

**DEVELOPMENT AND EFFECTIVENESS OF
MYDR CARE4U ONLINE HIV HEALTH
EDUCATION MODULE IN INCREASING
HIV KNOWLEDGE, REDUCING HIV
STIGMA AND INCREASING
ACCESSIBILITY TO HEALTHCARE
SERVICES FOR TRANSGENDER**

DR. MOHD HAZWAN BIN BAHARUDDIN

UNIVERSITI SAINS MALAYSIA

2022

**DEVELOPMENT AND EFFECTIVENESS OF
MYDRCARE4U ONLINE HIV HEALTH
EDUCATION MODULE IN INCREASING
HIV KNOWLEDGE, REDUCING HIV
STIGMA AND INCREASING
ACCESSIBILITY TO HEALTHCARE
SERVICES FOR TRANSGENDER**

By

DR. MOHD HAZWAN BIN BAHARUDDIN

**Dissertation Submitted in Partial Fulfilment of
the Requirements for the degree of
Doctor of Public Health
(Epidemiology)**

May 2022

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim.

In the name of ALLAH, the most Gracious and the most Merciful. Salutations be upon His messenger Muhammad (peace be upon him), his family and his companions. Alhamdulillah, I have completed this dissertation submission on time with the help and success granted by ALLAH. I would like to express my sincere gratitude and thank to the following individuals who have contributed in many ways to achieve this major milestone in my carrier :

1. My utmost gratitude to my supervisor, Assoc. Prof. Dr Wan Mohd Zahiruddin Wan Mohammad for his strong support and encouragement to complete this dissertation. His effective communication able to encourage constructive criticism to the content of this dissertation. He also had shown strong determination to facilitate any challenges encountered while conducting this study. From his resourceful experienced, he manages to provide in-depth key decision point to construct relevant information in the whole study process.
2. A special thanks to Ministry of Health, Malaysia for giving permission to conduct this study in Kelantan and Pahang. Good cooperation from Public Health Specialist, Family Health Specialist and Health Education Officer at healthcare facility really help to provide input in this dissertation.
3. I am deeply thankful to all outreach workers from Persatuan Perantaraan Pesakit Kelantan (SAHABAT) for their kind cooperation and willingness to spend their precious time for this work. Not to forget, I am also grateful to all

study participants for their willingness to participate in this study. Without them, the study would never have been completed.

4. I also would like to acknowledge all lecturers in the Department of Community Medicine, Universiti Sains Malaysia for their contribution to complete this dissertation. Their contribution was invaluable and shall be treasured.
5. I would like to thank my lovely wife, Farah Munirah Binti Mior Mazlan and my beloved children; Muhammad Khalis, Muhammad Rayyan and Jasmeen Maisara for their continuous moral support and endless motivation throughout this challenging journey.
6. Last but not least, I would like to thank my father, Baharuddin Bin Ali and my mother, Wan Shahiran Binti Wan Mahyudin for their doa's and encouragement while I was facing any challenges to complete this study. Their psychological support was very helpful in managing any difficulty throughout this study.

جَزَاكَ اللهُ خَيْرًا

“May the Almighty recompense you with goodness.”

TABLE OF CONTENTS

ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	v
LIST OF TABLES	xi
LIST OF FIGURES	xiii
LIST OF ABBREVIATIONS	xiv
LIST OF SYMBOLS	xv
LIST OF APPENDICES	xvi
ABSKTRAK	xvii
ABSTRACT	xx
Chapter 1 INTRODUCTION	1
1.1 Burden of HIV infection worldwide.....	1
1.2 Burden of HIV infection in Malaysia	2
1.3 Key population of HIV in Malaysia	4
1.4 Healthcare services for key population in Malaysia.....	7
1.5 Transgender and barrier to HIV health education	8
1.6 Low level of HIV knowledge among transgenders	10
1.7 High level of stigma about HIV infection among transgenders	11
1.8 Low uptake of HIV screening among transgenders.....	12
1.9 Strategies to provide HIV health education for transgender.....	13
1.10 Internet communication technology use by transgender	15
1.11 Problem statement	17
1.12 Rationale of the study	18
1.13 Research Questions.....	18
1.14 Research hypothesis	19

1.15 Objectives of the study	19
1.15.1 General Objectives.....	19
1.15.2 Specific objective.....	19
Chapter 2 Literature Review	21
2.1 High barrier of HIV health education for transgender.....	21
2.2 HIV knowledge among transgenders.....	24
2.3 Stigma about HIV infection among transgenders.....	27
2.4 The use of internet communication technology by transgender	33
2.5 Development of online health education	36
2.6 Online HIV health education for key population.....	44
2.7 The use of Health Belief Model (HBM) as theory for HIV health education	51
2.8 Dephi-technique for development of new HIV health education	54
2.9 Facebook as platform for health education.....	57
2.10 Conceptual Framework.....	61
Chapter 3 Methodology	62
3.1.1 Phase 1.....	62
3.1.2 Study design	62
3.1.3 Study location.....	62
3.1.4 Study duration.....	63
3.1.5 Development of MyDrCare4u Online HIV health education module	63
3.2 Phase 2.....	77
3.2.1 Study design	77
3.2.2 Study location.....	77
3.2.3 Study population.....	77
3.2.4 Sampling frame.....	77
3.2.5 Subject criteria.....	77
3.2.6 Sample size estimation	78

3.2.7 Subject recruitment and sampling method.....	81
3.2.8 Research tools.....	82
3.2.9 Data collection method.....	86
3.2.10 Intervention group	87
3.2.11 Control group.....	88
3.2.12 Follow up.....	88
3.2.13 Outcome measures.....	88
3.2.14 Statistical analysis.....	89
3.2.15 Baseline comparison between intervention and control group	89
3.2.16 Data analysis.....	90
3.2.17 The effect of online HIV health education module (MyDrCare4u) for transgender on HIV knowledge.....	90
3.2.18 The effect of online HIV health education module (MyDrCare4u) for transgender on HIV Stigma.....	93
3.2.19 The effect of online HIV health education module (MyDrCare4u) for transgender on proportion of HIV screening test in intervention group.....	94
3.2.20 Flow chart of study in Phase 2.....	95
3.2.21 Summary flowchart of study.....	96
3.2.22 Ethical issues	98
Chapter 4 Results	99
4.1 Content validation of online HIV health education module (MyDrCare4u) for transgender	99
4.2 Face validation of online HIV health education module (MyDrCare4u) for transgender	101
4.3 Usability of online HIV health education module (MyDrCare4u) for transgender ...	102
4.4 Baseline comparison between intervention and control group	103
4.4.1 Baseline characteristics and comparison of sociodemographic characteristics between intervention and control group.....	104

4.4.2 Baseline characteristics and comparison of history of social stigma and discrimination characteristics between intervention and control group.....	106
4.4.3 Baseline characteristics and comparison of access to HIV prevention and care services characteristics between intervention and control group.....	107
4.4.4 Baseline characteristics and comparison of sexual behaviour and risk of HIV transmission characteristics between intervention and control group.....	109
4.4.5 Baseline comparison of mean HIV knowledge score and mean HIV stigma score between intervention and control group.....	111
4.5 Effect of Online HIV Health Education Module (MyDrCare4u) for Transgender on HIV knowledge score between intervention and control group at baseline and three-month	112
4.5.1 Within group difference.....	112
4.5.2 Between group difference regardless of time	113
4.5.3 Between group difference with regards to time	114
4.6 Effect of online HIV health education module(MyDrCare4u) for transgender on HIV stigma score between intervention and control group at baseline and three-month	116
4.6.1 Within group difference.....	117
4.6.2 Between group difference regardless of time	118
4.6.3 Between group difference with regards to time	119
4.7 Effect of online HIV health education module (MyDrCare4u) for transgender on HIV screening test among respondents in intervention group.....	120
Chapter 5 Discussion	121
5.1 Phase I	121
5.1.1 Development of online HIV health education module (MyDrCare4u) for transgender...	121
5.2 Phase II	125
5.2.1 Sociodemographic Characteristics of Respondent.....	125
5.2.2 Baseline comparison between intervention and control group	130

5.2.3 Effect of MyDrcare4u online HIV health education module on HIV knowledge score ..	132
5.2.4 Effect of online HIV health education module (MyDrcare4u) for transgender on HIV stigma score	136
5.2.5 Effect of MyDrcare4u online HIV health education module on proportion of HIV screening test	138
5.3 Validity of study findings	142
5.4 Strength and limitation	148
5.5 Conclusion	151
5.6 Recommendations	152
5.7 Future research	153
Chapter 6 References.....	155
Chapter 7 Appendices.....	222
Appendix A. Consent for participants in Content Validity Phase	224
Appendix B. Consent for participants in Face Validity Phase	239
Appendix C. Malay Translated and Validated HIV-KQ-18 Questionnaires	253
Appendix D. Original version of HIV-KQ-18 Questionnaire in English language.....	254
Appendix E. Original version of HIV-KQ-45 Questionnaire in English language	255
Appendix F. Approval letter from original author of Malay translated and validated HIV-KQ-18 Questionnaire.....	258
Appendix G. Malay translated and validated of HIV Stigma questionnaire	259
Appendix H. Malay-mHealth Application Usability Questionnaire (M-MAUQ).....	260
Appendix I. Proforma	262
Appendix J. Notification of Copyright in a Work	266
Appendix K. Ethical clearance approval was obtained from Human Research and Ethics Committee	269

Appendix L. Proof of manuscript submission to International Islamic Universiti Malaysia	
Medical Journal Malaysia (IMJM)	272

LIST OF TABLES

Table 3.1: Table of content discussion of Facebook live every session.....	73
Table 4.1: Information about each of the concept in theory of Health Belief Model (HBM).....	99
Table 4.2: Content validity index of MyDrCare4u Online HIV Health Education Module for transgender based on relevancy rating of topics by six experts.....	100
Table 4.3 : Face validity index of MyDrCare4u Online HIV Health Education Module for transgender based on relevancy rating of topics by ten transgender raters	101
Table 4.4: Baseline comparison of sociodemographic characteristics between intervention and control group (n=60)	105
Table 4.5: Baseline comparison of history of social stigma discrimination characteristics between intervention and control group (n=60).....	106
Table 4.6: Baseline comparison of access to HIV prevention and care services characteristics between intervention and control group (n=60).....	108
Table 4.7: Baseline comparison of sexual behaviour and risk of hiv transmission characteristics between intervention and control group (n=60).....	110
Table 4.8: Baseline comparison of mean HIV knowledge score and mean HIV stigma score between intervention and control group (n=60).....	111
Table 4.9: Comparison for mean difference of HIV Knowledge score within each group, (n=60)	113
Table 4.10: Comparison for mean different of HIV Knowledge score between intervention and control group , (n = 60)	113

Table 4.11: Comparison for mean difference of HIV knowledge score among intervention and control group regard to time, (n=60).....	114
Table 4.12: Comparison for mean different of HIV stigma score within each, (n=60)	117
Table 4.13: Comparison for mean different of HIV Stigma score between intervention and control group , (n = 60)	118
Table 4.14: Comparison for mean difference of HIV stigma score among intervention and control group regard to time , (n=60).....	119
Table 4.15: Comparison for proportion of respondent perform HIV screening test in intervention group at baseline and at three-month follow up (n=30)	120

LIST OF FIGURES

Figure 1.1 : Reported number of HIV cases and notification rate in Malaysia 1986-2019 (Ministry of Malaysia, 2015)	3
Figure 2.1 : E-learning System's Theoretical Framework.....	40
Figure 2.2 : Conceptual framework for the effect of online HIV health education module (MyDrCare4u) for transgender	61
Figure 3.1 : Flow chart development and validation of Online HIV health education module (MyDrCare4u) for transgender	71
Figure 3.2 : Main page of MyDrCare4u Web-based application via laptop	72
Figure 3.3 : Main page of MyDrCare4u Web-based application via smartphone	72
Figure 3.4 : Sampling method for Phase 2 study	82
Figure 3.5 : Study flow chart Phase 2	95
Figure 3.6 : Summary both Phase 1 and Phase 2	96
Figure 4.1 : Flow diagram of progress in Phase II study based on TREND statement	103
Figure 4.2 : Profile plot of estimated marginal means of HIV knowledge score for each group at baseline and three-month follow up.	115
Figure 4.3 : Profile plot of estimated marginal means of HIV stigma score for each group at baseline and three-month follow up.....	120

LIST OF ABBREVIATIONS

AIDS	Acquired immunodeficiency syndrome
FSW	Female sex worker
HIV	Human Immunodeficiency Virus
IBBS	Integrated Biological Behavioural Survey
IQR	Interquartile range
IVDU	Intravenous drug user
JAKIM	Jabatan Kemajuan Islam Malaysia
JKNK	Jabatan Kesihatan Negeri Kelantan
LGBT	Lesbian, Gay, Bisexual, And Transgender
MAC	Malaysia AIDS Council
MAUQ	mHealth App Usability Questionnaire
MOH	Ministry of Health Malaysia
MSM	Men having sex with men
NGO	Non-Governmental Organization
NSPEA	National Strategic Plan Ending AIDS
PWID	Person who injecting drugs
RM ANOVA	Repeated measure analysis of variance
SD	Standard Deviation
SDG	Sustainable Development Goals
UNAIDS	The Joint United Nations Programme on HIV/AIDS
UNAIDS	United Nation program on AIDS
USA	United State of America
USM	Universiti Sains Malaysia
VCT	Voluntary and counselling testing
WHO	World Health Organization

LIST OF SYMBOLS

$<$	less than
$>$	more than
$=$	equal to
$\times$	times
α	alpha
β	beta
$\%$	percentage
$:$	ratio

LIST OF APPENDICES

Appendix A. Consent for participants in Content Validity Phase

Appendix B. Consent for participants in Face Validity Phase

Appendix C. Malay Translated and Validated HIV-KQ-18 Questionnaires

Appendix D. Original version of HIV-KQ-18 Questionnaire in English language

Appendix E. Original version of HIV-KQ-45 Questionnaire in English language

Appendix F. Approval letter from original author of Malay translated and validated HIV-KQ-18 Questionnaire

Appendix G. Malay translated and validated of HIV Stigma questionnaire

Appendix H. Malay-mHealth Application Usability Questionnaire (M-MAUQ)

Appendix I. Proforma

Appendix J. Notification of Copyright in a Work

Appendix K. Ethical clearance approval was obtained from Human Research and Ethics Committee

Appendix L. Proof of manuscript submission to International Islamic Universiti Malaysia Medical Journal Malaysia (IMJM)

ABSKTRAK

PEMBANGUNAN DAN KEBERKESANAN MODUL PENDIDIKAN KESIHATAN HIV SECARA ATAS TALIAN (MYDR CARE4U) BAGI MENINGKATKAN ILMU PENGETAHUAN BERKENAAN HIV, MENGURANGKAN STIGMA KEPADA HIV DAN MENINGKATKAN AKSES PERKHIDMATAN KESIHATAN KEPADA TRANSGENDER

Latar Belakang: Populasi transgender sangat terkesan dengan HIV yang disebabkan oleh aktiviti seksual yang tidak selamat. Perbezaan tafsiran jantina oleh transgender yang bertentangan dengan nilai adat dan sosial masyarakat Melayu Islam telah mengurangkan akses mereka kepada perkhidmatan di fasiliti kesihatan. Keadaan persekitaran yang kurang kondusif di fasiliti kesihatan mengurangkan motivasi mereka untuk terlibat secara aktif dalam strategi kesihatan bersama. Kompleks ketidaksamaan masalah kesihatan ini mengurangkan ilmu pengetahuan berkaitan dengan penyakit HIV yang merupakan elemen yang sangat penting untuk mengurangkan risiko jangkitan HIV. Oleh yang demikian, modul pendidikan kesihatan HIV secara atas talian telah dibangunkan dengan integrasi teknologi digital terkini dan teori pendidikan kesihatan mengikut keperluan komuniti transgender.

Objektif: Kajian ini adalah bertujuan untuk membangunkan pendidikan kesihatan HIV secara atas talian (MyDrCare4u) dan menilai keberkesanan modul ini terhadap ilmu pengetahuan berkaitan dengan HIV, stigma terhadap penyakit HIV dan akses perkhidmatan kesihatan kepada transgender.

Kaedah: Kajian ini terdiri daripada dua fasa, Fasa I adalah pembentukan pendidikan kesihatan HIV dan Fasa II melibatkan kajian kuasi-eksperimen. Modul pendidikan

kesihatan HIV secara atas talian yang baru dibangunkan ini adalah berdasarkan konsensus persetujuan bersama oleh pihak berkepentingan secara sistematik berdasarkan teori *Health Belief Model (HMB)* dengan menggunakan teknik Delphi yang diubahsuai. Modul ini telah disampaikan kepada kumpulan intervensi di Kelantan, manakala kumpulan kawalan di Pahang menerima pendidikan kesihatan HIV di fasiliti kesihatan seperti yang biasa dijalankan. Analisa pengukuran berulang, ujian Chi-kuasa dua, ujian T dan ujian Fisher's exact telah digunakan.

Keputusan: Dalam Fasa I, pengesahan kandungan, pengesahan pemahaman dan pengesahan penggunaan modul yang baru dibentuk telah dinilai sebagai cemerlang dan disahkan oleh penilai-penilai yang dilantik. Manakala dalam Fasa II untuk intervensi, terdapat perubahan yang signifikan purata skor ilmu pengetahuan berkaitan dengan HIV diantara kumpulan intervensi dan kumpulan kawalan tanpa mengikut masa [$F(1,58) = 5.98, p < 0.001$; effect size ($(\eta_p^2) = 0.093$]. Terdapat juga perubahan yang signifikan purata skor stigma terhadap HIV diantara kumpulan intervensi dan kumpulan kawalan tanpa mengikut masa [$F(1,58) = 10.97, p = 0.002$; effect size ($\eta^2 = 0.159$)]. Kumpulan intervensi didapati mempunyai peningkatan ilmu pengetahuan signifikan berkaitan dengan HIV daripada garis dasar sehingga susulan tiga bulan [Huynh-Feldt: $F(1.7, 49.8) = 38.86, p < 0.001$; effect size ($\eta^2 = 0.573$)]. Kumpulan intervensi juga didapati mempunyai pengurangan stigma yang signifikan terhadap HIV daripada garis dasar sehingga susulan tiga bulan [$F(0.96; df = 2; p = 0.619)$]. Terdapat juga signifikan peningkatan perkadaran saringan ujian HIV kumpulan intervensi dari garis dasar sehingga susulan tiga bulan ($p < 0.001$)

Kesimpulan: Modul pendidikan kesihatan HIV yang baru dibangunkan ini terbukti efektif dalam meningkatkan ilmu pengetahuan dan mengurangkan stigma terhadap

HIV serta dapat meningkatkan perkadaran saringan HIV dalam kalangan transgender. Hasil kajian ini memberikan petunjuk untuk pelaksanaan pada masa hadapan melalui kerjasama antara pihak berkepentingan ke arah menghentikan AIDS pada tahun 2030 di Malaysia.

KATA KUNCI : HIV/AIDS , Modul Pendidikan Kesihatan HIV secara atas talian , ilmu pengetahuan HIV

ABSTRACT

DEVELOPMENT AND EFFECTIVENESS OF MYDRCARE4U ONLINE HIV HEALTH EDUCATION MODULE IN INCREASING HIV KNOWLEDGE, REDUCING HIV STIGMA AND INCREASING ACCESSIBILITY TO HEALTHCARE SERVICES FOR TRANSGENDER

Background: Transgender populations hugely affected by HIV infection due to unsafe sexual behaviour. The contrary of gender value to socio-cultural expectation among transgender in Malay-Muslim community strongly hindrances to access the facility-based healthcare services. Lacking of supportive environment on conventional HIV health education significantly reduce their motivation to actively involved in current engagement strategy. This complex health disparities lead to inadequate level of HIV knowledge which was the uttermost important element in decreasing risk of the infection. Acknowledging these issues, a structured online HIV health education module named MyDrCare4u has been developed by integrating the advancement of digital communication with the theory-based health education which tailored with the cultural needs of transgender.

Objective: The current study was aimed to develop MyDrCare4u Online HIV health education and to evaluate the effectiveness of this module on level of HIV knowledge, level of HIV stigma and accessibility to healthcare services for transgender.

Methodology: This study comprised of two phases which are development of HIV health education module in Phase I and quasi-experimental study in Phase II. The newly developed MyDrCare4u online HIV health education module was based on enriched consensus of relevant stakeholders systematically from Health Belief Model

(HBM) theory by using modified delphie technique. This module has been delivered to intervention group in Kelantan while control group in Pahang received HIV health education at healthcare facility. Repeated Measures Analysis of Variances (RM ANOVA), Chi-Square test, Independent T-test and Fisher's exact test were applied.

Result: In Phase I, the content validation, face validation and usability assessment of newly developed module was rated excellent and verified by specific raters on each stage. In Phase II, there was an overall statistically significant difference in mean HIV knowledge scores between intervention and control group, regardless of time [$F(1,58) = 5.98, p < 0.001$; effect size (η_p^2) = 0.093]. There was an overall statistically significant difference in mean HIV stigma scores between intervention and control group, regardless of time [$F(1,58) = 10.97, p = 0.002$; effect size (η_p^2) = 0.159]. The intervention group had statistically significant increment of mean HIV knowledge score from baseline to one-month and three-months follow up [Huynh-Feldt: $F(1.7, 49.8) = 38.86, p < 0.001$; effect size (η^2) = 0.573]. There was a statistically significant reduction of mean HIV stigma score from baseline to one-month and three-months follow up in intervention group [$F(0.96; df = 2; p = 0.619)$]. There was a statistically significant increment of proportion of HIV screening test in intervention group from baseline to three-months follow up ($p < 0.001$).

Conclusion: The newly developed online HIV health education module effectively increase HIV knowledge, reduce HIV stigma and increase proportion of HIV screening among transgender population. Our findings shed light for future implementation of this module through collaborative efforts of relevant stakeholders towards ending AIDS in Malaysia by 2030.

KEY WORDS : HIV/AIDS, Online HIV health education module, HIV knowledge

CHAPTER 1

INTRODUCTION

1.1 Burden of HIV infection worldwide

Human Immunodeficient Virus (HIV) is an autoimmune disease that precisely attacks the human immune cell. It was first discovered in the 1980s after an alarming rise of rare cancer and lung infections among the gay population in the United States of America (USA). The spreading of these viruses has become one of the most devastating and dreaded pandemics in history. To date, it is estimated about 78 million have been infected with HIV, and already claimed approximately 36.3 million lives. Recently, it was estimated about 37.7 people are living with HIV, which significantly continues the burden of this epidemic on public health (WHO, 2019). These viruses specifically attack the human immune system and reduce the efficiency of defensive mechanisms to protect against many infections and several types of life-threatening cancers.

Infected individuals gradually developed impaired immune system after being destroyed by the virus for several years. Advanced HIV infections can lead to major complications in human vital organs and systems. HIV-induced enteropathy, nephropathy, neurocognitive and pulmonary disorder are the common complication of HIV which are attributable to the risk of opportunistic infections (Chu & Selwyn, 2011). As the immune system weakens, which takes many years to develop depending on individuals, untreated HIV-infected individuals may advance to Acquired Immunodeficiency Syndrome (AIDS) by manifesting certain cancers, co-infections, and severe chronic complications of HIV. At these most advanced stages of HIV, the immune system has been severely compromised with the very low capability to

respond towards most infections and diseases. Kaposi's sarcoma, Cryptococcal Meningitis, and Tuberculosis were the common co-infection that occurred at the stage of AIDS. A person with AIDS also experiences a poor quality of life and shortened life expectancy, mostly depending on the level of viral loads, comorbidities, and other HIV-related infections such as hepatitis (Operskalski & Kovacs, 2011).

Managing the HIV pandemic has plagued global countries around the world with a high socioeconomic impact that affects both the healthcare system and country development. Infected professional and skilled workers to HIV infection translates into major deficits for economic growth, technology development, and the healthcare system (Maynard & Ong, 2016).

1.2 Burden of HIV infection in Malaysia

HIV infection was first detected in Malaysia in late 1986, a year after compulsory nationwide HIV surveillance has been implemented for early detection of the virus in the community. Since then, the numbers of HIV infected individuals were exponentially increase majority due to increase screening of HIV among high-risk group especially at rehabilitation centers and prisons. After almost ten years since the first cases, the reported individual with HIV infection had the steepest rise to 8049 people with 77.2% of them were intravenous opioid abusers (Ismail, Doi & Naganathna, 1995).

The substantial rise numbers of new cases HIV infection in Malaysia reached historically the highest numbers in 2002 with 6978 cases of new HIV infection were recorded (Choy, 2014). Popularly available injecting drugs in the local market such as heroin and cannabis during this period further increase the risk of unethical sharing of needle. Based on the report by National Drug Agency, it was estimated more than 350

000 drug abusers in Malaysia in 2002 with almost two thousand new drug abusers registered every month mainly on the following years. At this concentrated epidemic stage, there were 51 256 people living with HIV, 6579 people with AIDS and about 5676 people reported death due to AIDS (Huang & Hussein, 2004).

In respond to this catastrophically high burden of HIV infection, the government of Malaysia had implemented various strategic planning and advocacy initiatives in halting the fast spread of HIV infection. Through criminal justice system, revised version of Dangerous Drugs Act of 1952 had provided principle legal basis to control trafficking and misuse of drugs by mandatory punitive treatment in a drug rehabilitation centre followed by local community services. This enforcement successfully incarcerated 16 237 prisoners with drug-related offenses in 2007 (Kamarulzaman, 2009). Amid the escalating numbers of opioid abusers in drug rehabilitation centre, the treatment and prevention care among this high-risk group were implemented tailored to their social and cultural need. These combination efforts steadily reduce the number of new HIV cases in Malaysia as shown in Figure 1.1

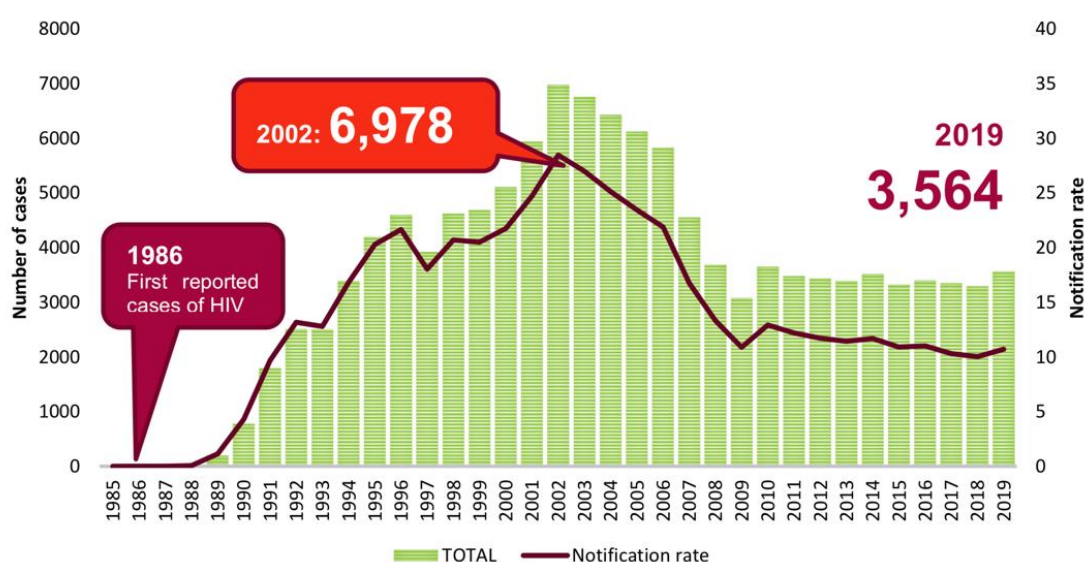


Figure 1.1 : Reported number of HIV cases and notification rate in Malaysia 1986-2019 (Ministry of Malaysia, 2020)

. Apparently, despite of successful strategy on reducing new HIV cases among opioid abusers, the number of new HIV cases remain plateau since 2010 without significant reduction. Larger scale of HIV infection has been permeated every stratum of the community majority via high risk of sexual behaviour. This situation hampered the previous multisectoral collaborative effort on reducing risk of HIV infection through sharing of needle. Acknowledging this worrisome trend, battling again the current trend of HIV infection were fraught with many challenges especially to implement targeted approach shifted towards reducing the risk of HIV infection via sexual transmission (Suleiman, Ramly & Ngadiman, 2021).

1.3 Key population of HIV in Malaysia

Key population of HIV defined as a group people with attributable to acquisition the HIV infection by specific high-risk behaviour. In fact, these key population are disproportionately affected by HIV with pooled prevalence of 10-50 times risk of getting HIV in comparison with general population (Figueroa *et al.*, 2015). There are four key populations which are Person Who Injecting Drugs (PWID), Transgender (TG) , Men Who Have Sex With Men (MSM) and Female Sex Worker (FWS) (WHO, 2016). HIV vulnerabilities among these key population are different due specific unique high-risk behaviour among themselves.

It was observed that the spread of HIV infection at early phase of HIV epidemic in Malaysia was predominantly through sharing of needle among PWID. The PWID refers to an opioid abuser who shared unsterile ejecting equipment such as needle and syringe which increase the risk of HIV infection. The crisis misuse and non-medical use of opioids among PWID had put this key population about 80% from the 115 000 people newly diagnosed with HIV in late 1980s (Chong *et al.*, 2021). This negative

behaviour was mainly driven by psychological addiction to the euphoric effect of the opioid (Benyamin *et al.*, 2008). To date, it is estimated about 75 000 PWID in Malaysia with 13.5% prevalence of HIV (Ministry of Health Malaysia, 2020). The culture of sharing unsterile injecting equipment among PWID was popular among this key population mainly due to financial constraint and lacking of awareness regarding the risk of HIV infection (Barnard, 1993). The comprehensive harm reduction program such as needle syringe exchange program and methadone maintenance therapy were embraced by government of Malaysia to reduce the risk of HIV infection among PWID. All these efforts were significantly reducing the new HIV infection reported among this key population.

Since a decades ago, the new cases of HIV via sexual transmission have been steadily increase by other key populations which are TG, MSM and FSW. The term transgender is an umbrella for persons whose gender expressions and gender identification are different from their gender biologically assigned to their sex at birth (Barmania & Aljunid, 2017). It is estimated about 50,000 of transgender population in Malaysia with majority of them are Malay and Muslim. The HIV prevalence among transgender is 10.9% (Wei *et al.*, 2012; Ministry of Health Malaysia, 2020). They have very high risk of HIV infection due to unprotected anal intercourse especially with multiple sexual partners. Thin layer of anal tissues which lining by a single layer of epithelial cell is fragile and easily break to expose with HIV virus. Once established the point of infection, rich number of activated lymphoid cells in anal mucosal facilitate the dissemination of the virus within twenty four hours (Baggaley, White & Boily, 2010; Pauff & Miller, 2012). Being transgender is forty nine times more risk of HIV infection compare to non-transgender population at similar reproductive age group (Baral *et al.*, 2013). Besides that, the risk of HIV transmission via anal

intercourse is up to 1.7% while the risk of heterosexual transmission up to 0.5% (Boily *et al.*, 2009).

MSM refers to a male identified gender who ever had history of having sexual intercourse a male identified gender (Benjamin Chun-Kit Tong, 2017). There were estimated 220 000 of MSM population recently with 21.6% prevalence of HIV infection among this key population (Ministry of Health Malaysia, 2020). MSM also had similar risk of HIV transmission with transgender population via anal intercourse, however higher stigma and discrimination experienced by transgender in the community reduce their participation to healthcare services. This situation masked the actual statistics about the risk and prevalence of HIV among the transgender which might be lower than actual data (Johnson *et al.*, 2015).

Lastly, FSW define as biologically female sex individual who involved in transactional sex services as their main source of financial support (Vandepitte *et al.*, 2006; Wickersham *et al.*, 2017). This key population was estimated about 22 000 in Malaysia with only 6.3% prevalence of HIV infection (Ministry of Health Malaysia, 2020). The FSW disproportionately have lower susceptibility to HIV infection compared to other key population with high risk of anal intercourse due to innate immunity and protection at vaginal area. Dense mucosal epithelium provide robust immunological and physical barrier against viral entry in the endocervix area which provide higher protection than anal mucosa epithelium (Wira *et al.*, 2005). It was estimated the risk of HIV transmission via vaginal intercourse was approximately one in hundred or one in thousand per coital act (Gray *et al.*, 2001).

1.4 Healthcare services for key population in Malaysia

Comprehensive healthcare services for key population which focus on HIV prevention and care programmes have been implemented since the beginning of HIV epidemic in Malaysia. As the initial phase of HIV epidemic largely driven by PWID, most of the healthcare services were initiated and implemented tailored to the social and cultural need of PWID (Ball, 2007). Viewing high risk behaviour and addiction among PWID as public health issues in conjunction with national security issues, the National Task Force on harm reduction had developed harm reduction programmes with advocacy from relevant stakeholders. The programmes such as needle syringe exchange program and methadone maintenance therapy were piloted in 2005 produce impactful result in reducing opioid addiction and risk of HIV infection among PWID. Following years, these harm reduction programmes able to be expended into fifty-nine government facilities and nine non-government clinics with almost twenty thousand registered clients nationwide (Kamarulzaman, 2009). Harmonized policy implementation between punitive action on PWID with rehabilitation support among these key population rapidly scale-up coverage of these programmes and participation of the PWID (Wilson *et al.*, 2015).

The number of new HIV cases showed significant reduction until reach plateau state at the beginning of 2010 due to vast majority of the key population have been infected via sexual transmission rather than sharing of needle. Based on recent integrated bio-behavioural survey (IBBS) 2017, 86.6% new cases of HIV were transmitted through sexual intercourses (Ministry of Health Malaysia, 2017). Despite of extensive scaling up coverage and effective quality of healthcare service delivery for PWID, the other key population affected HIV infection via sexual transmission experienced tremendous challenges on accessing healthcare services. One of the most

concern issues was the high degree of stigma and discrimination associated to their sexual behaviour and sexual orientation which contrary to social and cultural norm Muslim-majority community in Malaysia. High structural barrier facing by these key population especially among the transgender hinder their access to healthcare services focus on HIV prevention and care.

HIV health education is the most imperative healthcare services to deliver targeted information about HIV infection for key population (Orel, Spence & Steele, 2005). Conventionally, the thematic information about HIV infection were distributed via printed materials and community talk delivered by qualified healthcare workers. This approach however was not fully adapted by transgender community and stagnating the HIV information delivery. These situations subsequently reduce the level of knowledge about HIV infection and increase stigma to the HIV. Inadequate knowledge about HIV also elevated the rates of high sexual risk behaviour among the transgender. Addressing this gaps, specific HIV health education should be developed and delivered via culturally accepted method of delivery for transgender community. Moreover, recent advanced digital communication technology is potential to overcome the barrier of HIV health education delivery and create a favourable environment for specific key population.

1.5 Transgender and barrier to HIV health education

Barrier to HIV health education is one of the particular concern issues for transgender to access HIV health education at healthcare facility. It is the cornerstones gateway to receive accurate information about HIV infection from credential health educator. This healthcare environment create feeling of discrediting for transgender and interrupt their social interaction process with healthcare worker (Gray, 2002).

Feeling of unaccepted and facing lack of supportive environment at healthcare services placed transgender in unfavourable experience. The exclusion of transgender population to comprehensible HIV education through current strategies of health promotion is critical predictors for high risk of sexual behaviours. Latest report by Malaysian Integrated Bio-Behavioural Survey (IBBS) 2017 found that, only 22.8% of transgender population had engaged in health promotion by ministry of health (Ministry of Health Malaysia, 2017). This statistic indicates incorporating conventional HIV health education at healthcare facility for transgender population was not successfully reach them.

Most of the transgender experienced stigma and discrimination from the community due to contrary gender values to the societal expectation among Muslim-majority in Malaysia. Transgender is facing low tolerance and acceptance in perspective of Islam and socio-cultural point of Malay belief. Acknowledging this situation, being transgender is a social taboo and they are illegal and punishable by Syariah law (Lim *et al.*, 2020). They are socially transition from traditional population groups and have been linked to poor health outcome such as HIV, substances abuse, transactional sex and psychiatric illness due to barrier of healthcare services (Mendelson, Turner & Tandon, 2010). Rampant discrimination also affects their welfare, livelihood and social relationship which exacerbating the poor health outcome. Some of transgender being discriminated for employment intake by disregarding their qualifications. Widen disparities pushing them to transactional sexual activities in help to position themselves in financially stable situation.

1.6 Low level of HIV knowledge among transgenders

Knowledge about HIV infection is the uttermost important core element for safe sexual practise among transgender (Pahn *et al.*, 2020). The contingent of HIV knowledge strongly relies on reliable source of information about this infectious disease. Inequality to involve and actively participate in HIV health education at healthcare facility is one of the main factors to scourge the level of HIV knowledge. Poor dissemination of uniform and structured education technique opted out the transgender community for alternative source of the information about HIV (Coyle *et al.*, 2019). Ironically, unreliable information about HIV infection especially from extensively available online source provide more confusion and wrong practise of HIV prevention and treatment care. Besides that, some of them merely depend on their friends from similar high-risk group which do not have any credential and professional qualification to constructively deliver information about HIV infection (Barr, Budge & Adelson, 2016). Driven by this disadvantage situation, the transgender continuously trapped in high risk of sexual behaviour due to limitation of possessing HIV knowledge.

It is estimated more than 50% of transgender population in Malaysia have low level of HIV knowledge (IBBS, 2017). Inadequate level of HIV knowledge among transgender population with formidable barrier of current health promotion strategies translated into high HIV risk of sexual activity. This impact is evinced by high practise of unprotected sexual intercourse which have 138 HIV risk per 10000 exposures to an infected source (Patel *et al.*, 2014). Low level of HIV knowledge accelerate these population to expose with multiple sexual partners without recognizing the high risk HIV acquisition (Nemoto *et al.*, 2016a). Designing new method and strategy to

improve HIV knowledge warrant an urgent effort by multi-agency stakeholders to reach this key population efficiently.

1.7 High level of stigma about HIV infection among transgenders

Avoidance to HIV health education at healthcare services due to societal pressure left the transgender community with inadequate level of knowledge about HIV infection. Interrupted education delivery misleading their understanding about HIV infection which resulting in stigma about the infectious disease (Turan *et al.*, 2017). Reflected to this limitation, they perceived negative judgement and irrational attitudes towards people living with HIV or the risk associated with the infection. The outdated information influences the negative perception about HIV infection and discourage them to engage with HIV prevention and care services such as early HIV screening and treatment for eligible candidates (Sengupta *et al.*, 2011).

Misconception about risk HIV transmission such as shaking hand and sharing of eating utensils provide excessive fear and discriminatory attitudes towards people living with HIV. These negative portrayals of HIV infection were known to continue occurring among transgender population due to incomplete facts about the disease (Paltiel *et al.*, 2006) . The fear of getting infected through physical contact with HIV positive individuals support the lack of accurate health information about the mean of HIV transmission. This invalid in-depth perspective and personal belief create social disengagement and raised suspicious interaction while communicating with at risk population.

Besides that, the nature of HIV infection and its complication also were reported as driver to the stigma about HIV. Severe complication of HIV especially at the most severe phase of AIDS become a negative value to initiate early screening and

know the status of HIV among the key population. Immoral behaviour related to transgender such as involved in transactional sex, having multiple sexual partners and unprotected sexual intercourse ultimately devalued this key population to live in a healthy lifestyle (Warwick-Booth *et al.*, 2019). Acknowledging this situation, transgender with high probability of getting HIV prefer not tested rather than being punished and threatening their social status in the community. Once diagnosed with HIV infection, they will be perceived as contagious and risky to their community. More importantly, their social network will be narrower due to fear of contracted with HIV infection in their community. This extraordinary stigma about HIV infection creates disharmony experience by transgender that threatening themselves with potential rejection with family members, partners, and their community (Luseno *et al.*, 2021).

1.8 Low uptake of HIV screening among transgenders

HIV infection was labelled as socially undesirable infectious disease among transgender mainly among those with lacking of accurate information about HIV. Deeply discrediting HIV infection has negative impact on involvement and participation of transgender with HIV prevention and care services such as HIV screening program (Rizza *et al.*, 2012). Early HIV screening among transgender is a critical step for early detection and proper management of high-risk key population. However, mediated by societal pressure on the transgender identity in the community, transgender had experience strong barrier to perform regular HIV screening even though the services are available widely at healthcare centre.

The transgender also experience difficulty to interact and communicate with healthcare worker due to fear of mistreat and disrespectful behaviour towards them.

The uncondusive environment deemed as rejection for this key population thus withdrawing their participation in HIV screening test as coping mechanism to encounter this problem (Andrasik *et al.*, 2014). They also had lower trust on healthcare provider to share their personal information such as HIV status and their high risk of sexual behaviour. These undesirable challenges had reduced their motivation to perform early and regular HIV screening for greater potential health benefit.

HIV screening is a vital component in biomedical intervention to reduce the risk of HIV transmission. Early identification of undiagnosed individual infected with HIV facilitate early treatment with adequate care follow up at healthcare facility. Left undiagnosed with late detection of HIV, the HIV positive individual might face life-threatening condition due to damaged immune system and developed AIDS at later stage (Anthony & Bell, 2008). Therefore, early HIV screening among transgender required urgent comprehensive strategy to reduce morbidity and mortality related to HIV infection.

1.9 Strategies to provide HIV health education for transgender

Ministry of Health Malaysia (MOH) has made a great stride by implementing several strategies to increase access to HIV health education for transgender. Several intensify action through National Strategic Plan Ending AIDS (NSPEA) 2030 with targeted HIV health education for transgender were implemented based on recommendation by The Joint United Nations Programs on HIV/AIDS (UNAIDS) and Sustainable Development Goal (SDG).

Decentralization of HIV health education by involving non-governmental organization (NGO) is one of the efforts on deliver HIV health education for transgender. Direct involvement of outreach workers especially among their

representative were trained to deliver HIV health education for transgender in the community (Reback & Fletcher, 2014). The main objective is to strengthen knowledge about HIV infection which can increase awareness about the disease and promote positive behavioural changes. Capacity building to increase motivation and confident level of outreach workers to deliver HIV health education independently has been supported by series of training and courses by certified HIV health educator. The outreaches workers were given permission to share and utilized HIV health education materials from government clinic to standardized information delivery (Reback *et al.*, 2015). However, despite of good support and training by ministry of health, the wide distribution and diversity of transgender in community create a very challenging situation for outreach workers to reach them at their convenient time. Most of the transgender have individualized working time and lifestyle which almost impossible for the outreach workers to conduct HIV health education simultaneously for them. Personal coaching and small group discussion were very challenging and not practical due to time consuming and required a lot of resources.

Another strategy is by credential of local transgender representative as part of outreach team members. They help to mapping out and identify transgender population in community as strategy for targeted HIV health education delivery in the local community. Precise location and areas with high population of transgender is important for strategic planning and allocation of resource for HIV health education in the community (Andrew Scheibe *et al.*, 2018). Accurate information about local community is very helpful to organized well-prepared HIV health education team with resourceful materials and information about HIV infection. Although this effort was very helpful, insufficient number of transgenders involved to facilitate this implementation of HIV health education strategy limit the full-scale implementation

in the community. Continuous community assessment with limited resource is burdensome and not efficient for long term implementation (National Strategic Plan Ending AIDS, 2020). Thus, more cost-effective, and practical method of HIV health education delivery warrant an urgent implementation towards sustainability of this program.

1.10 Internet communication technology use by transgender

Internet is a global digital communication technology which connect people around the world without visibly present to interact to each other. This revolutionized communication technology has been widely used as a powerful medium to deliver information and sharing of knowledge from various discipline and services (Sun & Chen, 2016). People from different location able to communicate simultaneously through different platform such as social media application, email, and video conferencing. Majority of people already embedded this technology to enhance their communication and as important tools to offer new virtual environment for social life and meeting up with new friends.

The shift towards online digital communication has been very popular among transgenders. They able to disclose their present in real world by communicate through virtual environment such as using the social media application across geographical location. This safe environment had garner attention among the transgender as alternative method meet new friends, sharing knowledge and organized their community without appear in public (Shapiro, 2003). The emerging of online support group to strengthen their social movement had foster the utilization of internet among this key population. Alongside with this, non-formal health education conducted by community members especially related to sexually transmitted disease and HIV

infection has been migrated to online discussion for more flexible delivery. However, the information delivered by non-credential health educator might be outdated and untrue which erroneously influence their action towards HIV prevention and treatment care.

Culturally adapted HIV health education programs and practise with gender-affirming approach able to elicit concern and questions about risk of HIV among transgender (Cao *et al.*, 2017). The use of digital information and social media among transgender as their main platforms of communication can be integrated with the introduction of digital health promotion. This salient strategy is very efficient and appeal to be cost-effective and practical to answer any unexamined assumption thus increase HIV knowledge and promote positive sexual health behaviour (Niakan *et al.*, 2017). The content of internet-based health promotion can be easily updated to recent changes of guideline and information. Online digital strategy can be reach at convience time and more wide geographical area with diverse format available such as via mobile phone, massaging application and web browser. Virtual information sharing provide more privacy as it can be access anonymously and create a comfortable platform for transgender to involved in two way communication with healthcare provider (Minichiello *et al.*, 2013). Established interaction between transgender and healthcare providers improved social support and facilitate decision making process towards behavioural changes through targeted intervention activities.

1.11 Problem statement

Transgender is one of the most marginalized and discriminated key populations of HIV. This is due to different and complex perspective of transgender from the socio-cultural and religious view in Malaysia. Prejudicial pressure and discrimination from different context interrupt their social interaction with current practise of healthcare system. Structural barrier dominantly causes by lack of targeted program or policy relevant to the needs of transgender is the major factor for poor engagement in prevention program. Unfavourable environment at healthcare services limits their participation on face-to-face HIV education program.

Facing different type of discrimination at facility-based health promotion weaken their motivation to learn about HIV. This condition hugely impacts on reducing level of HIV knowledge which possibly influence sexual behaviour among transgenders. Misleading HIV information and incorrect guidance from unreliable source turned into high risk of HIV practise such as not wearing condom and having multiple sexual partners.

Inadequate HIV knowledge would have driven negative perception towards HIV disease. Unnecessary fear the complications of HIV and misconception regarding infectiousness to others create negative psychological respond to HIV. High risk behaviours which commonly related to HIV infection among transgender like having multiple sexual partners further diminished their effort to explore more about HIV disease. Wrong judgement about HIV disease directly increases level of HIV stigma among transgender which may add more complexities on practising safe sexual activity

1.12 Rationale of the study

1. Development of new online HIV health education for transgender is very important to increase access to the information about HIV infection which tailored to the social and cultural need of transgender
2. High level of HIV knowledge reduces negative perception related to this infectious disease and increase motivation to participate in HIV prevention and care services
3. Comprehensive understanding about HIV infection reduce stigma to this infectious disease and increase awareness for HIV screening uptake

1.13 Research Questions

Phase I

1. Does the online HIV health education module (MyDrCare4u) is a valid tool to increase HIV knowledge, reduce HIV stigma and increase accessibility to healthcare services for transgenders?

Phase II

1. Does the use of online HIV health education module (MyDrCare4u) effective in improving the level of HIV knowledge, reducing level of HIV stigma and increasing accessibility to healthcare services for transgenders?

1.14 Research hypothesis

Phase I

The online HIV health education module (MyDrCare4u) is a valid tool to increase HIV knowledge, reduce HIV stigma and increase accessibility to healthcare services for transgenders

Phase II

The use of online HIV health education module (MyDrCare4u) effective in improving the level of HIV knowledge, reducing level of HIV stigma and increasing accessibility to healthcare services for transgenders?

1.15 Objectives of the study

1.15.1 General Objectives

To develop and evaluate the effectiveness of online HIV health education module (MyDrCare4u) for transgender in increasing HIV knowledge, reducing HIV stigma and increasing accessibility to healthcare services for transgender

1.15.2 Specific objective

Phase I

1. To develop online HIV health education module (MyDrCare4u) for transgender.
2. To validate (content and face validity) online HIV health education module (MyDrCare4u) for transgender.
3. To describe the usability of online HIV health education module (MyDrCare4u) for transgender.

Phase II

1. To compare the level of HIV knowledge between transgender in online HIV health education module (MyDrCare4u) within and between control group at 1 month and 3 months.
2. To compare the level of HIV stigma between transgender in online HIV health education module (MyDrCare4u) within and between control group at 1 month and 3 months.
3. To compare the HIV screening uptake among transgender in online HIV health education module (MyDrCare4u) at 1 month and 3 months.

CHAPTER 2

LITERATURE REVIEW

2.1 High barrier of HIV health education for transgender

Transgender experience negative judgement and discrimination in the community (Sengupta *et al.*, 2011). The different of gender expression and gender identification from their biologically assigned gender to sex at birth create contentious religious, moral, and ethical issues in Malaysia. Like majority of Islamic country, transgender population is illegal by constitutional law and punishable by Syariah law. Discussing the right of transgender to have privileged of health equity is a very sensitive issue. With the majority of transgender are Malay and Muslim, they experienced isolated with pervasive social discrimination due to different cultural norms and Islamic way of life practise (Barmania & Aljunid, 2017). Islam practise a very strict prohibitions of gender reassignment surgery without medical justification which put the majority of transgender population in a vulnerable and marginalised part of society. This situation weakens their ability to reach and engaged with HIV prevention and care services. Despite having aware of HIV as an infectious disease, lack of in depth knowledge about the route of HIV transmission, benefit of early screening and treatment and complication of HIV contribute to the high risk behaviour of sexual activities (Johnston *et al.*, 2011).

Based on Integrated Bio-behavioural Survey (IBBS) among transgender in Malaysia, there were about 40% of transgender have never had face-to-face or group discussion with healthcare worker to discuss about their health condition. Besides that, more than half of transgender population prefer friendly infrastructure health promotion conducted by NGOs (IBBS, 2017). Feeling of being judge by the

community due to incongruent of gender presentation with the biological sex, they felt more ease to discuss about their health in a place without exposing to vulnerability of being discriminated. Citing unfavourable experiences with healthcare workers such as lack of communication skills and counselling technique with transgender, these scenarios hinder continuation of care at healthcare services.

Health disparities defined as the type of health status particularly affect the specific population of people that closely linked with economic, social, or environmental disadvantage. The affected population experienced greater social or economic obstacles to health based on their racial or ethnic group, religion, socioeconomic -status, gender, age, or mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion (Braveman, 2014). Transgender experience health disparities due to persistent societal pressure for their different of gender expression and gender identification from the gender biologically assigned to their sex at birth. Deep-rooted discrimination among transgender in Malaysia had cause suboptimal HIV care continuum among this marginalized population. Based on respondent-driven sampling in three regions around Greater Kuala Lumpur by Ranjit *et al.*, 2021, 44.1% of transgender never had HIV testing and known their status of HIV disease and only 34% of them who were diagnosed with HIV currently on ART. The information about viral suppression was not documented due to limitation of access to the personal laboratory information.

Limited structured HIV health education guideline for transgender reduces provider's experience and knowledge on conducting effective communication with transgender. An online survey by a study among transgender in USA found that, 31.5% of transgender experienced gender insensitivity issues, 28.7% feeling

discomfort and 7% had history of verbal abuse while attending healthcare services (Kosenko *et al.*, 2013). Absent of formal HIV health education strategy force cultural stereotypes and reduce their support at healthcare setting for transgender. Lack of acceptance uniquely affect their mental health and psychological distress such as depression even more serious thoughts of death or suicide. Persistent discrimination with poor social support and lack of coping mechanism contribute to the high rates of depression range from 48% to 62% among transgender (Budge, Adelson & Howard, 2013). By preventing emotional responds to stressor and minimizing the problem, majority of them prefer to detach themselves from the problem. Leaving them with unanswered question of health issues cause more poorer outcome of HIV infection among this key population.

In response to tailored with the specific needs of transgender , MOH Malaysia have approved credential of transgender representative as outreaches workers (Ministry of Malaysia, 2015). The aim of this strategy to reduce prejudice, discourage and scepticism of transgender at healthcare services by adapting to their cultural context and behaviour in community. One of the key activities is training of HIV community-based testing and HIV health education for transgender outreach workers. Well trained and experienced outreach workers increase their performance to conduct HIV rapid test and HIV health education at community-based at their convenient place. This approach were found to be cost-effective for HIV rapid test at early stages of the disease and successful to reach key population for health education thus directly enable accurate preventive plan (Parker *et al.*, 2015). Despite of the positive findings of screening test, the sustainability of health education towards behavioural changes was not achieved. Door-to-door community health promotion required additional time effort for regular visit and additional financial cost like transport and accommodation.

Another drawback of this approach is linkage to facility-based services are still required to facilitated behavioural changes. Motivated transgender for positive changes required to come at nearest local clinics for confirmation HIV test and appointment booking for continuation of care. Another obstacle for this strategy is the different nature of work among transgenders. Majority of them involved in selling sex industry as their main source of income to earn a living. Being discriminated for their identity, difficulty in findings job forcing them to transactional sex activity. High financial burden for hormonal therapy and goal transformation of feminization surgery such as implanting breast and vaginoplasty adding more pressure for extra income (Ocha & Earth, 2013). High commitment with clients at dedicated time and place reduce their commitment to attend community-based health promotion.

2.2 HIV knowledge among transgenders

The knowledge about HIV infection is the uttermost important and crucial element for comprehensive understanding of this infectious disease. Basic information about the nature history and the high risk behaviours related of HIV infection was very helpful for preventive strategy (Bazargan *et al.*, 2000). Transgender community was very high risk of getting HIV due to unsafe sexual practice. Possess correct information about risk of HIV infection through unsafe sexual behaviour provide strong foundation to initiate positive behaviour changes. However, low level of knowledge about HIV infection significantly affects their awareness about the risk of this infection. Unaware about the long incubation period of HIV make them feel healthy without any serious health issue. Rooted with low level of HIV knowledge, the disproportionate burden of HIV infection among transgender continue to threaten the effectiveness of current HIV health education program in Malaysia.