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The Effectiveness of Group Video-based Smoking Cessation Strategy (GRACIOUS) on Patient's Motivation to Quit: A Randomised Study Among High Cardiovascular Risk Smokers

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ABSTRACT

Background: Smoking is a major risk factor for cardiovascular disease, particularly in high-risk individuals. This study aimed to evaluate an effectiveness of innovative, tailored group video-based smoking cessation intervention in enhancing knowledge and motivation to quit among high cardiovascular risk smokers. The group video-based programs may offer a flexible, engaging and impactful alternative to traditional in-person interventions. Methods: This was a two-armed, randomized control trial involving 100 high cardiovascular-risk smokers attending the outpatient clinic Hospital Pakar Universiti Sains Malaysia. Participants were randomized into two equally divided groups. The intervention group received a group video-based smoking cessation seminar and standard care, while the control group received only standard care. Knowledge and motivation scores were measured at baseline, 2 weeks, and 8 weeks post-intervention. Results: There was a significant group-time interaction for both knowledge ($p<.001$, 95% CI) and motivation scores ($p<.001$, 95% CI) between the intervention and control groups. Both groups showed significant improvements in knowledge and motivation at 2 and 8 weeks compared to baseline ($p<0.05$, 95% CI), with the intervention group showing a greater mean difference in both scores. Conclusion: The addition of a group video-based smoking cessation strategy to standard care significantly improved knowledge and motivation to quit smoking among high cardiovascular-risk smokers.

Keywords: *Cardiovascular Risk Factor; Brief Intervention; Smoking Cessation; Knowledge; Motivation to quit smoking.*

INTRODUCTION

According to the World Health Organization – Non-Communicable Disease (NCD) Country Profiles 2018, cardiovascular disease (CVD) has been the leading cause of death in Malaysia

for many years, accounting for 35% of total deaths(WHO,2018). The prevalence of cardiovascular risk factors among adults in this country is also on the rise, with the most recent percentage being 38.1% for hypercholesterolemia, 30% for hypertension, 18.3% for diabetes, 50.1 % for overweight or obese, and 21.3% for smoking (National Institutes of Health, 2019). The World Health Organization (WHO) Global Report showed that tobacco was responsible for 23% of all NCD deaths in Malaysia in 2004 (World Health Organization, 2012).

Tobacco use is the single most preventable cause of death in the world, and WHO has shown that smoking is a risk factor contributing to six out of eight leading causes of death worldwide (World Health Organization,2009). Smoking is a strong independent risk factor that contributes to CVD, particularly coronary heart disease (CHD) and stroke. It is well known that smoking accelerates the development of plaque and may lead to plaque rupture, causing premature but preventable death (McEvoy et al, 2015). The risk of CVD in smokers is two to four times higher than in non-smokers (Centers for Disease Control and Prevention,2014). Besides, smoking may also multiply the risk of CVD in the presence of other risk factors (Centers for Disease Control and Prevention,2010), indicating the importance of smoking cessation as a primary, secondary and tertiary prevention of CVD. However, not many people are currently aware that smoking in a high-risk population will result in a higher risk of cardiovascular morbidity and mortality (Haffner, Lehto, Rönnemaa, Pyörälä, and Laakso, 1998).

For smoking cessation intervention, there are generally two types that have been practiced, which are brief and intensive intervention (Ministry of Health Malaysia. Clinical Practice Guideline,2016). A brief intervention was given to all smokers, irrespective of their condition. The commonly used approach in our clinical setting is either the '5 As' steps or the ABC approach, which is usually delivered individually (Ministry of Health Malaysia. Clinical Practice Guideline,2016). Its main aim is to promote health education and motivate them to quit smoking, which can lead to desired behavioural changes (Prochaska and Velicer, 1997). A systematic review comparing brief and intensive smoking cessation interventions in the general population has shown that although there is a higher cessation rate in the intensive intervention (Stead, Buitrago, Preciado, Sanchez, Hartmann-Boyce, and Lancaster, 2013), brief intervention is more widespread compared to the more specialized smoking clinic which was only accessed by fewer smokers (West, McNeill, and Raw, 2000). Brief intervention for smoking cessation is mainly targeted at people in the first three stages of ‘stages of change’, which are pre-contemplation, contemplation, and preparation (Prochaska and Velicer, 1997).

This demonstrates that, while brief interventions are widely implemented in clinical practice, they may not fully engage or be tailored to individuals with high cardiovascular risk in terms of smoking cessation.

Given the steady increase in the cardiovascular risk within our population over the past few years, including the growing number of smokers, intervention targeting this high-risk group are crucial to prevent complications, particularly premature death. In response, we applied the Health Belief Model to develop an innovative group video-based smoking cessation strategy. This approach aims to bridge the gap between brief and intensive interventions by combining the accessibility of brief interventions with the depth of more tailored, health-specific content for high cardiovascular-risk smokers. This strategy seeks to enhance their knowledge of the health risks associated with smoking and directly improve motivation to quit, ultimately promoting behavioural change and smoking cessation.

LITERATURE REVIEW

Motivation on smoking cessation is a complex concept, and it is proven to be difficult to motivate behaviour change. According to the theory postulated by the Transtheoretical Model (TTM) of Health Behaviour Change, increasing one's awareness of potential risks or harm caused by unhealthy habits could increase the motivation for behaviour change. Additionally, following the most universally applied theoretical framework for health behaviour; The Health Belief Model (HBM) which consists of six concepts (DeBarr,2004), has been shown to motivate patients to stop smoking, improve knowledge, attitudes and their behaviour (Renuka, and Pushpanjali, 2014). The motivation of smoking cessation can be assessed by a few methods either by monitoring changes of stage after the intervention or using the various motivation scoring that are readily available. One of scales that frequently used is Smoking Cessation Motivation Questionnaire (Q-MAT) (Aubin, Lagrue, Legeron, and Azoulai, 2004). Using this scale, the level of smoking cessation motivation is determined by the score, which the higher the score, the more motivated the patient is to quit smoking.

In Malaysia, our approach for brief intervention is generally similar for all (Ministry of Health Malaysia. Clinical Practice Guideline,2016). Health education is one of the strategies to overcome the growing tobacco epidemic. Previous studies have shown evidence of the effectiveness of smoking cessation information that has been tailored to the specific target population (Aimer, Stamp, Stebbings, Cameron, Kirby, Croft, and et al, 2015),(Azmi, Nurumal, Mohamed, and Rahman, 2020), (Lennes, Luberto, Carr, Hall, Strauss, Ponzani, and

et al, 2020), however, presently there are limited brief smoking cessation interventions that specifically target patients with high cardiovascular risk. Motivating smokers by focusing on health concerns tailored to their condition can help smoking cessation (Walsh and Sanson-Fisher, 2001).

Besides that, the use of information technology in smoking cessation strategies has been quite prevalent in recent years. Health promotion through either video-based education tools (Wilson et al, 2010), short message services (SMS) (Head, Noar, Iannarino, and Harrington,2013) or computer-based intervention (Portnoy, Scott-Sheldon, Johnson and Carey, 2008) has all been shown to be effective and facilitate changes in patient behaviour. medium either in the video or text-based form is effective in prolonged abstinence among smokers (Stanczyk, De Vries, Candel, Muris, and Bolman, 2015). In this study, the efficacy of both video and text-based computerized medium in smoking intervention was compared, both of which reported prolonged abstinence when compared to control, and more so in video intervention. While there is some strength to it, few limitations need to be considered such as subjects need to attend between three to six sessions over a twelve-month period, which is rather difficult to practice in primary care settings with the risk of high drop-out rates, as shown in this study. Additionally, the use of computers means the need for internet coverage to assess the website, which is unfortunately not feasible in our study setting.

A video-based educational strategy has been quite prevalent in promoting specific preventive health behaviours that have the potential to reduce morbidity and mortality associated with certain diseases. Certain factors, such as video-modelling and message-framing, may contribute to the effectiveness of the video-based intervention. It was suggested that in promoting preventive behaviour such as smoking cessation, the content of the video should be tailored, contain creative video messaging, and should enhance the positive benefits of changed behaviour (Tuong, Larsen, and Armstrong, 2012). The use of videos can minimize the burden on staff by providing needed skill training and role models for patients (Hollis, Lichtenstein, Vogt, Stevens, and Biglan,1993). Besides, adding video-based educational materials to standard brief intervention not only provides knowledge-based learning, but also provides an emotional incentive to change behaviour (Adam, McMahon, Prober, and Bärnighausen, 2019). Azmi et al. are doing one of the studies which used video-based smoking cessation education. In addition to standard brief advice, the study uses additional video with fear-arousal message in the form of personal testimonials for intervention in CVD patients. The result showed a significant improvement in the motivation, behaviour and smoking status of the patient (Azmi, Nurumal, Mohamed, and Rahman,2020). However, the

video in this study was developed specifically for hospitalized smokers with cardiac disease, which may not be applicable in different settings as a broader target population might be needed.

From this we can deduce that, in conjunction to brief standard clinical care, using the Health Belief Model to generate a group video-based smoking cessation strategy that addresses health-specific content unique to patients with high cardiovascular risk in addition to brief standard clinical care, will increase efficiency in increasing awareness and motivation to quit, which can subsequently promote behavioural change that is smoking cessation. Furthermore, the use of video-based medium in this strategy will successfully minimize the issue of time constraints, the intensity of labour, sustainability and help motivate more smokers to quit.

METHODS

Study design

This randomized controlled trial was conducted among high cardiovascular-risk smokers attending an Outpatient clinic at Hospital Pakar Universiti Sains Malaysia (HPUSM), Malaysia. It was run from September 2021 until July 2022, from recruitment until the last data collection. The inclusion criteria for this study were an adult age 18 and above, able to comprehend and understand Malay, a current tobacco smoker and in the high cardiovascular risk category calculated using the Framingham Risk Score FRS-CVD calculator. Patients receiving other interventions for smoking cessation, having documented underlying psychiatric illness or an illiterate, blind or deaf are excluded.

Sample size

The sample size was calculated for all objectives using Power and Sample Size calculation software for comparing two means between groups and paired-t for within group. The biggest sample size was taken as the study sample size. The largest sample size for this study is the knowledge score. The calculation of sample size is as follows; α.= 0.05, Power = 0.9, m = Ratio between intervention and control group = 1, δ Detectable difference in the mean knowledge score intervention and control group = 1, σ = Standard deviation of mean knowledge score for the intervention group in the post-test = 1.38 (Sejr and Osler, 2002). A detectable difference of one unit score was decided after considering the study's clinical importance and feasibility. The minimum required sample size was 41, and after considering the non-response rate of 20%, the sample size calculated for each group was 50.

Research tools

i. **Socio-demographic data, smoking history, and Fagerstrom Test for Nicotine Dependence (FTND)**

The questionnaire was constructed in Malay. It includes information regarding the socio-demographic background, including age, gender, marital status, working status, monthly income, educational level, and underlying comorbidity. Brief smoking history, such as the age started smoking, and duration of smoking also included. The FTND was used to evaluate the level of nicotine dependence of the subjects (Ministry of Health Malaysia. Clinical Practice Guideline,2016).

ii. **Framingham Risk Score (FRS-CVD) 2008**

The Framingham Risk Score FRS-CVD score was used to determine the eligibility of the participants in the study. The score was measured using an online validated calculator. The data required for risk stratification was taken from the patient's case sheet. These include systolic blood pressure, total cholesterol (TC), high-density lipoprotein (HDL) cholesterol, hypertension status (with two categories- with or without treatment), diabetes status, and smoking status. HDL and TC readings were taken from the available blood test result for the past 6 months. After the score was calculated, the percentage will determine the 10-year risk for patients to develop cardiovascular disease. Scores of more than 20% are defined as high-risk groups and thus qualified for this study.

iii. **Group video-based smoking cessation strategy for high cardiovascular-risk smokers (GRACIOUS)**

The Group Video-based Smoking Cessation Strategy for High Cardiovascular Risk Smoker (GRACIOUS) was developed in accordance with the Health Belief Model of health behaviour (Hochbaum, Rosenstock, and Kegels, 1952). It was prepared in Malay and used video as a medium. The educational content is mostly adapted from the report of The Health Consequences of Smoking—50 Years of Progress (Centers for Disease Control and Prevention, 2014;2015) and specific to the high cardiovascular risk group. Before implementation, the content validity of the module was evaluated by four experts in the field. They comprised one health education expert, one public health specialist, and two family medicine specialists from the Ministry of Health and Hospital USM. Face validity was performed on five smokers; however, the internal structure of the module was not tested.

The video was divided into three main topics, smoking and health, Information and demonstration of Nicotine Replacement Therapy (NRT) and Experience sharing video-an

experience-sharing interview with a high cardiovascular-risk patient who has successfully stopped smoking. The video was approximately 20 minutes long.

iv. Brief standard clinical care for smoking cessation

We provide a brief standard clinical care that has been widely used in our clinical setting to help all subjects with smoking cessation before randomization. The method to be used is known as the ABC approach. This approach consists of three steps: (1) asking people about their smoking status and documenting it; (2) providing brief advice to stop smoking to all people who smoke, irrespective of their desire or motivation to quit; (3) making an offer of and refer to or provide evidence-based cessation treatment (Ministry of Health Malaysia. Clinical Practice Guideline,2016). It was delivered individually and took around 5 minutes to be completed.

v. Questionnaire to assess patient's knowledge of smoking health risk

A questionnaire to assess the knowledge of the health risks associated with smoking was developed based on the content of the group video-based smoking cessation strategy. It was prepared in Malay language and consisted of fourteen questions. It includes questions regarding the health effects of smoking in the general population, as well as the high cardiovascular-risk group, and pharmacotherapy for smoking cessation. Questions about the health effect of smoking was constructed following Global Adult Tobacco Survey (GATS) questionnaire, while questions regarding health problems related to smoking were obtained by reviewing the literature on smoking-related illness, choosing conditions that have been used in other surveys (Ron, Ahmad Shalihin, Rahmat, Ahmed, Cummings, and Maizurah,2010),(Oncken, McKee, Krishnan-Sarin, O'Malley, and Mazure, 2005) as well as adding illnesses that are known to worsen with smoking (e.g., diabetes) (Centers for Disease Control and Prevention, 2014;2015). Distracter items were also selected based on items used in other surveys and other medical conditions not known to be related to smoking (e.g., appendicitis, gallstones). Questions about NRT were constructed following the Malaysia clinical practice guideline and literature review on NRT knowledge (Anindya, Laily, and Ayub, 2017). In the questionnaire, the subject must choose between three options of an answer, either 'Yes,' 'Don't know' or 'No'. Three marks will be given for the correct answer, two for don't know, and one for the wrong answer. The mark will be totalled, and higher scores indicate a higher knowledge level. The content of the questionnaire was reviewed by four experts in the field before utilization. After that, face validity was done between ten

adult smokers which is 10% of the sample size. Subsequently, a preliminary reliability test was carried out among 30 adult smokers with Cronbach's alpha value of 0.7.

vi. Smoking Cessation Motivation Questionnaire (Q-MAT)

Q-MAT was a validated scale that was widely used to measure patients' motivation for smoking cessation. It consists of four questions, the response modalities of which generated a score ranging from 0 (lack of motivation) to 20 (excellent motivation). Back translation for linguistic validity was carried out by language experts using Behling's and Law's (2000) technique to translate this questionnaire in Malay after permission from the original developer.

Data collection procedure

Patients were recruited on a voluntary basis. They were provided with flyers during the registration at the clinic. Those who wish to participate can approach the staff and they were evaluated for suitability according to inclusion and exclusion criteria. As consent was obtained, participants needed to respond to pre-test questionnaires comprised of socio-demographic data, FTND, knowledge of smoking and Q-MAT. Then, a simple computer-generated randomization was conducted using an Excel programme to divide participants equally between the control and intervention groups.

Control group

Participants received brief standard clinical care for smoking cessation following Kementerian Kesihatan Malaysia (KKM) guideline. After two and eight weeks, a similar set of questionnaires was administered to reassess the participants' knowledge and motivation to quit. Afterwards, they were given the option to receive the GRACIOUS module following the completion of the study.

Intervention group

In addition to standard care, participants in the intervention group were arranged to attend an online seminar in a group of ten. They were shown the GRACIOUS module once. Few steps were taken to prevent the content of the intervention from being disclosed to the control group. The seminar was conducted live, and a link was provided to the participants scheduled to attend on the seminar day. Participants were strictly reminded before the seminar not to record it in any form. The researchers also ensured that participants from the two groups had

no contact and were uninformed of one another. After the intervention, they were given follow-ups at two and eight weeks to reassess their knowledge and motivation to quit.

Data analysis

Collected data were entered and analysed using Statistical Package for Social Science (SPSS) version 26. Two-way repeated measures ANOVA was conducted to compare the mean of knowledge and motivation score between the intervention and control group at the time of pre-test, 2- and 8-weeks post-intervention.

Ethical Considerations

This study was ethically approved by the Research and Ethical Committee, School of Medical Sciences, Universiti Sains Malaysia (USM/JEPeM/20050261).

RESULTS

A total of 100 participants in this study were equally divided into control and intervention groups. All participants were male. Most of them are Malay, married, and employed. Table 1 shows the baseline characteristics of participants in the intervention and control groups. There was no significant difference in baseline knowledge and motivation score, age of start smoking and Fagerstrom test score between the intervention and control group.

Table 1: Baseline characteristics of participants in the intervention and control groups.

Variables	Intervention (n=50)	Control (n=50)	P-value
Knowledge score	31.74±3.74	32.40±3.33	0.35[a]
Motivation score	7.56±3.61	7.58±3.42	0.98[a]
Age (y)	53.70±7.22	58.02±5.40	0.001[a]
Age starts smoking (y)	18.38±3.28	18.34±3.01	0.95[a]
Duration of smoking (y)	35.32±7.95	39.68±5.69	0.002[a]
CAD history			0.01[b]
Yes	25 (50)	13 (26)	
No	25 (50)	37 (74)	
CVA history			0.22[b]
Yes	13 (26)	8 (16)	
No	37 (74)	42 (84)	

Hypertension			0.37[b]
Yes	34 (68)	38 (76)	
No	16 (32)	12 (24)	
Diabetes mellitus			0.04[b]
Yes	33 (66)	42 (84)	
No	17 (34)	8 (16)	
Hyperlipidaemia			0.36[b]
Yes	35 (70)	39 (78)	
No	15 (30)	11 (22)	
Fagerstrom test score			0.10[b]
Very low addiction	10 (20)	19 (38)	
Moderate addiction	7 (14)	8(16)	
High addiction	5 (10)	1 (2)	

Values are presented as mean±standard deviation or number of subjects (%).

[a] By independent t-test.

[b] By chi-square test.

CAD, Coronary artery disease; CVA, Cerebrovascular accident

A two-way repeated measure ANOVA was conducted to compare the effect of GRACIOUS on the mean of knowledge and motivation score between the intervention and control group at the time of pre-test, 2- and 8-weeks post-intervention. Table 2 shows a group-time interaction of mean knowledge score change between the intervention and control groups ($p<0.001$). There was a significant change in the mean knowledge score between the intervention and control group over time with $p<0.05$ [Greenhouse-Geisser, $F (1.4, 133.5 = 287.46)$]. Post hoc analysis with Bonferroni correction done and based on the test of within-subject effects, there was a significant difference in mean knowledge score between the pre-test and post-test 2 weeks ($p<.001$ for both groups), and pre-test and post-test 8 weeks ($p<.001$ for both groups). However, there was no significant difference in mean knowledge score between the post-test 2 weeks and the post-test 8 weeks ($p=1.00$ intervention; $p=0.75$ control). The intervention group has overall higher mean differences compared to the control group.

Table 2. Comparison of mean knowledge score change between the intervention and control groups for group*time interaction.

Group	Desc Mean[a] (SD[b])			EMM[c] (95% CI[d])			F stat[e] (df[f])	P-value[g]
	0 Week	2 weeks	8 weeks	0 week	2 weeks	8 weeks		
Intervention	31.74 (3.74)	38.36 (2.06)	38.48 (2.18)	30.75-32.73	37.61-39.11	37.72-39.24	17.23	<.001
Control	32.40 (3.33)	34.80 (3.16)	34.60 (3.14)	31.41-33.39	34.05-35.55	33.84-35.36		

[a]. Descriptive mean

[b]. Standard deviation

[c]. Estimated marginal mean

[d]. Confidence interval

[e]. F statistic

[f]. Degree of freedom

[g]. Group-time interaction of repeated measure analysis of variance

Table 3 illustrates the group-time interaction of mean motivation score change between the intervention and control groups. There was a substantial change in the mean motivation score between the intervention and control groups over time $p<0.05$ [Huynh-Feldt, $F (1.9, 188.6 = 181.23)$]. Post hoc analysis with Bonferroni correction done and based on the test of within-subject effects, there was a significant difference in mean knowledge score between the pre-test and post-test 2 weeks ($p<.001$ for both groups), and pre-test and post-test 8 weeks ($p<.001$ for intervention; $p=0.01$ for control). The difference in mean knowledge score between the post-test 2 weeks and the post-test 8 weeks in the control group was significant ($p=0.03$) but not in the intervention ($p=1.00$). Nevertheless, the intervention group has higher mean difference.

Table 3. Comparison of mean motivation score change between the intervention and control groups for group*time interaction.

Group	Desc Mean[a] (SD[b])			EMM[c] (95% CI[d])			F stat[e] (df[f])	P-value[g]
	0 Week	2 weeks	8 weeks	0 week	2 Weeks	8 Weeks		
Intervention	7.56 (3.61)	11.88 (3.54)	11.84 (3.18)	6.57-8.55	10.95-12.81	10.96-12.72	11.44	<.001
Control	7.58 (3.42)	8.88 (3.07)	8.34 (3.11)	6.59-8.57	7.95-9.81	7.46-9.22		

[a]. Descriptive mean

[b]. Standard deviation

[c]. Estimated marginal mean

[d]. Confidence interval

[e]. F statistic

[f]. Degree of freedom

[g]. Group-time interaction of repeated measure analysis of variance

DISCUSSION

The steady increase in the cardiovascular risk trend among our population over the past few years, including the number of smokers, justifies the importance of intervention for this specific group in preventing complications, mostly premature death. As this study also demonstrated, giving standard brief advice on smoking cessation to active smokers is known to increase their motivation to quit and enhance overall tobacco abstinence rates (Lei, West, Bulgiba, and Shahab, 2011). Additionally, using a group video-based smoking cessation strategy that addresses health-specific content unique to high cardiovascular-risk smokers substantially raises their knowledge and motivation to engage in health-promoting behavior that can result in smoking cessation.

This research suggests that, in addition to standard care, one video-show session that is specifically produced for high cardiovascular-risk patients increases their knowledge and motivation to quit smoking. From the analysis, it showed that participants in the intervention group had greater improvement in mean knowledge (highest mean difference -6.74 between

pre-test with post-test 8 weeks) and motivation score (highest mean difference -4.32 at pre-test with post-test 2 weeks) compared to the control group. These findings are similar to previous studies in which there were improvements in behavioural changes, motivation, or smoking status among a specific group of patients when the intervention was tailored to them (Azmi, Nurumal, Mohamed, and Rahman, 2020), (Lennes, Luberto, Carr, Hall, Strauss, Ponzani, and et al, 2020).

For the intervention group, we can see that the knowledge score maintains from week 2 to week 8 post-intervention. This demonstrates that despite exposure to the content only once, patients can retain the information for eight weeks. However, the score for motivation declines over time, but it is not statistically significant. This finding can be attributed to the fact that health-promoting behaviour is not only contributed by knowledge level but also requires changes in attitude and perception (Hochbaum, Rosenstock, and Kegels, 1952). In addition, the control group demonstrated a slight improvement in both scores. Therefore, standard care given opportunistically during a clinic visit is still helpful in improving patients' knowledge and motivation on smoking cessation.

The use of video as a medium of educational strategy has been quite prevalent in promoting specific preventive health behaviours, potentially reducing morbidity and mortality associated with a certain disease. Certain factors, such as video modelling and massage framing, may contribute to the effectiveness of the video-based intervention. It was suggested that in promoting preventive behaviour such as smoking cessation, the content of the video should be tailored, contain creative video messaging, and should enhance the positive benefits of changed behaviour (Tuong, Larsen, and Armstrong, 2014). Previous research by Stanczyk et al. (Stanczyk, De Vries, Candel, Muris, and Bolman, 2015) evaluated the effectiveness of video and text-based computerized mediums in smoking intervention which reported prolonged abstinence in both groups. Besides, adding video-based educational materials to standard brief intervention not only provides knowledge-based learning but also provides an emotional incentive to change behaviour (Adam, McMahon, Prober, and Bärnighausen, 2019). By augmenting the standard brief advice for smoking cessation with an additional video containing a fear-arousal message in the form of personal testimonials for intervention in CVD patients, a study by Azmi et al. (Azmi, Nurumal, Mohamed, and Rahman, 2020) showed a significant improvement in motivation, behaviour, and smoking status of the patient. From this, we can deduce that in conjunction with brief standard clinical care, the use of information technology (IT), specifically a video-based medium in smoking cessation

strategy, is beneficial to promote behaviour change, reduce the workforce burden and preserve sustainability.

From our observation, this research is the first to generate and demonstrate the effectiveness of a specific brief smoking cessation strategy for smokers with high cardiovascular risk. In addition, the content of the intervention was provided using video-based material, which ensures consistency and accuracy of the information given. The participants in both arms were equally divided and normally distributed statistically, with no dropout.

There are a few limitations of this study. First, all the participants were male. The prevalence of smokers among females is much lower in Malaysia, especially in Kelantan. The sample was taken from the Outpatient clinic, Hospital Pakar USM; thus, the result may only represent part of the population. The tools used in this study may need full validity and reliability testing to ensure higher-quality results. In addition, the study duration from intervention until the last follow-up was eight weeks, which may not be long enough to determine the long-term effect and outcome of this intervention. Further research with a longer study period, repeated exposure to the intervention material, and repeated measures of the effectiveness should confirm the long-term impact and final endpoint of this strategy which is smoking abstinence. Besides, additional study is needed to understand the factors affecting behaviour modification among smokers in a high cardiovascular-risk group.

CONCLUSION

Although standard care has a similar positive effect on patients' knowledge and motivation to quit, the intervention group demonstrates greater improvement and sustainability. As the results of this study indicate, the content and medium through which the advice was delivered are important factors to consider during smoking cessation counselling. This research also expands the limited literature on the effectiveness of a brief smoking cessation strategy specific for high cardiovascular-risk smokers in improving their knowledge and motivation to quit. Though, further study should confirm the long-term outcome of this intervention.

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