years' Experience (Per-Protocol Analysis) (n=10).....	169
Table 4.26: Summary of Pairwise Comparison of the Effect of Intervention on the CHV's tasks (Self-Efficacy and Importance) among the CHVs with More than Three Years' Experience (n=10)	170
Table 4.27: The Modules' Mean Satisfaction Score (n=35).....	173
Table 4.28: Comparison of Module Satisfaction Score between CHVs with three years of experience and below with CHVs with more than three years of experience (n=35)	174
Table 4.29: Comparison of Module Satisfaction Score between CHVs who did not understand their tasks or were unsure with CHVs who understood their tasks (n=35)	176

LIST OF FIGURES

Figure 2.1: Quadrant Graph Format (Source: Hennessy, D.A. and Hicks, C. M. (2011) Hennessy-Hicks Training Needs Analysis Questionnaire and Manual. Figure 1, page 27. Available at: https://www.who.int/workforcealliance/knowledge/toolkit/19/en/)	16
Figure 2.2: The Relationship between Self-Efficacy and Empowerment.....	22
Figure 2.3: Conceptual Framework of the Study	31
Figure 3.1: Example of Importance-Performance Analysis.....	51
Figure 3.2: Part 1 Study Flow Chart	60
Figure 3.3: Statistical Analysis Flowchart for RM MANOVA	68
Figure 3.4: Part 2 Study Flow Chart	69
Figure 4.1: Importance-Performance Analysis for Non-communicable Disease Prevention Education Training Needs	74
Figure 4.2: Clarity and Practicability of the Video Content and the Appropriateness of the Video Duration (n=27).....	79
Figure 4.3: Interventional Study Flow Chart	80
Figure 4.4: A Line Graph between SE Score and Time by the CHV's Experience for Task 1	102
Figure 4.5: A Line Graph between Task importance score and Time by the CHV's Experience for Task 1	102
Figure 4.6: A Line Graph between SE Score and Time by the CHV's Experience for Task 2.....	103

Figure 4.7: A Line Graph between Task importance score and Time by the CHV's Experience for Task 2	103
Figure 4.8: A Line Graph between SE Score and Time by the CHV's Experience for Task 3.....	104
Figure 4.9: A Line Graph between Task importance score and Time by the CHV's Experience for Task 3	104
Figure 4.10: A Line Graph between SE Score and Time by the CHV's Experience for Task 4.....	105
Figure 4.11: A Line Graph between Task importance score and Time by the CHV's Experience for Task 4	105
Figure 4.12: A Line Graph between SE Score and Time by the CHV's Experience for Task 5.....	106
Figure 4.13: A Line Graph between Task importance score and Time by the CHV's Experience for Task 5	106
Figure 4.14: A Line Graph between SE Score and Time by the CHV's Experience for Task 6.....	107
Figure 4.15: A Line Graph between Task importance score and Time by the CHV's Experience for Task 6	107
Figure 4.16: A Line Graph between SE Score and Time by the CHV's Experience for Task 7.....	108
Figure 4.17: A Line Graph between Task importance score and Time by the CHV's Experience for Task 7	108

Figure 4.18: A Line Graph between SE Score and Time by the CHV’s Experience for Task 8.....	109
Figure 4.19: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 8	109
Figure 4.20: A Line Graph between SE Score and Time by the CHV’s Experience for Task 9.....	110
Figure 4.21: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 9	110
Figure 4.22: A Line Graph between SE Score and Time by the CHV’s Experience for Task 10.....	111
Figure 4.23: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 10	111
Figure 4.24: A Line Graph between SE Score and Time by the CHV’s Experience for Task 11	112
Figure 4.25: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 11	112
Figure 4.26: A Line Graph between SE Score and Time by the CHV’s Experience for Task 12.....	113
Figure 4.27: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 12	113
Figure 4.28: A Line Graph between SE Score and Time by the CHV’s Experience for Task 13.....	114

Figure 4.29: A Line Graph between Task importance score and Time by the CHV's Experience for Task 13	114
Figure 4.30: A Line Graph between SE Score and Time by the CHV's Experience for Task 14.....	115
Figure 4.31: A Line Graph between Task importance score and Time by the CHV's Experience for Task 14	115
Figure 4.32: A Line Graph between SE Score and Time by the CHV's Experience for Task 1 (Per-Protocol Analysis).....	144
Figure 4.33: A Line Graph between Task importance score and Time by the CHV's Experience for Task 1 (Per-Protocol Analysis)	144
Figure 4.34: A Line Graph between SE Score and Time by the CHV's Experience for Task 2 (Per-Protocol Analysis).....	145
Figure 4.35: A Line Graph between Task importance score and Time by the CHV's Experience for Task 2 (Per-Protocol Analysis)	145
Figure 4.36: A Line Graph between SE Score and Time by the CHV's Experience for Task 3 (Per-Protocol Analysis).....	146
Figure 4.37: A Line Graph between Task importance score and Time by the CHV's Experience for Task 3 (Per-Protocol Analysis)	146
Figure 4.38: A Line Graph between SE Score and Time by the CHV's Experience for Task 4 (Per-Protocol Analysis).....	147
Figure 4.39: A Line Graph between Task importance score and Time by the CHV's Experience for Task 4 (Per-Protocol Analysis)	147

Figure 4.40: A Line Graph between SE Score and Time by the CHV’s Experience for Task 5 (Per-Protocol Analysis)	148
Figure 4.41: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 5 (Per-Protocol Analysis)	148
Figure 4.42: A Line Graph between SE Score and Time by the CHV’s Experience for Task 6 (Per-Protocol Analysis)	149
Figure 4.43: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 6 (Per-Protocol Analysis)	149
Figure 4.44: A Line Graph between SE Score and Time by the CHV’s Experience for Task 7 (Per-Protocol Analysis)	150
Figure 4.45: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 7 (Per-Protocol Analysis)	150
Figure 4.46: A Line Graph between SE Score and Time by the CHV’s Experience for Task 8 (Per-Protocol Analysis)	151
Figure 4.47: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 8 (Per-Protocol Analysis)	151
Figure 4.48: A Line Graph between SE Score and Time by the CHV’s Experience for Task 9 (Per-Protocol Analysis)	152
Figure 4.49: A Line Graph between Task importance score and Time by the CHV’s Experience for Task 9 (Per-Protocol Analysis)	152
Figure 4.50: A Line Graph between SE Score and Time by the CHV’s Experience for Task 10 (Per-Protocol Analysis)	153

Figure 4.51: A Line Graph between Task importance score and Time by the CHV's Experience for Task 10 (Per-Protocol Analysis)	153
Figure 4.52: A Line Graph between SE Score and Time by the CHV's Experience for Task 11 (Per-Protocol Analysis)	154
Figure 4.53: A Line Graph between Task importance score and Time by the CHV's Experience for Task 11 (Per-Protocol Analysis)	154
Figure 4.54: A Line Graph between SE Score and Time by the CHV's Experience for Task 12 (Per-Protocol Analysis)	155
Figure 4.55: A Line Graph between Task importance score and Time by the CHV's Experience for Task 12 (Per-Protocol Analysis)	155
Figure 4.56: A Line Graph between SE Score and Time by the CHV's Experience for Task 13 (Per-Protocol Analysis)	156
Figure 4.57: A Line Graph between Task importance score and Time by the CHV's Experience for Task 13 (Per-Protocol Analysis)	156
Figure 4.58: A Line Graph between SE Score and Time by the CHV's Experience for Task 14 (Per-Protocol Analysis)	157
Figure 4.59: A Line Graph between Task importance score and Time by the CHV's Experience for Task 14 (Per-Protocol Analysis)	157

LIST OF SYMBOLS

>	More than
α	Alpha
β	Beta
σ	Standard deviation
Z	Z-score
Δ	Precision
x	Multiplication
%	Percentage
n	Number of samples
r	Rho
η^2	Partial eta squared

LIST OF ABBREVIATIONS

CHV	Community Health Volunteer
CVI	Content Validity Index
df	degree of freedom
FVI	Face Validity Index
I	Importance
I-CVI	Item level Face Validity Index
I-FVI	Item level Face Validity Index
IPA	Importance-Performance Analysis
IPH	Institute of Public Health
IQR	Interquartile range
MOH	Ministry of Health
NCD	Non-communicable disease
NGT	Nominal Group Technique
PKDPM	<i>Pejabat Kesehatan Daerah Pasir Mas</i>
PKDT	<i>Pejabat Kesehatan Daerah Tumpat</i>
PKDTM	<i>Pejabat Kesehatan Daerah Tanah Merah</i>
S-CVI	Scale level Content Validity Index
SD	Standard deviation
SE	Self-Efficacy
S-FVI	Scale level Face Validity Index
SS	Sum of Squares
WHO	World Health Organization

LIST OF APPENDICES

- A Content Validation Questionnaire for Self-Efficacy and Importance Rating Scale
- B Face Validation Questionnaire for Self-Efficacy and Importance Rating Scale
- C Self-Efficacy and Importance Rating Scale
- D Content Validation Questionnaire for Module Satisfaction Rating Scale
- E Face Validation Questionnaire for Module Satisfaction Rating Scale
- F Module Satisfaction Rating Scale
- G Participant's activity sheet
- H Participant's Information Sheet and Consent form for Training Needs Survey
- I Proforma for Training Needs Survey
- J WhatsApp Message for the NCD Prevention Program Module with YouTube Link
- K Video Validation Questionnaire
- L Participant's Information Sheet and Consent form for Interventional Study
- M Proforma for Interventional Study
- N Ethical Approval from Medical Research and Ethics Committee
- O Ethical Approval from *Jawatakuasa Etika Penyelidikan Manusia USM*
- P Approval from Kelantan State Health Department
- Q List of NCD Prevention Education Video
- R Achievement of the Study

ABSTRAK

Latar belakang: Pendidikan komuniti merupakan salah satu intervensi kesihatan awam yang penting dalam membendung kebimbangan yang semakin meningkat tentang kejadian penyakit tidak berjangkit (NCD) dan komplikasinya. Sukarelawan kesihatan komuniti (CHV) telah diambil untuk mendekati masyarakat dalam menyampaikan maklumat tentang pencegahan NCD. Latihan adalah penting untuk memastikan pendidikan yang berkesan dan cekap oleh CHV. Latihan melalui YouTube ialah pilihan untuk mengatasi kelemahan latihan berasaskan kelas.

Objektif: Untuk membangunkan program latihan berasaskan YouTube dan untuk menentukan kesan program terhadap keberkesanan sendiri dan kepentingan tugas dalam pendidikan pencegahan NCD dalam kalangan CHV di Kelantan.

Kaedah: Skala Penilaian Keberkesanan Kendiri (SE) dan Kepentingan Tugas bagi 14 tugas CHV telah dibangunkan melalui teknik kumpulan nominal (NGT) dan disahkan untuk mengukur SE CHV dan kepentingan tugas. Tinjauan keperluan latihan telah dijalankan menggunakan skala penilaian yang baru dibangunkan (n=78), dan Analisis Kepentingan-Prestasi telah dilakukan untuk mengenal pasti keperluan CHV bagi pembangunan modul latihan. NGT bersama CHV yang berpengalaman dan pakar turut dijalankan. Modul ini dinilai menggunakan kajian intervensi satu lengan sebelum dan selepas dalam kalangan CHV di Pasir Mas. Para peserta diberi masa empat minggu untuk menonton 12 video latihan YouTube. Skala Penilaian SE dan Kepentingan Tugas dikumpul sebelum dan selepas intervensi untuk membandingkan purata markah SE dan markah Kepentingan Tugas sebelum dan selepas intervensi menggunakan RM MANOVA (n=35). Pengalaman CHV dan tahap pendidikan tertinggi juga dimasukkan

ke dalam analisis sebagai pembolehubah bebas. Empat belas model RM MANOVA telah dibangunkan untuk setiap tugas.

Keputusan: Tinjauan Keperluan latihan menunjukkan keperluan untuk menekankan defisit keberkesanan dalam pengesanan awal NCD, petua untuk berhenti merokok dan mitos tentang produk komersial. Kajian intervensi menunjukkan bahawa CHV dengan pengalaman tiga tahun dan ke bawah mempunyai SE yang lebih tinggi (Beza Purata Adj: 3.1, 95%CI: 1.89, 4.22) dan skor Kepentingan tugas (Beza Purata Adj: 3.0, 95%CI: 1.74, 4.23) dengan ketara berbanding CHV yang mempunyai pengalaman lebih daripada tiga tahun. Terdapat juga interaksi antara masa dan pengalaman CHV. Analisis subkumpulan selanjutnya mendedahkan bahawa CHV dengan pengalaman tiga tahun dan ke bawah meningkatkan markah SE (Beza Purata Diperbetulkan: -1.4, 95%CI: -2.58, -0.31) dan markah kepentingan tugas (Beza Purata Diperbetulkan: -2.0, 95%CI: -3.49, -0.56) selepas intervensi. CHV dengan pengalaman tiga tahun juga mempunyai kepuasan yang lebih baik dengan modul tersebut.

Kesimpulan: Latihan melalui YouTube lebih sesuai sebagai Latihan tambahan untuk latihan berasaskan kelas. Gabungan kedua-duanya boleh mewujudkan latihan yang lebih komprehensif dan mampan serta boleh mengurangkan kelemahan setiap pendekatan.

KATA KUNCI: NCD, Pencegahan, Percubaan komuniti, Sukarelawan kesihatan komuniti, YouTube

ABSTRACT

Background: Community education is one of the important public health interventions in curbing the rising concern of non-communicable disease (NCD) incidence and its complications. Community health volunteers (CHVs) were recruited to outreach the community by delivering information on NCD prevention. Training is essential to ensure effective and efficient education by the CHVs. Training through YouTube is an option to overcome the limitation of class-based training.

Objective: To develop a YouTube-based training program and to determine the effect of the program on self-efficacy and task importance in NCD prevention education among CHVs in Kelantan.

Methods: The self-efficacy (SE) and Task Importance Rating Scale of 14 CHV tasks were developed via nominal group technique (NGT) and validated to measure CHV's SE and task importance. A training needs survey was conducted using the newly developed rating scale (n=78), and Importance-Performance Analysis was performed to identify CHV's needs for training which was used for the development of the module. NGT with expert and senior CHVs was also conducted. The module was evaluated using one arm before and after an interventional study among CHVs in Pasir Mas. Participants were given four weeks to watch 12 YouTube training videos. The self-efficacy (SE) and Task Importance Rating Scale was collected pre and post-intervention to compare the mean SE and tasks Importance score before and after the intervention using RM MANOVA (n=35). The analysis also included CHV's experience and highest education level as the independent variables. Fourteen models of RM MANOVA were developed for each task.

Results: The training Needs Survey showed a need to emphasise efficacy deficit in early detection of NCD, tips for quitting smoking and myth about commercial products. An interventional study showed that CHVs with three years of experience and below had a higher SE (Adj Mean Diff: 3.1, 95%CI: 1.89, 4.22) and task Importance score (Adj Mean Diff: 3.0, 95%CI: 1.74, 4.23) significantly than CHVs with more than three years of experience. There was also an interaction between time and the CHVs experience. Further subgroup analysis revealed that the CHVs with three years of experience and below increased SE (Adj Mean Diff: -1.4, 95%CI: -2.58, -0.31) and task importance scores (Adj Mean Diff: -2.0, 95%CI: -3.49, -0.56) after the intervention. CHVs with three years of experience also had better satisfaction with the module.

Conclusion: Training through YouTube is suitable for use during the epidemic. It shows benefits for less experienced CHVs in increasing their SE and perceived task importance in NCD prevention education.

KEYWORDS: NCD, Prevention, Community trial, Community health volunteers, YouTube

CHAPTER 1 : INTRODUCTION

Annually, non-communicable disease (NCD) has caused many millions of life losses globally. These death was vastly premature and attributed mainly to the four common risk factors; i) unhealthy diets, ii) physical inactivity, iii) alcohol use, and iv) smoking (World Health Organization [WHO], 2018). In Malaysia, the common risk factors were prevalent and contributed to the high prevalence of hypertension, diabetes, and high cholesterol. It was reported that 8.1% of Malaysians had each hypertension, diabetes, and high cholesterol. It will later develop its complication of cardiovascular diseases. Cardiovascular diseases, mainly stroke and coronary heart disease, were Malaysia's leading cause of death (Institute for Public Health [IPH], 2020).

The impact of NCD has been devastating to the healthcare sector. A Global Action Plan for the Prevention and Control of NCDs 2013-2020 was launched to reduce the preventable and avoidable burden of morbidity and mortality due to NCDs (WHO, 2013). Several principles were adopted, including people and community empowerment and multisectoral action. In response to the action plan, Malaysia launched the National Strategic Plan for Non-communicable Disease 2016-2025 (Ministry of Health [MOH], 2016). Therefore, specific strategic plans were outlined for community empowerment through community health volunteers (CHV) (MOH, 2016).

CHV is an individual ready to serve the community without being compelled and rewarding expectations (MOH, 2017). Since 2002, MOH has initiated many community empowerment programs that involved CHVs nationwide. It began with *Panel Penasihat Klinik Kesihatan* and *Kelab Warga Emas* followed by Communication for Behavioural Impact (COMBI) and *Komuniti Sihat Pembina Negara* (KOSPEN). *Panel Penasihat Klinik Kesihatan* acts as a community

representative and health-promoting agent focusing on general health, including NCD (MOH, 2002). In 2018, there were 14,489 CHVs in 866 health clinics throughout Malaysia (MOH, 2018). Meanwhile, *Kelab Warga Emas* centred on community involvement in elderly healthcare. By the end of 2017, there were 269 clubs under the health clinic throughout Malaysia (MOH, 2018). On the contrary, COMBI initiatives aim for dengue fever prevention (MOH, 2011), in which there are 2,723 COMBI teams throughout Malaysia involving 63,000 CHVs by 2018 (MOH, 2018). KOSPEN, on the other hand, precisely aim for NCD prevention (MOH, 2013). At the end of 2017, KOSPEN has involved more than 36,210 CHVs at more than 5,954 localities nationwide (MOH, 2018).

CHV is selected from the community member to promote health and advocate for community empowerment. They are expected to educate and perform basic health screening in the community. The involvement of CHV in NCD prevention is essential and has shown significant results. It was reported that CHV performed more effectively than standard care in improving behavioural outcomes and biochemical risk factors. The system of CHV is also said to be more cost-effective (Jeet et al., 2017). The CHV performance can be measured by self-efficacy (SE).

SE is defined as people's beliefs in their ability to influence events that affect their lives (Bandura, 2010). SE affects how an individual feels, thinks, motivates, and behaves. An individual with higher SE will foresee challenges to be overcome. They see failures as a sign of knowledge deficit and insufficient effort and skill that are required. Thus, leading to a more empowered individual through increased knowledge, behavioural change, and skill development (Bandura, 1994). SE was influenced by several internal and external factors such as information received, societal

encouragement, individual experience, and individual accomplishment (Rawlett, 2014).

Training is vital to increase the CHV's SE. It influences self-efficacy through information attainment, cue to action, verbal encouragement, experience, and personal accomplishment. Training is essential to ensure good CHV performance in their tasks, thus increasing the CHV's SE. Training increase SE through growth in knowledge and development of skills. A qualitative study mentioned the importance of being knowledgeable and skilful for CHV to perform well (Taylor, Mathers & Parry, 2018). Two works of literature, including a systematic review, also supported that the excellent performance of CHV depends on the training they received. It also concluded that a specific task requires specific training (Smith *et al.*, 2014; Sharma *et al.*, 2019). However, CHV training has been intermittent (Sharma *et al.*, 2019), too theoretical and class-based, leading to impracticality (Lehmann & Sanders, 2007).

The advancement of mobile technology and comprehensive coverage of internet connectivity has created a new training platform option. One of them is digital health. Digital health is defined as the use of information and communication technology in all their forms for health, including mobile health (mHealth), health information technology, electronic health records (EHRs), and telehealth (NCD Alliance, 2019). It includes social media users such as WhatsApp, WeChat, and YouTube. Social media is one of the good options for training, especially YouTube, as it is familiar to the community and widely used. In 2016, the estimated number of social media users was 21.9 million in Malaysia, with 45.3% having a YouTube account (Malaysian Communications and Multimedia Commission, 2017). Training through digital health has been shown to empower CHV, increase knowledge, increase self-efficacy, and develop skills (Ramukumba & Hägglund, 2019).

Additionally, digital health training provides an excellent experience for the CHV (O'Donovan *et al.*, 2018). Several works of literature also offer evidence of satisfaction among participants in experiencing digital health intervention (Alessi & Rash, 2017; Lee *et al.*, 2018). Therefore, the health sector can use other training methods such as digital health rather than traditional class-based learning.

Problem Statement and Study Rationale

Currently, CHV is trained using a traditional class-based system. The approach was more theoretical (Lehmann & Sanders, 2007) and unsustainable. The class-based system requires vast resources to be sustained as it needs to be held multiple times frequently (Walsh *et al.*, 2010). Inability to accomplish this led to an intermittent training experience. Furthermore, the class-based approach was inconvenient for the CHV, especially regarding the timing of the training, accommodation and travelling (Walsh *et al.*, 2010). The class-based system also used hardcopy materials that were quickly lost and limited the content's revisit. The situation was even worse in the current crisis of the COVID-19 pandemic and movement control order, as all forms of face-to-face class-based training were halted due to the risk of disease transmission.

Using the YouTube platform as training creates a window of opportunity to utilise CHVs' time during this pandemic to enhance their knowledge and develop skills for NCD prevention education (Walsh *et al.*, 2010). It used the YouTube platform to achieve sustainable, continuous training and convenience for the CHVs. Thus, increasing their SE and empowering them to be community health advocates with minimal dependence on the health care providers.

Research Questions

1. What is the level of self-efficacy of CHV in promoting NCD prevention education?

2. Are CHV's perceived NCD prevention tasks as important to be delivered?
3. What training is needed for CHV to function as educators in preventing NCD?
4. Can YouTube become an alternative mode of training to improve the self-efficacy of CHV in preventing NCDs?

Objectives

1.1 General Objective

To develop a YouTube-based training program and to determine the effect of the program on self-efficacy and task importance in NCD prevention education among CHVs in Kelantan.

1.2 Specific Objectives

1.2.1 Part 1

1. To describe the mean self-efficacy score in NCD prevention education among the CHV in Kelantan.
2. To describe the mean task importance score in NCD prevention education among the CHV in Kelantan.
3. To describe the CHV training needs in NCD prevention education using Importance-Performance Analysis among the CHV in Kelantan.
4. To develop and validate a YouTube-based training program in NCD prevention education for CHVs in Kelantan.

1.2.2 Part 2

1. To compare mean self-efficacy scores before and after the YouTube-based training program among the CHV in Kelantan.
2. To compare mean task importance scores before and after the YouTube-based training program among the CHV in Kelantan.

3. To describe the satisfaction score of the CHV towards the YouTube-based training program.

Research Hypotheses

1. There is a significant difference in self-efficacy scores before and after the program.
2. There is a significant difference in task importance scores before and after the program.

CHAPTER 2 : LITERATURE REVIEW

The Burden of Non-Communicable Disease

The burden of NCD on the healthcare sector has been devastating. Annually, NCD kills more than 40 million people globally. A quarter of this NCD death was premature. Eighty-five per cent of sudden death occurs in low- and middle-income nations and is mainly attributed to four common risk factors. These are tobacco use, unhealthy diet, physical inactivity, and alcohol use. Tobacco is attributed to 7.2 million deaths annually, followed by excess salt intake at 4.1 million annual deaths and alcohol at 3.3 million annual death and physical inactivity at 1.6 million yearly death (WHO, 2018).

In Malaysia, the four common risk factors were prevalent. One out of five Malaysian adults are currently smoking, mainly contributed by men (IPH, 2015). Regarding an unhealthy diet, four out of five Malaysian consume salt excessively (IPH, 2019), and only five per cent consume adequate fruits and vegetables. Physical inactivity was also prevalent at 25%, followed by alcohol use. Alcohol use was 11.8%, with only half of it being binge drinking episodes. In Kelantan, the prevalence of alcohol use was very low compared to the national level at 0.8%. The high prevalence of common risk factors led to increased NCDs, mainly diabetes at 18.3%, hypertension at 30.0%, and hypercholesteremia at 38.1%. It contributes primarily to the leading cause of premature death among Malaysians' cardiovascular diseases such as stroke and coronary heart disease (IPH, 2020).

Importance of Community Health Volunteers in Non-communicable Disease

Prevention

The devastating impact of NCD requires more human resources. Human resource is crucial in improving patients' health and preventing the healthy population from developing NCD. However, human resources in preventing NCD were insufficient, especially in developing nations (Jeet *et al.*, 2017). This situation was also similar in Malaysia as one of the developing nations. There was insufficient human resource in the community, especially among nutritionists, dieticians, exercise instructors, and health education officers. To overcome this situation, CHV act as a new agent of change to reach the community (Mustapha *et al.*, 2014). CHV can act as an educator, navigator, and social support to the community (Sharma *et al.*, 2019). An educator delivers culturally appropriate education and advice to modify a person's lifestyle. A navigator provides health access to the community through appointment follow-up, transportation, and a home visit. CHV also provide better social support and community motivation toward a healthier lifestyle. In Malaysia, CHV's role has been mentioned as one of the strategic partners of the community for people empowerment in NCD prevention (Ministry of Health, 2016).

The involvement of CHV in the health system improved the health outcome and was more cost-effective. CHV involvement in NCD prevention was reported to be more effective than standard care. A meta-analysis reveals promising evidence that intervention by CHV improved behavioural outcomes, especially for tobacco cessation. The meta-analysis involving three studies also showed that CHV intervention could reduce weight. However, the result was insignificant for body mass index (BMI). The meta-analysis involved a larger number of studies (n=8) for BMI. However, the author did not elaborate on why BMI was insignificant. CHV also

improves biochemical risk factors in the community with non-communicable diseases, mainly diabetes. A similar meta-analysis reveals that HbA1c was reduced by a mean difference of 0.83% (95%CI: -1.25, -0.41), and total cholesterol was reduced by 0.1 (95%CI: -0.26, 0.00). Despite the low reduction in HbA1c, the ability of CHV to sustain long-term control of HbA1c is more important. The meta-analysis included four studies for both the HbA1c and total cholesterol. Despite the significant finding, the clinical significance was low. HbA1c was reduced by 0.83% and total cholesterol by 0.1. It was because of the dilution effect due to the clustering in the community trial. It was also contributed by less trained CHVs due to short-term training (Jeet *et al.*, 2017).

Nevertheless, the health system that involves CHV as part of its components has shown to be more cost-effective. It was proven by a cost-effective analysis of a CHV intervention involving low-income adults with type 2 diabetes in the US. The cost-effectiveness of the CHV was higher or comparable to standard management of type 2 diabetes in improving health and healthcare quality. It was contributed by personal interaction and rapport of the CHV, thus improving access to care and better patient SE in self-health care (Brown 3rd *et al.*, 2012).

Training Needs for Community Health Volunteer

The CHV training needs are essential to optimise their task performance. A qualitative study mentioned the two primary needs for CHV. There are knowledge and skills. Knowledge was further divided into specific health knowledge, for example, knowledge on smoking prevention and health service knowledge such as understanding the healthcare system. In terms of skills, CHV needs communication skills and counselling. These skills are essential for the CHV as their core task is delivering information. Communication skills also play a key role in ensuring the

delivered information suits the intended community's educational level and is culturally appropriate (Taylor, Mathers & Parry, 2018).

Other works of literature have discussed the need for appropriate training. Previously CHVs' training was too theoretical and class-based. There is a need to change the approach from a theoretical to a competency-based approach. In the theoretical approach, the training was delivered to give vast health knowledge to the CHV without focusing on specific skills producing CHV with varied skills. In contrast, a competency-based approach aims to ensure CHV competency in a standardised procedure with specific skills (Lehmann & Sanders, 2007). It was further supported by another study that mentioned that specific training was required to meet the need of the CHV's task description to ensure good performance. This qualitative study mentioned that unspecific training led to CHV confusion and frustration, thus disrupting their performance (Smith *et al.*, 2014). A systematic review involving 37 articles also suggests a similar recommendation and further emphasises the need to provide initial intensive training, continuous education, and team-building among the CHV (Sharma *et al.*, 2019). It is vital to ensure a high retention rate of the CHVs. Poor performing CHVs due to single and inadequate training without team building led to high absentees and turnover of CHVs. It disrupts the continuity of the CHV program within the community leading to less successful intervention (Barnes-Boyd, Fordham Norr & Nacion, 2001).

Training Approach and Content for Non-communicable Disease Prevention

Many works of literature have reported on the approach of CHV training. There are mainly three approaches that have been used for training. There are i) training focusing on knowledge of the specific disease, for example, a training program by Bayık Temel *et al.*, (2017) in Turkey; Luger *et al.*, (2016) in Austria; and Sherman & Smith, (2019)

in the US, and ii) training focusing on specific diseases with an introduction to the approach and role of the CHV, for example, a training program by Ayala *et al.*, (2017) in US and iii) training focus on a specific disease and skills development with an introduction to the approach and role of the CHV, for example, a training program by Ferguson *et al.*, (2012) in the US; Oliver *et al.*, (2018) in Canada; and Draper *et al.*, (2019) in South Africa. Some examples of the skills were communication, negotiation, advocacy, motivational interviewing, and interpersonal and relationship-building skills. Based on the training need of CHV, the third approach is the best method as it includes CHV roles and skills development as part of the program. Understanding their roles and job description (Smith *et al.*, 2014) and skills are the needs of CHVs to perform well in their tasks (Lehmann & Sanders, 2007; Smith *et al.*, 2014; Taylor, Mathers & Parry, 2018).

CHV can be trained for general health and specific health conditions. Training content for general health includes first aid treatment (Lehmann & Sanders, 2007; Sharma *et al.*, 2019), general health education, referral, and record keeping (Lehmann & Sanders, 2007). The training for specific health conditions focuses on specific groups or diseases, such as the elderly or NCD prevention training.

For NCD prevention, some training focus on a healthy lifestyle approach, such as NCD prevention training by Draper *et al.*, (2019) and Luger *et al.*, (2016). Training by Draper *et al.*, (2019) include the healthy eating plate, physical activity program, and behaviour change technique, whilst Luger *et al.*, (2016) only focus on nutritional aspect and strength exercise. Different target participants of the intervention contribute to the differences. Draper *et al.*, (2019) involved the church's community, while Luger *et al.*, (2016) applied to the elderly.

Meanwhile, other research focused on specific risk factors in NCD prevention, namely physical activity intervention (Ayala *et al.*, 2017), smoking intervention (Sherman & Smith, 2019), and alcohol intervention (Jongudomkarn, 2014). The training content by Ayala *et al.*, (2017) involved different techniques for exercise, including exercise routine, exercise circuit, and Zumba. The study involved CHV in the Latino community in the US due to the high prevalence of sedentary lifestyle. The CHV's role as a health promoter ensures community retention in the physical activity intervention. Another study in the US community focused on smoking intervention involving eight community leaders and 30 pharmacy students. It focused on strengthening smoking cessation services by involving community leaders and students to increase access to cessation services. The content of the smoking intervention program includes the health risk of smoking, the community and economic impact, the benefit of quitting, behavioural, cognitive and stress management techniques, and smoking cessation medication. (Sherman & Smith, 2019).

Meanwhile, the content of the alcohol intervention training program includes harmful alcohol consumption, strategic planning, and family care. The study focused on alcohol due to the increasing alcohol consumption that affects individuals, families and society. Therefore, it centred on female CHV to undertake the role of alcohol prevention in the family and the community (Jongudomkarn, 2014).

There is also a study that focused on screening prevention. A study in Turkey focused on breast and cervical cancer screening involving 37 teachers in the public training centre. The training content includes the importance of breast and cervical cancer prevention, anatomy and physiology of breast and cervix, breast and cervical

cancer symptoms and signs, risk factors, prevention, early detection, breast self-examination, mammogram, pap smear test, and treatment (Bayık Temel *et al.*, 2017).

Other than that, there was also training centred on specific NCD. The study in the US focuses on diabetes. It involved ten CHVs with professional healthcare backgrounds to ensure continuity of care from the hospital to the community. The training was more extensive as it involved CHV with a professional healthcare background. The content of training include i) core competency module such as interviewing, communication, interpersonal and relationship-building skills, ii) diabetic-specific modules, such as nutrition and physical activity for diabetic patient, primary, nursing and speciality care in diabetes, and iii) continuous training such as blood glucose testing workshop, and patient goal setting (Ferguson *et al.*, 2012).

There is also training for CHV in the specified group. A study in Canada involved 143 CHV to ensure effective health access to the ageing population. The training for the CHV involved face-to-face and online training. The training content includes an overview of the program, CHV's role, effective and intercultural communication, conflict resolution, data gathering tools, privacy and confidentiality, health and safety, information technology and health record. The CHV role in the study focuses more on supporting the elderly in assessing their needs and providing resources and access to their needs (Oliver *et al.*, 2018).

Training Needs Assessment

Training needs assessment is a method to identify the training needs of the organisation and the training required to meet the needs (Ministry of Interior and Japan International Cooperation Agency [MIJICA], 2010). It identifies the gap between the actual and desired outcomes, prioritises them, and selects the most important for reduction

(Bansal & Tripathi, 2017). It has three stages: organisational analysis, task or operational analysis, and individual analysis (Bansal & Tripathi, 2017; Hartoyo & Efendy, 2017; Mazhisham *et al.*, 2018). The organisational analysis identifies the training needs to meet the organisational objective and analyse the resource required for training. The task or operational analysis identifies the knowledge, skills and abilities to achieve effective and efficient performance. The individual analysis identifies the individual's performance in performing the tasks (Bansal & Tripathi, 2017; Hartoyo & Efendy, 2017; Mazhisham *et al.*, 2018). Training needs can be assessed through two methods, qualitatively or quantitatively. A qualitative approach through an in-depth interview (MIJICA, 2010; Hartoyo & Efendy, 2017), focus group discussion (MIJICA, 2010), Delphi technique (Mazhisham *et al.*, 2018), record review (Hartoyo & Efendy, 2017), and literature review (Hartoyo & Efendy, 2017). The quantitative method is a questionnaire survey (MIJICA, 2010; Hartoyo & Efendy, 2017) and knowledge and skills tests (Hartoyo & Efendy, 2017).

In the in-depth interview, an open question was given to the interviewee concerning the training. This method enables us to obtain in-depth data about the training and better understand the training issue. However, it requires more time, and the data is more challenging to organise. The respondent also may be shy to respond honestly in the interview. Therefore, the interviewer may require specific training to conduct the session successfully. The method is suitable for training that is little known and complex training. Whereas focus group discussion can be easier and quicker than an in-depth interview, it groups the respondent. However, the limitation is that certain individuals may dominate the group, and others may be left out. Like the in-depth interview, the interviewer must have the skills to conduct and ensure no opinion is left

out. It is recommended to use this method if the training involves skills that require teamwork (MIJICA, 2010).

The Delphi technique assesses experts' opinions concerning the trainee training needs, including experts such as academicians and professionals in the particular training field (Hartoyo & Efendy, 2017). It provides information based on the consensus of experts in the area. However, this method relies purely on the expert opinion and leaves out the trainee opinion. It is also very complex and time-consuming (Barrett & Heale, 2020).

For record and literature review, both methods provide factual information needed for the training. It also provides advantages, disadvantages, and recommendations for trainee training needs. However, this method may give out-of-date, inaccurate and inconsistent information. The different settings and target groups contribute to the differences in the training needs (MIJICA, 2010).

For the quantitative method, a questionnaire survey including knowledge and skill tests provides statistical information on the training needs. The data is organised and easily analysed statistically. However, the information is not in-depth as in in-depth interviews and focus group discussions. The method may leave out important information that is not in the survey. Therefore, it is important to use the quantitative method if the training area is well known (MIJICA, 2010).

The most widely used training needs assessment tool in healthcare is the Hennessy-Hicks Training Needs Analysis Questionnaire. It was widely used to assess training needs among nurses, primary healthcare workers, and other healthcare professionals (Markaki *et al.*, 2021). The tools have two ratings: Rating A, the importance attributed to each task, and Rating B, individual self-efficacy, which is the

personal belief in their ability to perform each task. The tools identify training needs by identifying the gap between both ratings. The data can be analysed using a quadrant graph format (Figure 2.1) using Rating A as the y-axis and Rating B as the x-axis (Hennessy, D.A. and Hicks, 2011). The method of analysis originated from the Importance-Performance Analysis (IPA). It aims to determine customer satisfaction through the perceived importance and performance of the product (Martilla & James, 1977). It is a tool to assess the product or service performance, identify its strength and weakness, and thus prioritise action on the area for improvement. Since then, IPA has been used widely in various fields, including business, administration, tourism, education, and healthcare (Sever, 2015). IPA was widely used because it is a simple evaluation tool and can be presented diagrammatically (Wong, Nishimoto & Philip, 2011).

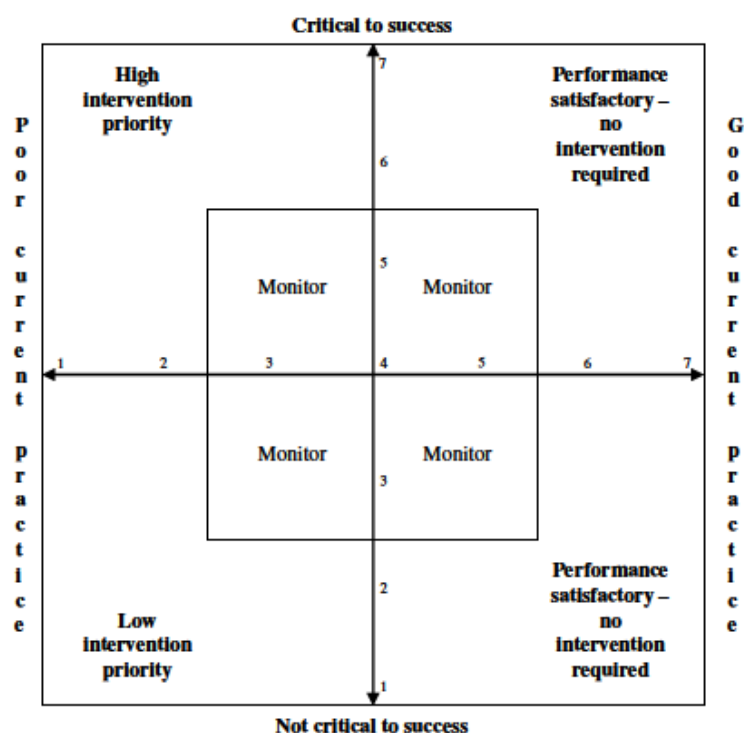


Figure 2.1: Quadrant Graph Format (Source: Hennessy, D.A. and Hicks, C. M. (2011) Hennessy-Hicks Training Needs Analysis Questionnaire and Manual. Figure 1, page 27. Available at: <https://www.who.int/workforcealliance/knowledge/toolkit/19/en/>)

CHV's Training Evaluation

The training program for CHV can be evaluated with various methods depending on the evaluation's objective. For example, the smoking cessation program in the US evaluates the CHV's knowledge and SE after the training. The study used a before and after design involving community leaders and pharmacy students (Sherman & Smith, 2019). Another study with a similar design involving teachers as CHV also evaluates the CHV knowledge and stage of change based on the transtheoretical model after the training (Bayık Temel *et al.*, 2017). A study also reported using a mixed-method design to evaluate CHV's training. The qualitative aspect was conducted through in-depth interviews and focus group discussions. It elaborates in-depth on the CHV's feedback on the advantages and disadvantages of the training and recommendation to improve. Meanwhile, the quantitative aspect of the training evaluates their knowledge and SE on their skills after training through a questionnaire (Ferguson *et al.*, 2012).

All three evaluations of training above showed the training had positively impacted the CHVs in terms of their knowledge (Ferguson *et al.*, 2012; Bayık Temel *et al.*, 2017; Sherman & Smith, 2019) and behaviour change (Bayık Temel *et al.*, 2017). However, there is some limitation that was highlighted. There are issues with the availability of validated tools to assess the knowledge and SE of the CHV as it was very specific to certain tasks (Bayık Temel *et al.*, 2017; Sherman & Smith, 2019). Brief training also is inadequate to increase the SE among the community members (Sherman & Smith, 2019). It is also recommended to ensure continuity of training from the initial training to ensure learning retention. Other than that, the training design should ensure the CHV manages to perform the expected task (Ferguson *et al.*, 2012).

Measuring Self-efficacy

Self-efficacy can be measured using a questionnaire. There are many questionnaires available for measuring self-efficacy. There are two scales: the general self-efficacy scale and the specific self-efficacy scale for particular tasks or situations.

Some of the examples of scales that measure general self-efficacy are The Self-Efficacy Scale (Sherer *et al.*, 1982), The General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995), New General Self-Efficacy Scale (Chen, Gully & Eden, 2001), Self-Efficacy Survey (Panc, Mihalcea & Panc, 2012), and Strengths Self-Efficacy Scale (Tsai *et al.*, 2013). Each of the scales had a different construct and uses. The Self-Efficacy Scale was used mainly for clinical and personality research. It was developed based on the construct of individual experience and success attributed to skills (Sherer *et al.*, 1982). Meanwhile, The General Self-Efficacy Scale was used to measure general self-efficacy based on the construct of individual coping mechanisms. It was used for clinical and behaviour research (Schwarzer & Jerusalem, 1995). Whereas, The New General Self-Efficacy Scale was suitable for organisational behaviour research. It focuses on assessing workers' motivation and performance in various working contexts. It measures general self-efficacy regarding individual ability to achieve goals and task performance (Chen, Gully & Eden, 2001). Another tool is the Self-Efficacy Survey measured general self-efficacy in different aspects of particular intellectual, family, and social functions. It helps understand the psychological area of individual function (Panc, Mihalcea & Panc, 2012). There are also SE tools used to measure general self-efficacy and identify the area of an individual's strengths. The Strengths Self-Efficacy Scale was used to empower individuals and optimise their strengths (Tsai *et al.*, 2013). However, all of the scale mentioned above is only suitable for measuring general self-efficacy and not specific tasks or situations. It is recommended

that specific self-efficacy be tailored to specific activity domains (Bandura, 2006). Apart from that, comparing general and specific self-efficacy measures, specific self-efficacy measures are the best for specific task measurement. It is because of its better validity and predictability of the tasks' actual performance than the general self-efficacy scale (Chen, Gully & Eden, 2001). Therefore, a specific self-efficacy scale must be developed for specific tasks to ensure validity.

Many specific self-efficacy scales have been developed related to NCD risk factor prevention. For example, there are i) Cessation Self-Efficacy Questionnaire (Malay version) that measures smoker's self-efficacy in smoking cessation (Teo *et al.*, 2015), ii) Community Intervention Self-Efficacy Scale for Parent Leaders (CONNECTED) measuring the perceived ability of an individual to improve community health and prevent youth alcohol consumption (Lloret *et al.*, 2020), iii) Self-Efficacy for Healthy Diet Scale for women to measure their ability to achieve healthy diet (Simmonds *et al.*, 2016), and iv) Exercise Self-Efficacy Scale (Indonesian version) measures individual perceives ability to exercise in difficult situation (Hakim *et al.*, 2020). Most of the scale measures individual self-efficacy in performing the prevention rather than educating the community. Only the CONNECTED scale measures self-efficacy to promote health. However, it centred on community health improvement rather than NCD prevention. The CONNECTED scale still does not fit the specific description of the CHV tasks in NCD prevention education. Therefore, there is a need to develop a specific self-efficacy scale for CHV tasks in NCD prevention education.

Bandura, (2006) developed a guideline for constructing a self-efficacy scale. The guideline for self-efficacy development was necessary as no self-efficacy scale measures fit for all purposes. There were several recommendations provided, namely,

i) the self-efficacy scale must be designed according to the specific tasks to ensure accurate estimation of the outcome, ii) the scale should be designed with sufficient challenges to avoid the ceiling effect. Without sufficient challenges, each individual will be able to perform the task easily, thus causing each individual to be highly efficacious, iii) the scale should be administered privately with anonymous identification, and response confidentiality should be guarded to minimise response bias due to the socially desired outcome. Without confidentiality, the respondent may rate the SE scale higher to reflect better SE to the researcher, and iv) the scale should be from zero to 100 or a more straightforward scale of zero to 10. A scale with a smaller range than ten should be avoided because of less sensitivity and reliability (Bandura, 2006). A study by Preston & Colman, (2000) compared several response scales. The research concluded that the response scale of ten, 11, and 101 had similar reliability, validity, and discriminating power. However, in terms of preference, the respondent preferred a ten-response scale over 11 and 101. It indicates that the ten response scale is adequate for the SE scale due to its preference, without jeopardising its validity, reliability and discriminating power.

Self-efficacy and Empowerment

CHV involvement has shown to be significantly crucial in NCD prevention. CHV with high SE is important for NCD prevention and community empowerment. Self-efficacy is people's beliefs in their ability to influence events that affect their lives (Bandura, 2010). It is influenced by four sources: mastery experience, social modelling, social persuasion, and emotional and physiological states. Mastery experience explained that the experience of success and failure influences an individual's self-efficacy. Success increases it, and failure reduces it. Social modelling explains that a model or figure is a source of motivation for an individual's self-efficacy. Observation of the model's

success increases their belief to be capable of achieving similar success. Social persuasion explained that the support from society exerts influence on self-efficacy. It elevates their effort, thus increasing self-efficacy. Emotional and physiological states explained that emotions such as stress, depression, and anxiety with physical conditions such as strength and energy influence self-efficacy. Later on, another scholar added the fifth source of influence to self-efficacy: imaginary experience (Maddux, 2012). It explained that individuals' belief in their capability to succeed increases as they can visualise themselves acting effectively.

Another article further clarifies self-efficacy and discuss empowerment as part of the consequence of self-efficacy (Rawlett, 2014). The article further divided the source of influence into external antecedent and internal antecedent. Mastery experience and emotional and physiological states were internal antecedents, and social modelling and persuasion were external antecedents. The consequence of empowerment was also divided into internal and external consequences. Internal consequences such as increased knowledge and decision-making potential. External consequences such as behavioural change and skills development (Figure 2.2).

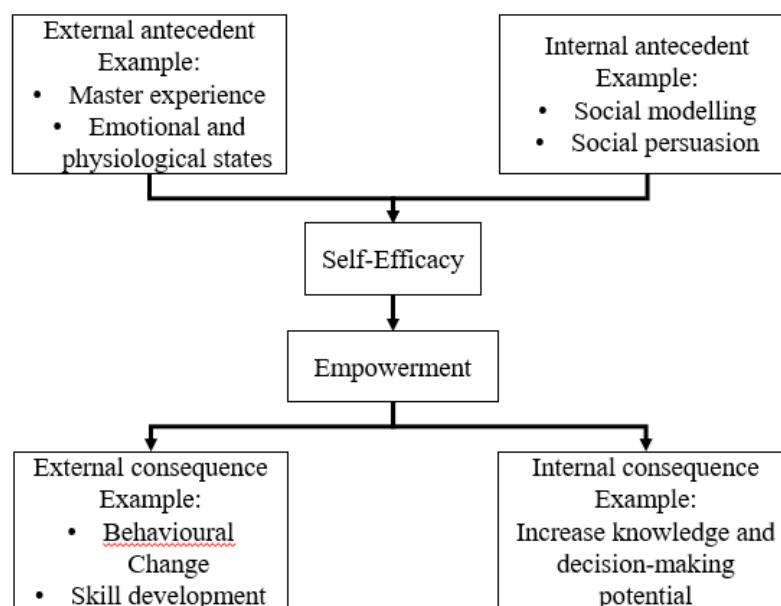


Figure 2.2: The Relationship between Self-Efficacy and Empowerment

Self-efficacy in Non-communicable Disease Prevention

Self-efficacy has been used as a measurement tool for NCD prevention education. There are studies investigating nutritional, smoking, and alcohol prevention.

A study in the USA has looked upon parental general SE and specific SE towards smoking prevention and its association with teen smoking intention. It is a cross-sectional study involving 272 parent-teen dyads. The findings reveal that parental SE and smoking prevention SE reduced teen smoking intention. It also reported the possibility of over-reporting higher SE due to the social desirability bias (Mahabee-Gittens *et al.*, 2011).

A study in England also investigates smoking prevention. It is an interventional study, before and after design without control involving eight coaches. It aims to determine the effect of brief smoking intervention training on the SE of the coaches as

CHVs on smoking prevention knowledge and smoking prevention education. The training is a three-hour workshop that includes smoking key message, practical tools, and skills on 5As (ask, advise, assess, assist, and arrange). The finding showed that the training could increase both SE post-training and maintain it at three months follow up. However, the study only had a very small sample size. It is also an interventional study without control with limitations such as maturation and the historical threat that reduce its validity (Hilland *et al.*, 2015). Maturation threat is the natural changes in the knowledge and experience of the participant. A historical threat is an event outside the research that may affect the outcome measures. For example, a smoking campaign that increased the knowledge of the participant. Another interventional study in the US also investigates brief smoking cessation educational intervention on the smoking prevention knowledge and SE of pharmacy students and community leaders. The two to three-hour training includes the health risk of smoking, the community and economic impact, the benefit of quitting, behavioural, cognitive and stress management techniques, and smoking cessation medication. On contrary to the previous study, the intervention was only able to increase the knowledge of student and community leaders. The SE was only increased for the student, whereas the community leader only had an increase in SE on the counselling but not on the recommendation of medication and arranging smoking cessation sessions with the client. It indicates that the brief intervention could not increase the SE of community members. (Sherman & Smith, 2019). The task may also be too difficult to carry out by the community leader as it requires more experience and skills.

A Cluster Randomized Control Trial in Netherland examined the intervention effect on parents' alcohol prevention SE. It involved 2562 parent-student dyads with four arms of intervention. The four arms intervention were: i) parent-only intervention

consisting of a 20-minute presentation, consensus-building of alcohol prevention rules among parents, and an information leaflet on the presentation and rules; ii) child-only intervention that focuses on the healthy attitude towards alcohol and refusal skills; iii) the combined parent-child intervention; and iv) control condition. A booster session of training was conducted one year later. Data were collected before the intervention, at 22 months and 34 months. The study showed that combining both parent-child interventions significantly affected the parent's alcohol prevention SE. The parent-only intervention was not significant. It is related to the SE theory that explains the social modelling through parental training and social persuasion contributed by the child's behaviour that affects parental SE (Glatz & Koning, 2016). However, there are still possible contamination issues as blinding was impossible for this intervention.

There is also a study that centred on nutritional intervention. A study in Australia aims to evaluate the effect of the brief educational intervention on the nutritional SE knowledge of the coaches. It is a before and after design study without control involving ten coaches. It involved 20 minutes of education. Data were collected before and after one to two weeks of the intervention. The study showed that the coaches nutritional SE knowledge increased after the intervention (Belski *et al.*, 2018).

Based on the interventional study, a comparison was difficult due to the difference in the target population, the scope of the intervention, and the SE tools used. Three of the four interventional studies have no control group with a very small sample size (Hilland *et al.*, 2015; Belski *et al.*, 2018; Sherman & Smith, 2019). It contributed to the difficulty of recruiting CHV from the community. Interestingly, all the intervention was brief, with the longest intervention for three hours. Furthermore, only a study conducted two training sessions (Glatz & Koning, 2016). It indicates limited