Pharmacist Contribution

in Post-Hospitalisation Cardiac Rehabilitation

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I dedicate this dissertation to young Edoardo and Sara,

both from Italy, for whose recovery I made a special effort.

Abstract

The provision of smoking cessation services should be prioritised in all cardiovascular disease settings, particularly within cardiac rehabilitation (CR). In the local scenario, there are opportunities for a focus on a pharmacist contribution in smoking cessation interventions in CR. The aim of this study was to develop a pharmacist contribution in post-hospitalisation CR and to evaluate outcomes.

An educational smoking cessation intervention was developed and implemented during the initial assessment session of the CR programme for active smokers and those who quit smoking post-cardiac event. Patients were counselled on posology of smoking cessation pharmacotherapy suggested by CR nurses and provided with pamphlets developed by the 'Health Promotion & Disease Prevention Directorate'. Telephone follow-up was undertaken after 3, 6, and 12 months. Descriptive statistics were undertaken. A framework for a telemedicine-based smoking cessation service in CR was developed.

Twenty-four patients (13 active smokers, 11 quit post-cardiac event, 19 male, mean age 56 years, 17 admitted with acute coronary syndrome, 16 referred post-percutaneous coronary intervention) were enrolled. Eight of the 13 smokers accepted to receive smoking cessation pharmacotherapy (NRT n=6, varenicline n=2). After 1 year, 3 patients from the active smoker cohort quit smoking, while 6 of the patients who quit smoking post-cardiac event remained abstinent. The proposed framework for a telemedicine-based smoking cessation service in CR considers a hybrid model to interact with the patient.

The developed smoking cessation intervention provided at initial assessment and the telephone follow-ups were intended to complement the present service and support patients to stop smoking. However, most patients were still smoking after 1 year, suggesting that a more aggressive approach in CR to improve smoking cessation outcomes is required. This study proposes a framework which could be implemented in CR with the aim of improving patient accessibility and outcomes.

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List of Abbreviations

BMI	Body mass index
BP	Blood pressure
CBT	Cognitive behavioural therapy
CCIAT	Community COVID Initial Assessment Team
CO	Carbon monoxide
COVID-19	Coronavirus disease 2019
CR	Cardiac rehabilitation
CRU	Cardiac Rehabilitation Unit
CVD	Cardiovascular disease
GP	General practitioner
HR	Heart rate
MDH	Mater Dei Hospital
nAChRs	Nicotinic acetylcholine receptors
NASA	National Aeronautics and Space Administration
NRT	Nicotine replacement therapy
PCI	Percutaneous coronary intervention
RR	Risk Ratio
SR	Sustained-release
t1	Initial assessment
t2	End-of-programme assessment
t3	3-month follow-up
t4	6-month follow-up
t5	1-year follow-up

Chapter 1:

Introduction

1.1. Cardiac rehabilitation

The past five decades have witnessed a sharp decline in cardiovascular disease (CVD) mortality throughout the industrialised world as a result of major public health initiatives and policy changes, together with advances in pharmacological and interventional therapies (Capewell and O'Flaherty, 2008; Ford and Capewell, 2011; Mensah et al., 2017; McClellan et al., 2019; Patel et al., 2019). Alongside population growth and ageing, these improved survival rates have, paradoxically, given rise to increased CVD prevalence (Dalal et al., 2015; Patel et al., 2019; Roth et al., 2020).

Patients with established CVD have a high risk of subsequent cardiovascular events (Turk-Adawi et al., 2014; Patel et al., 2019), hence preventing secondary cardiac events is of the utmost importance (Balady et al., 2011). A comprehensive approach encompassing several core components is recommended to halt or curtail disease progression (Frederix et al., 2017). One such secondary prevention model is cardiac rehabilitation (CR), which is a multidimensional and multidisciplinary intervention that reduces morbidity, mortality, and hospitalisation, in addition to improving exercise capacity, quality of life, and psychological wellbeing (Piepoli et al., 2010; Balady et al., 2011; Dalal et al., 2015).

CR is typically divided into three phases, the second of which is a structured outpatient programme that primarily focuses on physical exercise and risk factor modification (Figure 1.1) (Mampuya, 2012; Piepoli et al., 2014; Frederix et al., 2017; Winnige et al., 2021).

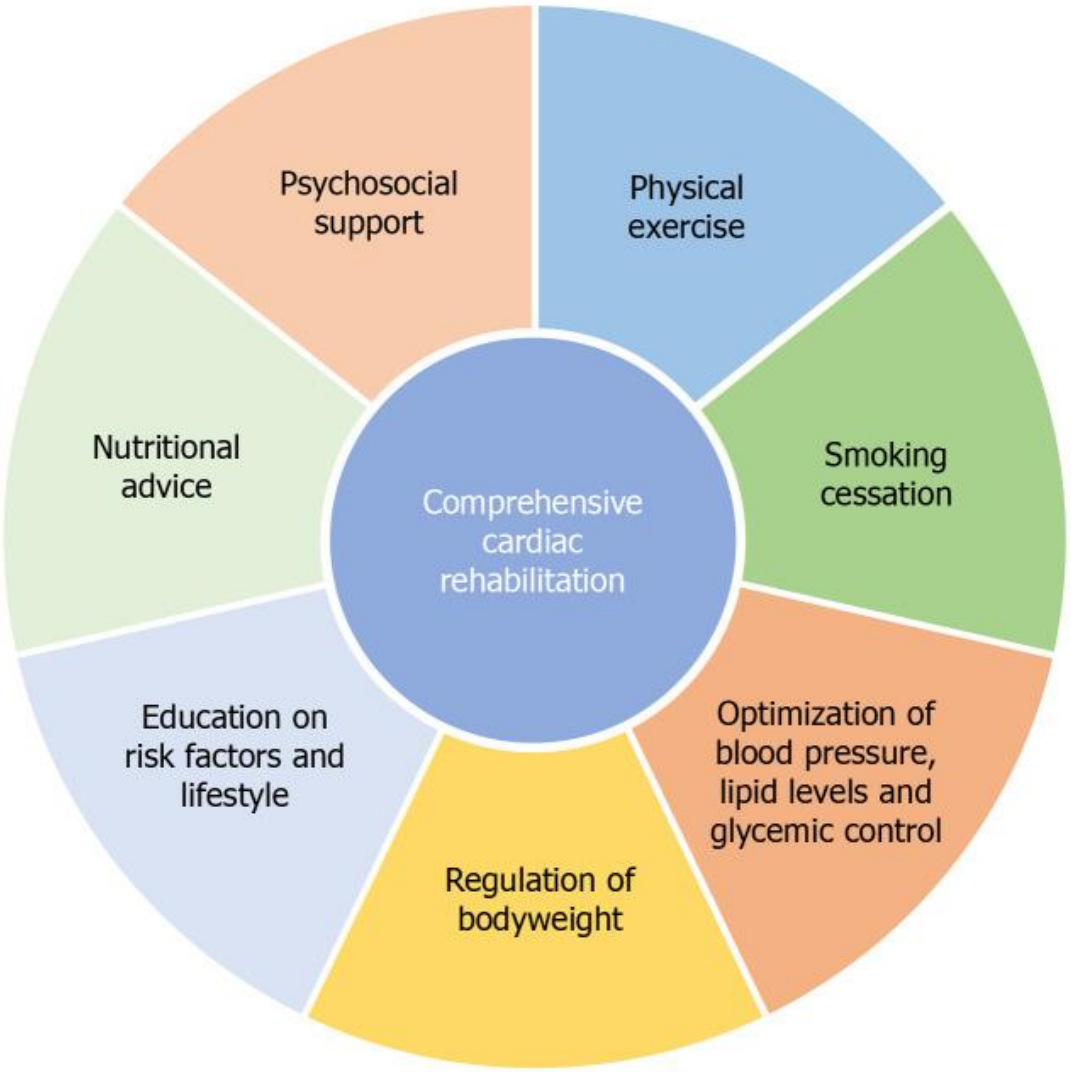

Figure 1.1: Core components of CR programme

Adopted from: Winnige P, Vysoky R, Dosbaba F, Batalik L. Cardiac rehabilitation and its essential role in the secondary prevention of cardiovascular diseases. World Journal of Clinical Cases. 2021; 9(8): 1761–1784.

In spite of its established benefits and its endorsement as a class I recommendation by several international guidelines, CR is greatly underutilised (Balady et al., 2011; Mampuya, 2012; Dalal et al., 2015; de Araújo Pio et al., 2020; Winnige et al., 2021). Frequently implicated logistic barriers to CR use include significant travel distance, transportation issues, and work constraints (Balady et al., 2011; Clark et al., 2012; Winnige et al., 2021). Several patient factors are associated with low CR participation

and adherence (Balady et al., 2011), one of which is smoking status (Gaalema et al., 2015; Ruano-Ravina et al., 2016). Since smoking is the most important modifiable CVD risk factor, with continued smoking after a cardiac event significantly increasing morbidity and mortality, the provision of smoking cessation services should be prioritised in all CVD settings, particularly within CR (Pipe and Reid, 2018). However, in the local scenario, behavioural counselling is minimal.[1] In view of this, smoking cessation was chosen to be the focus of this study. Moreover, given that CR use may be improved through the provision of alternative models of CR (Turk-Adawi et al., 2014; Ruano-Ravina et al., 2016; Servey and Stephens, 2016), the incorporation of telemedicine as a means of delivering smoking cessation counselling was also identified as an area of interest.

1.2. Smoking

The practice of tobacco smoking became highly popularised and widespread following the introduction of tobacco in Europe in the 16th century (Doll, 1998; Dani and Balfour, 2011, Castaldelli-Maia et al., 2016). The prevalence of smoking drastically increased in the 20th century due to mass production of cigarettes and propaganda (Castaldelli-Maia et al., 2016). Evidence of the hazards of smoking began emerging, prompting epidemiological research, but it was not until the 1964 landmark report titled "Smoking and Health: Report of the Advisory Committee to the Surgeon General of the United States" that the health implications of smoking were extensively publicised (Doll, 1998; Dani and Balfour, 2011). Tobacco control interventions have since been implemented, hence the prevalence of smoking has declined (Holford et al., 2014). With a total of 1.3

[1]Anders HO, Wirth F, Gauci M, Xuereb C, Desira J, Xuereb RG, et al. Cardiac Rehabilitation and Smoking Status. Poster session presented at the FIP World Congress of Pharmacy and Pharmaceutical Sciences, Abu Dhabi, United Arab Emirates. 2019 Sep [cited 2021 Aug 11]. Available from: https://www.um.edu.mt/library/oar/handle/123456789/49791

billion tobacco smokers worldwide, smoking remains a public health threat, killing 8 million people annually (Willett et al., 2021).[2]

1.2.1. Nicotine addiction

The tobacco industry recognised the addictive properties of tobacco products by the 1960s (Hurt and Robertson, 1998), yet continuously asserted that tobacco use is a conscious choice and not imposed upon the user (Henningfield et al., 2006). However, this claim was dismissed in 1988, following the publication of the report titled "The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General", which concluded that tobacco products are addictive and that nicotine is the pharmacologically-active component which causes and sustains the addiction.[3]

Nicotine is a volatile alkaloid which, upon inhalation of tobacco smoke, is carried into the lungs where it is readily absorbed into the pulmonary venous circulation (Benowitz, 2009; Benowitz, 2010). Nicotine reaches the brain via the arterial circulation and binds to nicotinic acetylcholine receptors (nAChRs), which are pentameric ligand-gated ion channels. Upon nicotinic agonism of nAChRs, the receptor channel opens and an influx of cations activates voltage-dependent calcium channels, allowing calcium entry which stimulates the release of various neurotransmitters, most notably dopamine. Nicotine acts on the mesolimbic pathway, which is involved in perception of pleasure and reward.

[2]World Health Organization (WHO). Tobacco [Internet]. Geneva: World Health Organisation; 2021 [cited 2021 Aug 11]. Available from: http://www.who.int/mediacentre/factsheets/fs339/en/

[3]U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General. The Health Consequences of Smoking: Nicotine Addiction: A Report of the Surgeon General [Internet]. Rockville (MD): U.S. Department of Health and Human Services; 1988 [cited 2021 Aug 11]. Available from: https://profiles.nlm.nih.gov/spotlight/nn/catalog/nlm%3anlmuid-101584932X423-doc

Thus, dopamine release transmits a pleasurable experience that is crucial to the reinforcing effects of nicotine (Benowitz, 2009; Benowitz, 2010; D'Souza and Markou, 2011). With long-term exposure to nicotine, desensitisation of nAChRs occurs, causing nAChR upregulation, and tolerance (neuroadaptation) develops to some of the effects of nicotine (Benowitz, 2009; Benowitz, 2010). During periods of abstinence, previously desensitised nAChRs become vacant and return to a responsive state, causing symptoms of craving and withdrawal in chronic smokers which are alleviated upon nicotine administration (Dani and Heinemann, 1996; Benowitz, 2009; Benowitz, 2010).

The development and maintenance of nicotine addiction also involves a psychological component (Le Houezec, 2003). Nicotine is a psychoactive drug which modulates levels of physiological arousal, yet reduces stress and anxiety and controls mood (Benowitz, 2009; Benowitz, 2010). However, it is likely that this enhanced arousal is due to relief from nicotine withdrawal symptoms (Knott et al., 2011). Similarly, it is believed that while smoking relieves stress, chronic smokers typically become anxious and nervous due to abstinence, with nicotine administration restoring mood normality (Parrott, 1998). Hence, the basis of nicotine addiction is the endless cycle of nicotine administration to counteract withdrawal symptoms arising from physical and psychological dependence (Dani and Heinemann, 1996; Benowitz, 2009; Benowitz, 2010).

Tobacco addiction goes beyond the positive and negative reinforcement associated with nicotine use, with conditioning having a major role in its development (Olausson et al., 2004a; Olausson et al., 2004b; Benowitz, 2009; Brunzell and Picciotto, 2009; Benowitz, 2010). Chronic smokers tend to associate certain stimuli, such as unpleasant moods,

situations (especially of a social nature), and environmental factors, with the rewarding effects derived from nicotine use. These stimuli, known as smoking-related cues, trigger relapse, and with repeated administration of nicotine, behavioural responses to conditioned stimuli are improved, possibly promoting compulsive smoking (Benowitz, 2009; Benowitz, 2010). Conditioning is also caused by the sensory impact of the act of smoking itself (Naqvi and Bechara, 2005).

1.2.2. Cardiovascular health risks of smoking

Tobacco products are composed of a mixture of chemicals intentionally added to improve the physical appearance and palatability, and to enhance the addictive potential of nicotine.[4] The toxic chemicals in cigarette smoke damage the arterial endothelium, resulting in the impaired production of the endothelial vasodilator nitric oxide (Powell, 1998; Saha, 2007; Messner and Bernhard, 2014; Gallucci et al., 2020). Hence, platelet aggregation, monocyte adhesion, and smooth muscle cell proliferation are not inhibited (Powell, 1998), giving rise to a procoagulant and inflammatory environment (Messner and Bernhard, 2014). In addition to affecting endothelial function, smoking has an effect on serum lipids, increasing total cholesterol, very-low and low-density lipoproteins, and triglyceride levels, whilst decreasing high-density lipoprotein (Craig et al., 1989). Consequently, smoking contributes to the initiation, development and promotion of atherogenesis, thereby predisposing smokers to the development of atherosclerosis and ultimately, thrombosis (Powell, 1998; Saha, 2007; Messner and Bernhard, 2014; Gallucci et al., 2020). Nicotine also contributes to CVD as it has systemic haemodynamic effects which are mediated by activation of the sympathetic nervous system. Smoking is

[4]World Health Organization (WHO). Fact sheet on ingredients in tobacco products [Internet]. Geneva: World Health Organisation; 2014 [cited 2021 Aug 11]. Available from: https://apps.who.int/tobacco/industry/product_regulation/factsheetingredients/en/index.html

therefore associated with several CVDs, including coronary artery disease, acute myocardial infarction, aortic aneurysm, stroke, peripheral arterial disease, and sudden cardiac death (Benowitz, 2003; Benowitz and Burbank, 2016).

1.3. Smoking cessation

Smokers mostly recognise the harm they are inflicting upon themselves, yet they continue to smoke (West, 2017). This is because abstinence is a difficult and gradual process (Sudeep and Chaitra, 2017), with relapse commonly occurring (D'Souza and Markou, 2011) due to the associated affective, somatic, and cognitive nicotine withdrawal symptoms, including irritability, agitation, frustration, depression, insomnia, poor concentration, and increased appetite, amongst others (Jarvis, 2004; Jiloha, 2014; McLaughlin et al., 2015).

1.3.1. Cardiovascular health benefits of smoking cessation

More pronounced benefits of smoking cessation are associated with earlier abstinence, yet smoking cessation is encouraged at any stage since prognosis, longevity, and quality of life are improved even after the onset of smoking-related diseases (Taylor et al., 2002; Le Foll et al., 2005; Galanti, 2008).

Smoking cessation gives rise to reduced inflammatory markers and hypercoagulability, improved high-density lipoprotein cholesterol levels, and enhanced endothelial function (Jha, 2020). Hence, in patients with existing CVD, smoking cessation significantly reduces all-cause mortality, cardiovascular mortality, sudden death, and the risk of new and recurrent cardiac events. The risk of coronary artery disease rapidly decreases

following smoking cessation, gradually declining until it falls by around half after five years, eventually approaching the risk of people who have never smoked. Similarly, in addition to reducing stroke morbidity and mortality, the risk of stroke approaches that of people who have never smoked after some years of smoking cessation (Jha, 2020).

1.3.2. Pharmacological interventions of smoking cessation

Pharmacotherapy in smoking cessation aims to inhibit the positive reinforcing effects associated with nicotine use, and to reduce the impact and number of nicotine withdrawal symptoms (Jiloha, 2014).

1.3.2.1. Nicotine replacement therapy

The first-line treatment in the management of nicotine dependence is nicotine replacement therapy (NRT), which provides nicotine in a safe and therapeutically-manageable way to diminish withdrawal symptoms and cravings (Jiloha, 2014). NRT alleviates the shift from smoking to abstinence (Hartmann-Boyce et al., 2018).

The concept of NRT originated in 1942, when general practitioner Lennox Johnston administered nicotine intravenously to volunteers in an attempt to compare the psychoactive effects of nicotine obtained via injection and smoking (Elam, 2014). Johnston observed that compared to non-smokers, chronic smokers found the sensations following the nicotine injection enjoyable and their nicotine cravings decreased following repeated injections (Jiloha, 2014). Johnston's research paved the way for other NRT dosage forms which are specifically formulated for absorption through the oral mucosa via chewing gum, oromucosal sprays, sublingual tablets, and lozenges, through the nasal

mucosa by means of inhalators and nasal sprays, and through the skin via transdermal patches (Jiloha, 2014; Wadgave and Nagesh, 2016; Hartmann-Boyce et al., 2018). These NRT dosage forms have different pharmacokinetic profiles (Le Foll et al., 2005), thereby allowing patients to adjust their nicotine intake according to their needs (Galanti, 2008).

In a review by Hartmann-Boyce et al. (2018), the authors found that at 95% confidence interval, the risk ratio (RR) of abstinence regardless of NRT dosage form was 1.55 relative to control. The RR for the individual dosage forms was as follows: chewing gum (1.49), transdermal patches (1.64), inhalator (1.90), nasal spray (2.02), oromucosal spray (2.48), and tablets/lozenges (1.52). The authors concluded that all NRT dosage forms are effective in smoking cessation treatment, increasing the rate of long-term abstinence by approximately 50 to 60% (Hartmann-Boyce et al., 2018).

1.3.2.2. Bupropion

Prior to 1997, NRT was the only known treatment available for smoking cessation (Wilkes, 2008). However, in a trial conducted by Hurt et al. (1997), the atypical antidepressant bupropion sustained-release (SR), which was originally marketed for the treatment of major depressive disorder as an immediate-release formulation, was found to be the first non-nicotine agent to have smoking cessation properties (Fava et al., 2005; Foley et al., 2006; Wilkes, 2008).

The mechanism of action of bupropion is attributed to its relatively weak but selective inhibition of the neuronal reuptake of dopamine and noradrenaline in the central nervous system (Slemmer et al., 2000; Galanti, 2008; Jiloha, 2014). Bupropion increases

dopaminergic activity in the mesolimbic system, an area associated with the positive reinforcing effects of nicotine and nicotine dependence, and augments noradrenergic activity in the locus ceruleus, leading to a decrease in nicotine withdrawal symptoms (Slemmer et al., 2000; Galanti, 2008; Jiloha, 2014). Bupropion and its metabolites may function as nAChR antagonists, thereby blocking the pharmacological effects of nicotine (Slemmer et al., 2000; Galanti, 2008).

In the double-blind, placebo-controlled trial of bupropion SR as an aid to smoking cessation, Hurt et al. (1997) randomly assigned a placebo or bupropion SR at a dose ranging from 100 to 300mg per day for a period of seven weeks to generally healthy, non-depressed smoking subjects (N=615). The self-reported smoking cessation rates for all treatment groups were verified by a carbon monoxide (CO) concentration in expired air less than 10ppm. Upon completion of the treatment period, the investigators found that the rate of smoking cessation was lowest for the placebo group (19.0%) and significantly increased with increased dosing up to 44.2% with 300mg. The results obtained demonstrated that bupropion SR is an effective medication in the treatment of smoking cessation (Hurt et al., 2007).

Follow-up at three-month intervals for twelve months was carried out and smoking cessation rates were reassessed. At one year, the rate for the placebo group was 12.4% while that of bupropion SR group was 23.1% with 300mg – an increase from 19.6% with 100mg. The authors observed that the smoking cessation rates were significantly higher for the 150mg and 300mg bupropion SR groups than the placebo group. It was noted that

while the 300mg dose is the most effective at the start of treatment, outcomes after twelve months did not differ significantly compared to the 150mg dose (Hurt et al., 1997).

In a study by Yilmazel Ucar et al. (2014), patients received bupropion SR 150mg per day for three days followed by 300mg per day for a period of twelve weeks. At 1-year follow-up, the overall smoking cessation rate was 23.0% (Yilmazel Ucar et al., 2014), which is consistent with the rate observed by Hurt et al. (2007).

1.3.2.3. Varenicline

Varenicline, a non-nicotine agent developed specifically for the treatment of smoking cessation, was licensed for use in 2006 (Niaura et al., 2006). Varenicline is a partial agonist which exerts its effects at the $\alpha_4\beta_2$ nAChR subtype (Mohanasundaram et al., 2008). In a study by Coe et al. (2005), it was observed that in addition to acting as a partial agonist, varenicline acts as an antagonist, depending on the state of the nAChR (Galanti, 2008; Ebbert et al., 2010). In the case of abstinence, varenicline acts as a partial agonist. Having approximately 30 to 60% of the *in vivo* efficacy of nicotine, varenicline stimulates the release of dopamine in the nucleus accumbens, preventing withdrawal symptoms (Coe et al., 2005; Fagerström and Hughes, 2008; Galanti, 2008; Ebbert et al., 2010). In the case of relapse, varenicline acts as an antagonist, preventing the nicotine-induced dopamine release and reducing the positive reinforcing effects associated with nicotine use (Coe et al., 2005; Fagerström and Hughes, 2008; Galanti, 2008; Ebbert et al., 2010).

The effectiveness of varenicline as a potential pharmacotherapeutic agent in the treatment of smoking cessation was observed in a double-blind, parallel-group, placebo- and active-

treatment-controlled trial conducted by Gonzales et al. (2006). Generally healthy subjects (N=1,025) were randomly assigned placebo, varenicline 2mg per day, or bupropion SR 300mg per day for twelve weeks. The self-reported smoking cessation rates for all treatment groups were verified by a CO concentration in expired air less than 10ppm. Upon completion of treatment, it was observed that the 4-week continuous abstinence rates for the placebo, 2mg varenicline, and 300mg bupropion SR groups were 17.7%, 44.0%, and 29.5%, respectively ($p<0.001$). Follow-up at three-month intervals for twelve months was carried out and smoking cessation rates were reassessed. At one year, the 4-week continuous abstinence rates for the placebo, 2mg varenicline, and 300mg bupropion SR groups were 8.4%, 21.9%, and 16.1%, respectively ($p<0.001$). Smoking cessation rates were significantly better for the varenicline group compared to placebo, concluding that varenicline is an effective therapy as an aid to smoking cessation (Gonzales et al., 2006).

A more recent study to investigate the efficacy of varenicline in smoking cessation was conducted by Ebbert et al. (2016). Participants (N=93) were randomised and received placebo or varenicline for a period of twelve weeks. At 3-month follow-up (end-of-treatment), the smoking cessation rate for varenicline was 53.3% while that of placebo was 14.5%, and the prolonged smoking cessation rate was 40.0% and 8.3% for varenicline and placebo, respectively. At 6-month follow-up (end-of-study), the smoking cessation rate for varenicline was 40.0% while that of placebo was 20.8%, and the prolonged smoking cessation rate for varenicline was 31.1% compared to 8.3% for placebo (Ebbert et al., 2016).

1.3.3. Non-pharmacological interventions of smoking cessation

Tobacco dependence is considered a chronic, relapsing condition (Galanti 2008; Steinberg et al., 2008), hence a multimodal approach implementing counselling with pharmacotherapy is encouraged (Le Foll et al., 2005). Counselling interventions comprise numerous approaches which aim to provide the patient with information and support.[5]

Healthcare professionals can provide patients with brief clinical interventions composed of five steps, including asking the patient if they use tobacco, advising the patient to quit based on smoking health risks, assessing the patient's willingness to quit, assisting the willing patient to quit, and conducting follow-up sessions to support and encourage the patient throughout the process, recommending pharmacotherapy if necessary (Glasgow et., 2006). These interventions are referred to as the "5A's" model. In a meta-analysis by Fiore et al. (2000), the estimated abstinence rate depending on clinical intervention was as follows: no clinical intervention (10.9%), less than 3 minute (13.4%), 3 to 10 minute (16.0%), and more than 10 minute (22.1%) clinical interventions.[5]

Cognitive behavioural therapy (CBT) considers the conditioning factors associated with smoking which lead to the development and maintenance of addiction (McGovern and Carroll, 2003; Le Foll et al., 2005). Hence, CBT endeavours to aid patients in identifying smoking-related cues to avoid situations which predispose them to relapse, and aims to help patients develop coping skills which will enable them to manage such situations (Le

[5]Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Goldstein MG, Gritz ER, et al. Treating Tobacco Use and Dependence. Clinical Practice Guideline [Internet]. Rockville (MD): U.S Department of Health and Human Services, Public Health Service; 2000 [cited 2021 Aug 11]. Available from: http://whyquit.com/pharmacology/June2000Guideline.pdf

Foll et al., 2005). This approach was found to have an estimated abstinence rate of 16.2% relative to 11.2% when no CBT was used, and the difference was statistically significant. Self-help in the form of leaflets, websites, and helplines, amongst others, whether independently or as an adjuvant to counselling, was found to have an estimated abstinence rate of 12.3% compared to 10.8% when no intervention was implemented, and the difference was statistically significant.[5]

1.4. Pharmacist intervention in smoking cessation

Healthcare professionals have an essential role in providing information which supports patients in making healthy lifestyle changes (Roberts et al., 2013). Pharmacists are acknowledged as the most accessible healthcare professionals within the community and are in a position to educate and advise patients on smoking cessation at no expense (Aquilino et al., 2003; El Hajj et al., 2017). The density of pharmacists differs globally and on average there are six pharmacists for every ten thousand people (Bates et al., 2016). The accessibility of pharmacists and their regular interaction with patients suggests that they have an integral role in public health, which has been further recognised due to the profession's shift from a product-centred to a patient-centric approach.[6] Through provision of pharmacotherapy and counselling, pharmacists can be instrumental in encouraging smoking cessation (Brown et al., 2016). Few recent studies assessing the effectiveness of pharmacist-led smoking cessation interventions are published.

[6]American Public Health Association (APHA). The Role of the Pharmacist in Public Health [Internet]. Washington, DC: American Public Health Association; 2006 [cited 2021 Aug 11]. Available from: https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/07/13/05/the-role-of-the-pharmacist-in-public-health

A study conducted by Condinho et al. (2015) assessed the effectiveness of a smoking cessation programme delivered in seven Portuguese community pharmacies. Active smokers willing to quit smoking were identified and invited to participate. An outsourced pharmacist trained in smoking cessation suggested a personalised multimodal therapeutic plan. Patients were followed-up one, six and twelve months post-quit date. During these consultations, the therapeutic plan was adjusted if necessary. From the 69 patients recruited, 23.0% of patients remained abstinent at 1-year follow-up (Condinho et al., 2015).

A randomised controlled study conducted in Australia by Thomas et al. (2016) evaluated the effectiveness of a pharmacist-led intervention compared to usual care in hospitalised smokers. Patients (N=600) were recruited from three hospitals and randomised to usual care or intervention group. Patients in the usual care group received routine smoking cessation support provided by the hospital, which involved brief counselling by hospital staff and smoking cessation pharmacotherapy for the duration of their hospital stay. Patients in the intervention group received smoking cessation behavioural therapy and pharmacotherapy counselling by a study pharmacist over the course of three sessions: during hospital stay, immediately before or after hospital discharge, and within one month post-discharge. Patients were followed-up within two days post-discharge, and at one-, six-, and twelve-month(s) post-discharge. At 1-year follow-up, 12.0% of patients in the intervention group and 11.0% of patients in the usual care group were abstinent (Thomas et al., 2016).

A randomised controlled trial conducted in Qatar by El Hajj et al. (2015; 2017) aimed to compare the effectiveness of a structured, patient-specific, pharmacist-delivered smoking

cessation programme with concise unstructured pharmacist-delivered advice. Smokers (N=314) were randomised to intervention or control group. Participants in the control group received a five-to-ten-minute unstructured smoking cessation counselling session, were offered NRT of their choice and educational resources, and were not invited for follow-up. Participants in the intervention group attended an eight-week programme consisting of four sessions, the first of which involved pharmacist-delivered NRT counselling as well as personalised behavioural and lifestyle strategies. During the following 3 sessions, reinforcement was provided in abstinent patients, review and actioning of identified problems was undertaken in patients who were still smoking, and NRT refills were provided. Participants in both groups were contacted via telephone at three, six, and twelve months post-quit date. At 1-year follow-up, 23.9% of patients in the intervention group were abstinent compared to 16.9% of patients in the control group (El Hajj et al., 2015; El Hajj et al., 2017).

1.5. Telemedicine

The provision of medical care and health services, as well as the exchange of healthcare information remotely by means of telecommunications technology is known as telemedicine (Zundel, 1996; Hurst, 2016). Current telemedicine systems were pioneered by the National Aeronautics Space Administration (NASA), when during the 1960s, they developed biomedical systems which permitted remote physiological monitoring and medical care of astronauts during flights (Hurst, 2016, Kichloo et al., 2020). NASA further contributed to this field by providing telemedicine services to various rural locations and providing telemedicine assistance in the aftermath of natural disasters. The 1990s saw a technological breakthrough in the form of the Internet, which revolutionised telemedicine, as medical information became easily available and widely accessible.

Nowadays, by virtue of the growing advancement and prevalence of mobile devices, telemedicine is continuously evolving and its potential is expanding (Hurst, 2016, Kichloo et al., 2020).

1.5.1. Prevalence of telemedicine

The importance of telemedicine as a means of delivering timely care over distance has become increasingly relevant worldwide as a result of greater healthcare needs ascribed to a growing prevalence of chronic disease (Dinesen et al., 2016). Telemedicine has been used to support integrated care in chronic disease management by providing education, enabling information transfer, facilitating contact with healthcare workers, and improving electronic records (Wootton, 2012). Despite evidence of telemedicine being a practical and cost-effective means of delivering care, enhancing self-management, and delaying hospitalisation (Darkins et al., 2008), its widespread adoption has mostly been limited for several reasons (Dinesen et al., 2016).

In the face of the coronavirus disease 2019 (COVID-19) pandemic, telemedicine became recognised for its ability to provide access to care for patients whilst maintaining physical distancing for the safety of patients and healthcare workers alike, all the while decreasing transmission of the virus (Kichloo et al., 2020; Romanick-Schmiedl and Raghu, 2020; Smith et al., 2020). Consequently, reimbursement for telemedicine was expanded, thereby increasing its utilisation (Fischer et al., 2020).

1.5.2. Telemedicine in smoking cessation

Various technological modalities for smoking cessation are available and are classified as Internet- or Web-based, telephone-based, or video-based. In a review by Walters et al. (2006), 9 of 19 studies that utilised computer-based interventions reported improved smoking cessation rates amongst treated subjects when compared to untreated controls at the longest follow-up. Meanwhile, a randomised controlled trial of Web- or computer-based smoking cessation programmes by Myung et al. (2009) found that smokers were 44.0% more likely to quit smoking using these programmes than unassisted. In a review by Matkin et al. (2019), smokers receiving multiple sessions of proactive telephone counselling had higher quit rates compared to control participants receiving self-help materials or brief counselling.

In a study by Richter et al. (2015), smokers were recruited and randomly assigned to receive either four sessions of telephone counselling or four sessions of real-time video counselling integrated into routine care, referred to as integrated telemedicine. The counselling duration and content was the same for both groups, and they each received identical materials and assistance in selecting smoking cessation medications. Smoking abstinence at twelve months did not differ significantly between the telephone or integrated telemedicine groups (9.8% versus 12.0%). However, participants within the integrated telemedicine group were much more likely to use smoking cessation medications compared to those within the telephone group (55.9% versus 46.1%) and were overall more satisfied with the service (Richter et al., 2015).

In a study by Byaruhanga et al. (2020a), smokers were recruited and randomly assigned to receive up to six sessions of either telephone counselling or video counselling. The counsellors used cognitive behavioural therapy and motivational interviewing techniques in both types of sessions. Participants who were willing to quit smoking within a month were offered five more counselling sessions on the quit date, and 3, 7, 14, and 30 days after the quit date. Meanwhile, participants who were not willing to quit within the next month were offered a further three counselling calls at 2, 4, and 6 weeks after the initial session (Byaruhanga et al., 2020a).

1.6. Aim and objectives

The aim of this study was to develop a pharmacist contribution in post-hospitalisation CR and to evaluate outcomes.

The objectives of the study were:

- To develop, implement and evaluate an educational smoking cessation intervention in CR
- To develop and propose a framework for a telemedicine-based smoking cessation service in CR

Chapter 2:

Methodology

2.1. Developing and implementing an educational smoking cessation intervention in cardiac rehabilitation

The methodology of the primary objective of the study involved literature review, orientation visits at the study setting, development and validation of an educational smoking cessation intervention and patient data collection form, and ethics approval. These steps were followed by a pilot study, patient recruitment, implementation of the educational smoking cessation intervention, completion of the patient data collection form, patient follow-up and statistical analysis (Figure 2.1).

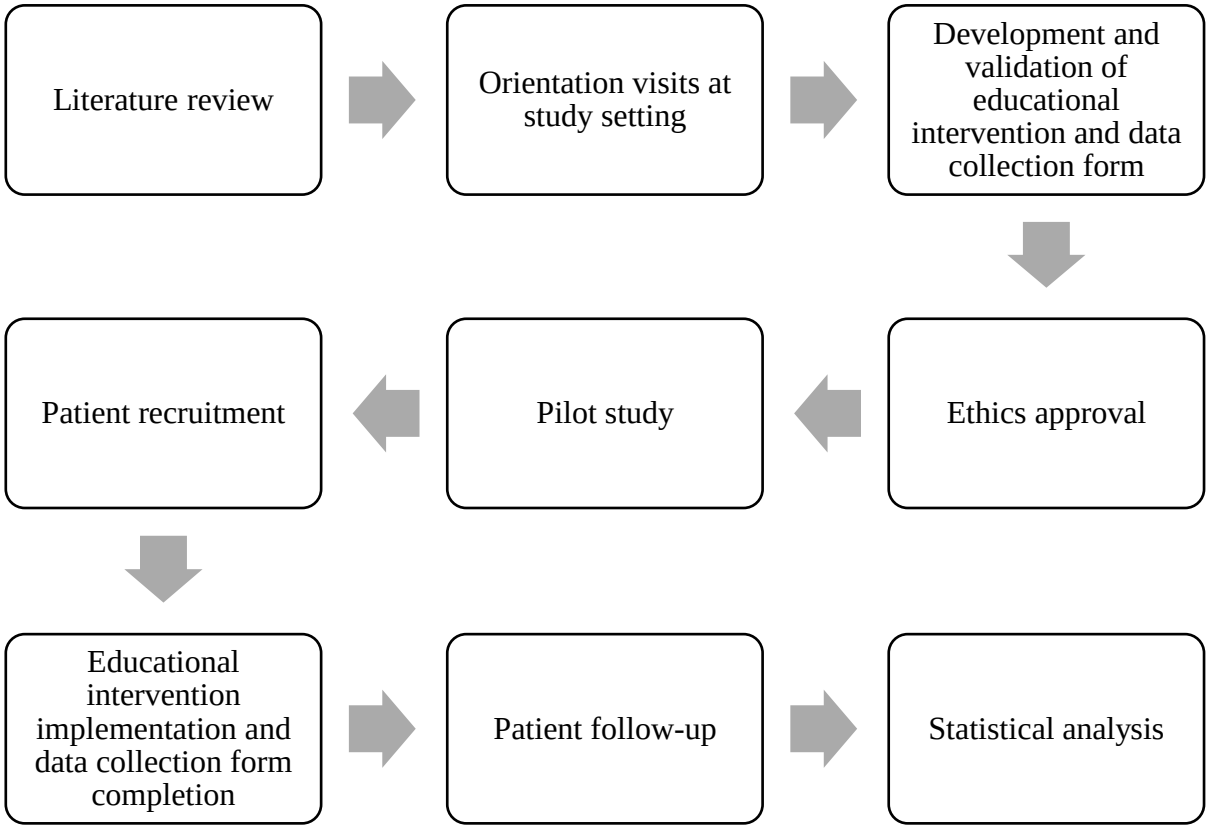

Figure 2.1: Outline of methodology of the primary study objective

2.1.1. Orientation visits at the study setting

Prior to starting the study, the investigator attended the Cardiac Rehabilitation Unit (CRU) at Mater Dei Hospital (MDH) for a total of 15 hours to observe the procedure adopted by the CR team following patient referral. The first point of patient contact occurs at initial assessment, usually undertaken 4 to 6 weeks post-discharge, whereby the nurses peruse the discharge letter and *'Cardiac Rehabilitation Referral Form'* of the patient to begin filling out the *'Cardiac Rehabilitation Assessment Form'* (Table 2.1) with the patient's details, diagnosis, and intervention.

The nurses explain the rationale for CR to the patient, and invite them to participate in the 6-week programme consisting of physiotherapist-led twice-weekly exercise classes and holistic educational sessions delivered by nurses, dietitians, and psychologists. The educational sessions are about the heart and CVD, diet, physical exercise, and stress management. The nurses proceed to question the patient about modifiable cardiovascular risk factors, such as dietary habits and physical activity. Height and weight are recorded, body mass index (BMI) calculated, and waist circumference measured. Blood pressure (BP) and heart rate (HR) are measured using a digital blood pressure monitor and recorded. Blood samples to measure baseline lipid profile, and blood glucose and HbA1c are drawn. The patient is then referred to the physiotherapy department to perform a 6-minute walk test which assesses their aerobic capacity and endurance. Patient reviews take place at the end of the CR programme and one year after the initial assessment.

In addition to familiarising the investigator with the study setting, these orientation visits served to gain insight into the smoking cessation counselling being provided to patients.

During initial assessment, current smokers are questioned about their daily cigarette consumption (exhaled CO levels are measured occasionally), advised to quit smoking, and offered smoking cessation pharmacotherapy. Smokers may be referred to a smoking cessation programme, unless they would have stopped smoking at cardiac event, in which case, they are encouraged to maintain abstinence and are offered smoking cessation pharmacotherapy should they experience nicotine cravings.

Regardless of whether or not they are referred to the smoking cessation programme, it is up to the smokers to infer how they can apply what they learn during the educational sessions, since none of these sessions are exclusively about smoking. That is to say, that although dietary and stress management advice could be applied in the event of withdrawal symptoms, such as nicotine cravings and irritability, the information is not specifically tailored for smokers, whose eating habits and stress levels may require a more specialised and intuitive approach. These orientation visits highlighted the shortcomings of the present smoking cessation counselling, granting the investigator the opportunity to develop a comprehensive smoking cessation intervention together with a personalised data collection form.

Table 2.1: *'Cardiac Rehabilitation Assessment Form'*

Heading	Content
Patient Details	Name; sex; ID number; age; mobile/telephone number of patient and next of kin; referring consultant; date of

	discharge; date CR commenced; number of sessions attended
Health History	Diagnosis; intervention; risk factors; physical activity; lifestyle; hypertension; sleep apnoea; intermittent claudication
Exercise Programme	Patient interest; if not interested, reason(s) stated; group
Initial Assessment	Date; height, weight, BMI, waist circumference; BP (R) and BP (L), HR; smoking status; blood tests; physical activity; results of 6-minute walk test and/or cardiopulmonary exercise testing; medical treatment
End-of-Programme Assessment	

2.1.2. Development and validation of an educational smoking cessation intervention

An educational smoking cessation intervention available in both English and Maltese (Appendix 1) was developed after a review of the literature on the chemical composition of cigarettes, nicotine addiction, risks of smoking, benefits of quitting smoking, behavioural and lifestyle modifications, smoking cessation pharmacotherapy, and pharmacist intervention in smoking cessation. The educational smoking cessation intervention was structured as described in Figure 2.2.

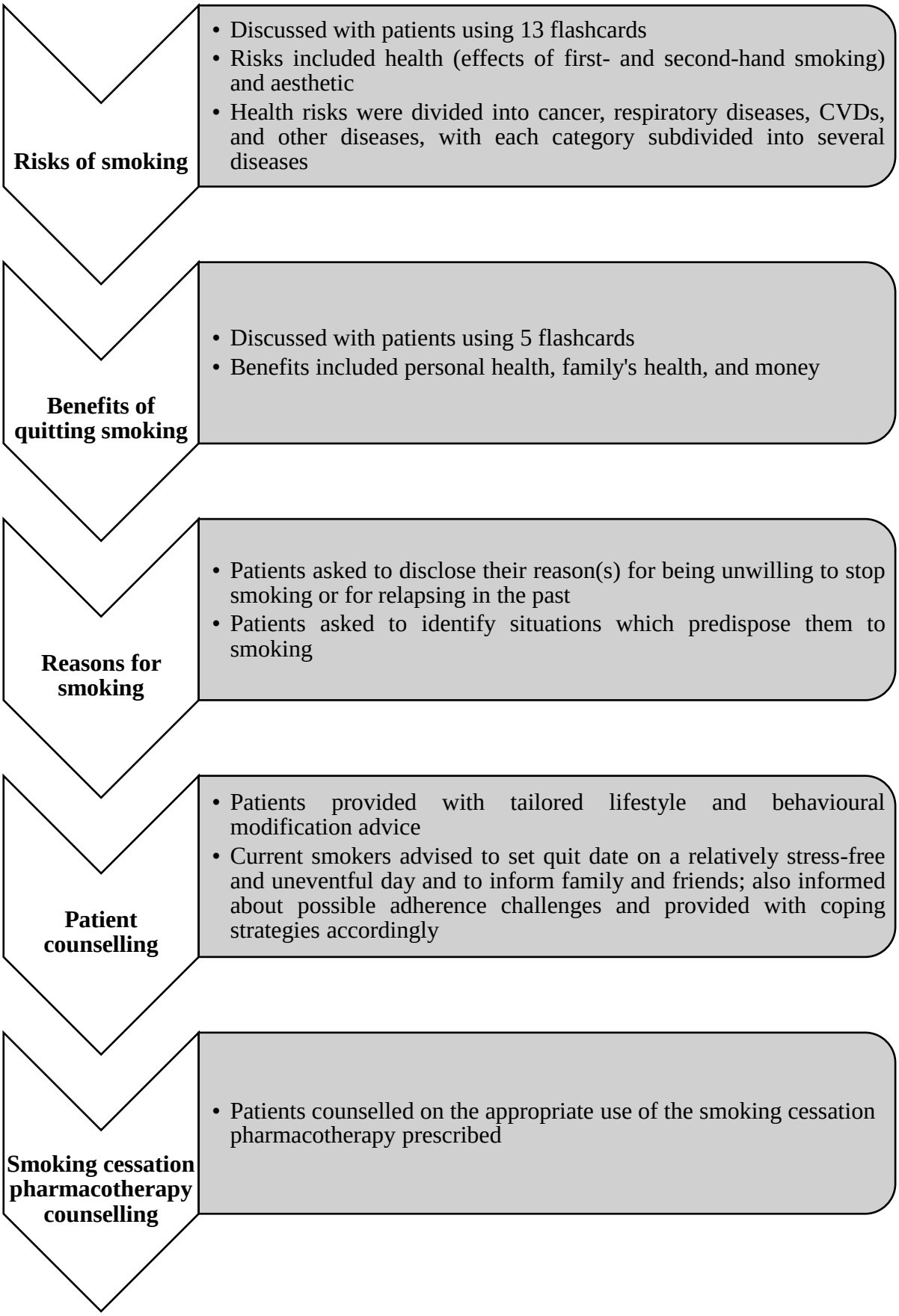

Figure 2.2: Educational smoking cessation intervention implemented at patient recruitment

The investigator identified the materials required to perform the intervention. Flashcards were prepared to facilitate visualising the risks of smoking and the benefits of smoking cessation. This involved sourcing images online and contacting their respective owners to request permission for use in the intervention. NRT samples (transdermal patches, oromucosal spray, chewing gum, inhalator) were obtained from the local agent (V.J. Salomone Pharma Limited) to demonstrate the smoking cessation pharmacotherapy available on the Maltese market. Since varenicline is a prescription-only medication, a sample could not be provided, thus a flashcard was prepared and used instead.

In an attempt to present the main points covered throughout the intervention in a concise manner with the purpose of helping patients recall the information, the investigator contacted the 'Health Promotion & Disease Prevention Directorate' to enquire into the possibility of using pamphlets intended to help smokers quit. The investigator was invited to see the available pamphlets and two pamphlets, one in English and one in Maltese, were chosen, namely *'Quit Smoking Now For Better Health'* and *'Ieqaf Pejjep Fittex L-Għajnuna'*. The pamphlets were delivered to the investigator via postal mail.

The educational intervention was validated by the Chairman of the Department of Cardiology, 3 nurses at the CRU, and 2 pharmacists working in academia. No amendments or improvements were suggested.

2.1.3. Development and validation of a patient data collection form

A patient data collection form (Appendix 2) was developed through extraction of relevant information from the *'Cardiac Rehabilitation Assessment Form'* and from the educational

smoking cessation intervention. The data collection form comprised 5 sections (Table 2.2). 'Patient Information' and 'Medical information' sections were completed from the aforementioned assessment form, while 'Smoking Assessment' and 'Telephone Interview: 3-month/6-month follow-up' were completed through patient interview.

Table 2.2: Layout of patient data collection form

Heading	Content
Patient Information	Study number; sex; age
Medical Information	Diagnosis; intervention; co-existing risk factors; medical treatment
Smoking Assessment	Date of initial assessment, end-of-programme assessment, and 1-year follow-up, daily cigarette consumption at each assessment, level of breath CO (ppm) at each assessment; willingness to quit smoking; reasons for smoking, being unwilling to stop smoking, or relapsing in previous quit attempts; referral to a smoking cessation programme by a CRU nurse; smoking cessation pharmacotherapy received in the past; smoking cessation pharmacotherapy

	suggested by CRU nurse at initial assessment
Telephone Interview: 3-month follow-up	Date of 3-month/6-month assessment; smoking status; daily cigarette consumption; reason(s) for smoking, being unwilling to stop smoking, or relapsing; pharmacotherapy started/stopped/never took; reason(s) for stopping pharmacotherapy
Telephone Interview: 6-month follow-up	

The data collection form was validated by the Chairman of the Department of Cardiology, 3 nurses at the CRU, and 2 pharmacists working in academia. The amendments (Table 2.3) suggested by the panel were implemented.

Table 2.3: Amendments to patient data collection form after validation

Heading	Content
Patient Information	Removal of initials
Medical Information	*Diagnosis:* replacement of 'Valve surgery' with 'Valvular heart disease'; removal of 'Other' *Medical treatment:* inclusion of 'ARB' with 'ACE inhibitor'

Smoking Assessment	*6-week follow up:* replacement of '6-week follow-up' with 'End-of-programme assessment' *Therapeutic intervention(s) suggested by CRU nurse:* replacement of 'Therapeutic intervention(s)' with 'Smoking cessation pharmacotherapy'; removal of 'E-cigarettes' and 'Bupropion' *Smoking cessation therapy received:* specification that pharmacotherapy was taken in the past
Telephone Interview: 3-month follow-up	*Smoking cessation pharmacotherapy started/stopped:* inclusion of 'Never started'/'Qatt ma beda/bdiet'; removal of 'E-cigarettes' and 'Bupropion'
Telephone Interview: 6-month follow-up	

2.1.4. Ethics approval

Approval to carry out the study was sought from the Chairman of the Department of Cardiology, Charge Nurse of the CRU, and Chief Executive Officer of MDH. Approval was sought from the Data Protection Officer of MDH and a *'Data Protection Clearance Declaration Form'* was signed by the investigator. The approval letters and data protection statement together with the prepared *'Research Ethics & Data Protection Form'* were submitted for review to the Faculty of Medicine and Surgery Research Ethics

Committee (FREC) of the University of Malta. A meeting with the FREC Committee was held to discuss the study protocol and FREC approval was granted (Appendix 3).

2.1.5. Pilot study

The educational smoking cessation intervention and the patient data collection form were assessed in the study setting through a pilot study to assess practicality and applicability, wherein 4 patients were recruited. No changes were made after the pilot study, hence the patients recruited during this phase were kept in the study cohort.

2.1.6. Patient recruitment and follow-up

Patients attending the initial assessment session at the CRU were recruited between September 2019 and January 2020. The study protocol was verbally explained to each patient who accepted to participate by the investigator, and a patient information sheet available in English and Maltese (Appendix 3) was provided. A consent form, also available in English and Maltese (Appendix 3), was presented and each patient was asked to sign it to provide informed written consent. A sequential, unique identification number was assigned to each patient with the purpose of safeguarding patient confidentiality. The educational smoking cessation intervention was implemented and smoking data obtained was recorded in the data collection form. Following the intervention, the patient's CR file was used to complete the data collection form.

Patients were followed up at the end of the CR programme using the patient's file at the CRU, and 3, 6, and 12 months post-initial assessment via telephone interview. The data collection form was duly updated.

2.2. Exploring remote smoking cessation service delivery

During the course of the research, the COVID-19 pandemic broke out. In view of this, the trajectory of the study was modified to explore the possible application of telemedicine to smoking cessation. The methodology of the secondary objective of the study involved literature review, communication with stakeholders involved, and development of a framework for a telemedicine-based smoking cessation service.

2.2.1. Communication with Primary HealthCare Telemedicine Centre

The investigator contacted a representative for the Primary HealthCare Telemedicine Centre in Mosta via telephone on 9th August 2021. Further communication occurred via email to relay more detailed information and statistics. The following aspects were discussed: running of the service; experiences, benefits, and limitations; patient views; future plans for service implementation; pharmacist contribution.

2.2.2. Development of a framework for a telemedicine-based smoking cessation service in cardiac rehabilitation

A framework for a telemedicine-based smoking cessation service in CR was developed after a review of the literature on smoking cessation and telemedicine modalities. The framework was presented as a flowchart, as this format is easy-to-follow. A bold, black 'Calibri' font of size 10 was chosen for the framework.

Chapter 3:

Results

3.1. Outcome of implementation of educational smoking cessation intervention

This section compiles the characteristics of the study population, their smoking habits at initial assessment and follow-ups, and the use of smoking cessation pharmacotherapy.

3.1.1. Patient characteristics

Twenty-four patients were recruited. Nineteen patients were male while 5 patients were female. The mean age was 56 years, ranging from 33 to 75 years.

The majority of patients were admitted with acute coronary syndrome (n=17), of whom 12 were diagnosed with STEMI and 5 with NSTEMI. Four patients were admitted with coronary artery disease, 2 patients with congestive heart failure, and 1 patient with valvular heart disease. Sixteen patients underwent a percutaneous coronary intervention (PCI), 4 patients a coronary artery bypass graft, and 1 patient an aortic/mitral valve replacement, while 3 patients received medical treatment only. Two patients had undergone previous revascularisation with PCI.

Patients had an average of 5 risk factors, ranging from 2 to 8 risk factors. In addition to smoking, the most prevalent risk factors for CVD in the study population were a BMI $\geq$ 25kg/m^2 (n=21) and hyperlipidaemia (n=20), followed by a positive family history of CVD (n=18), hypertension (n=15), and a sedentary lifestyle (n=15). Other risk factors included diabetes (n=8), alcohol use (n=5), psychological factors (n=5), renal impairment (n=2), and a history of stroke (n=1).

All 24 patients were receiving lipid-lowering agents in the form of statins. After statins, the most commonly prescribed medications were aspirin (n=22), ACE-I/ARB (n=21), omeprazole (n=21), clopidogrel (n=18), and beta-blockers (n=12). Other medications included antiarrhythmics, anticoagulants, antidepressants, benzodiazepines, bronchodilators, calcium channel blockers, diuretics, histamine H_2-receptor antagonists, hypoglycaemic agents, and nitrates.

3.1.2. Smoking status at initial assessment

Thirteen patients were active smokers while 11 patients had stopped smoking at cardiac event. Of the active smoker cohort, most patients smoked between 1 to 10 cigarettes daily (n=8). The mean daily cigarette consumption was 12 cigarettes per day, ranging from 5 to 25 cigarettes per day. Of the patients who stopped smoking post-cardiac event, the mean daily cigarette consumption prior to quitting smoking was 28 cigarettes per day, ranging from 10 to 60 cigarettes per day.

3.1.3. Willingness to quit smoking and reasons for being unwilling to quit smoking

Of the 13 active smokers, 7 were willing to quit smoking within the next month while 3 were unwilling to quit smoking. Three patients were unsure.

The majority of active smokers were reluctant to abstain from smoking as they considered it part of their daily routine (n=12), and felt that it helps them cope with negative moods and stress (n=9) (Figure 3.1).

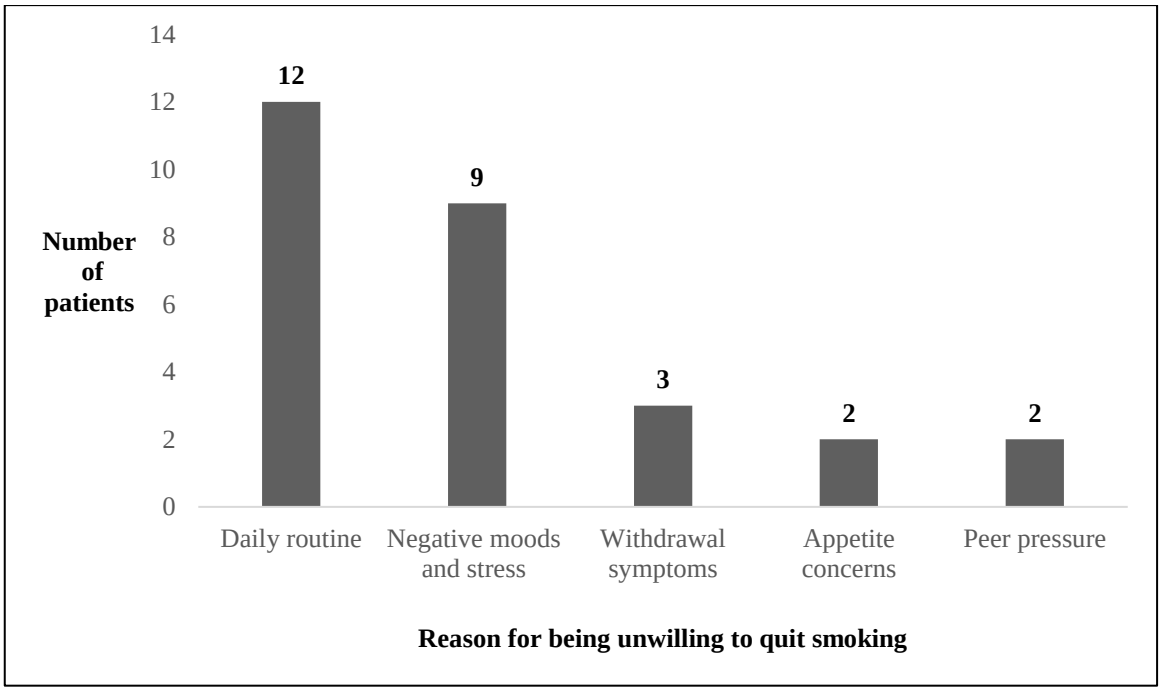

Figure 3.1: Reasons active smokers gave at initial assessment for being unwilling to quit smoking (n=13)

3.1.4. Flashcard selection

Eighteen patients selected a flashcard, with half of them opting for 'Flashcard 2: Cardiovascular diseases' (Figure 3.2) (Appendix 1). Of the 6 patients who did not select a flashcard, 4 had stopped smoking post-cardiac event.

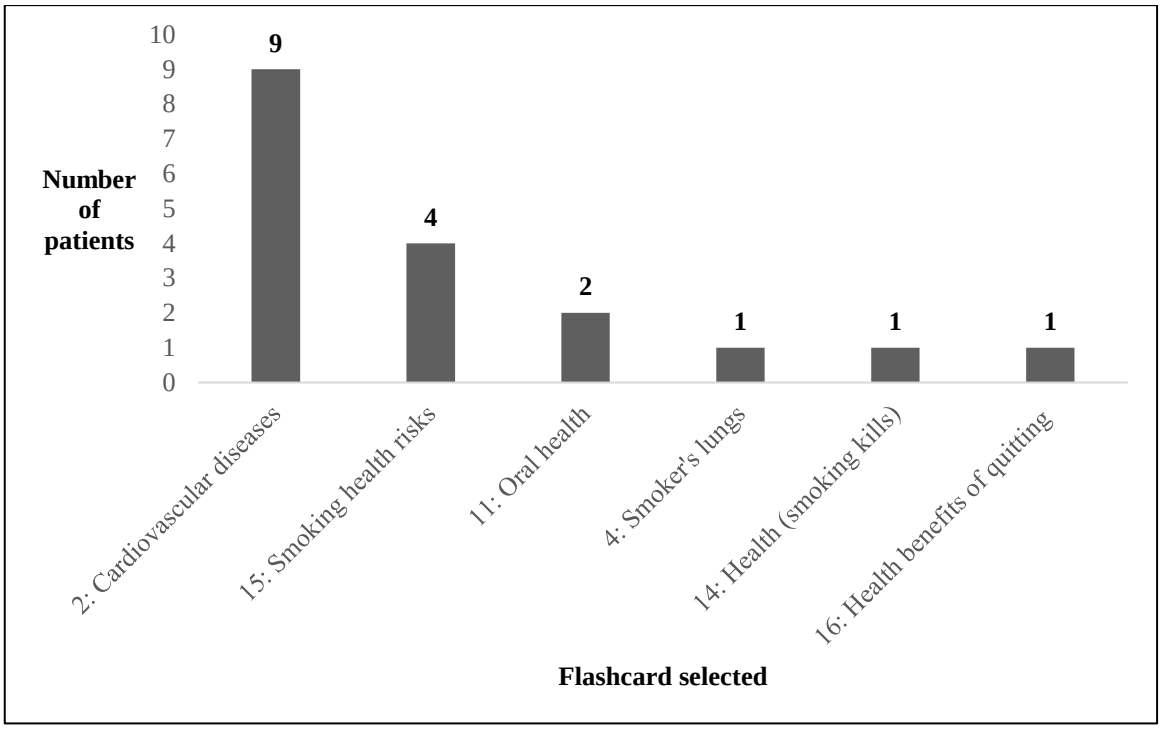

Figure 3.2: Flashcard selected by patients (n=18)

3.1.5. Smoking cessation programme referrals and pharmacotherapy prescribing

Four active smokers were referred to the tobacco cessation counselling services provided at the Floriana and Mosta Health Centres.

Ten patients had a history of smoking cessation treatment use (Table 3.1), 3 of whom were still taking at the time of initial assessment.

Table 3.1: History of smoking cessation pharmacotherapy use (n=10)

Smoking cessation pharmacotherapy		Number of patients
NRT	Chewing gum	4
	Inhalator	1
	Oromucosal spray	4
	Transdermal patch	7
Varenicline		3

NRT, either as oromucosal spray and/or transdermal patches, and varenicline were offered to active smokers. Eight patients accepted to receive smoking cessation pharmacotherapy (Figure 3.3).

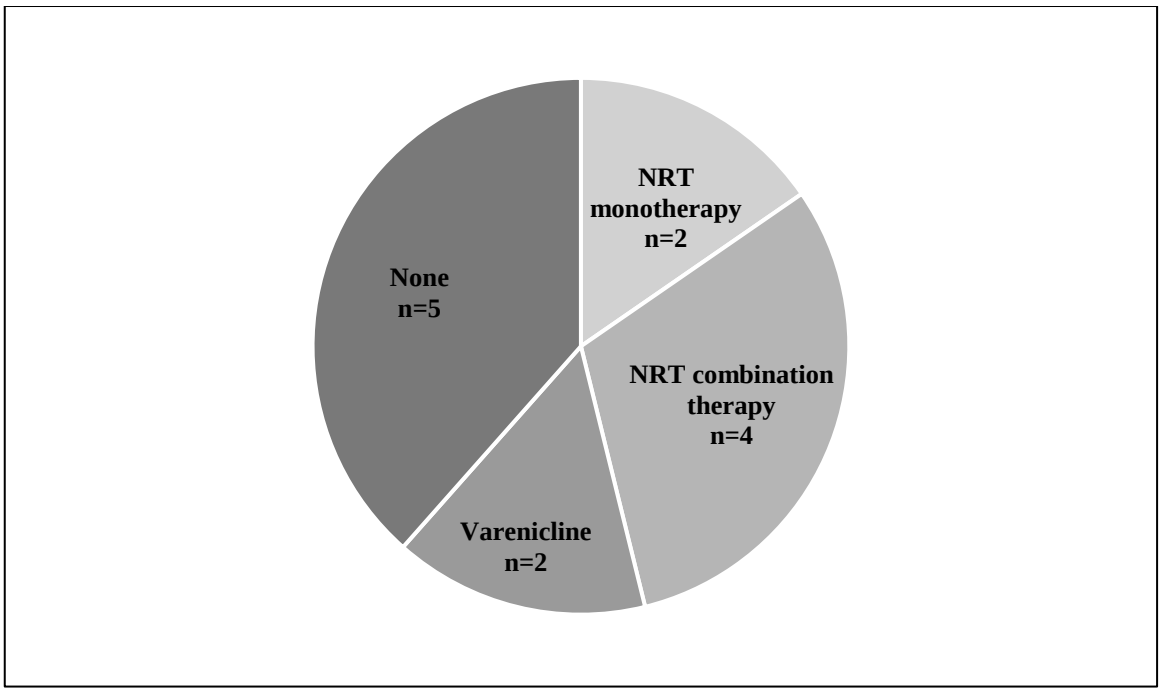

Figure 3.3: Smoking cessation pharmacotherapy suggested to active smokers (n=13)

3.1.6. Cardiac rehabilitation programme attendance

Twenty patients accepted the invitation to participate in the CR programme. The 4 patients who declined were all active smokers, citing work-related difficulties (n=3), travel issues (n=2), and a lack of interest in exercise (n=1).

3.1.7. Smoking status at follow-ups

Seventeen patients were followed up at end-of-programme. Of the seven patients who failed to attend (FTA), 5 belonged to the active smoker cohort. Amongst those who attended, the mean follow-up time between initial assessment (t1) and end-of-programme assessment (t2) was found to be 14 weeks, ranging from 6 to 33 weeks. Due to the discrepancy in follow-up time, the results obtained were disregarded.

Twenty-three patients were followed up at 3 (t3) and 6 (t4) months post-initial assessment. Another patient was lost to follow-up at 12 months (t5) post-initial assessment. The smoking status of active smokers at follow-ups is compared to baseline in Figure 3.4.

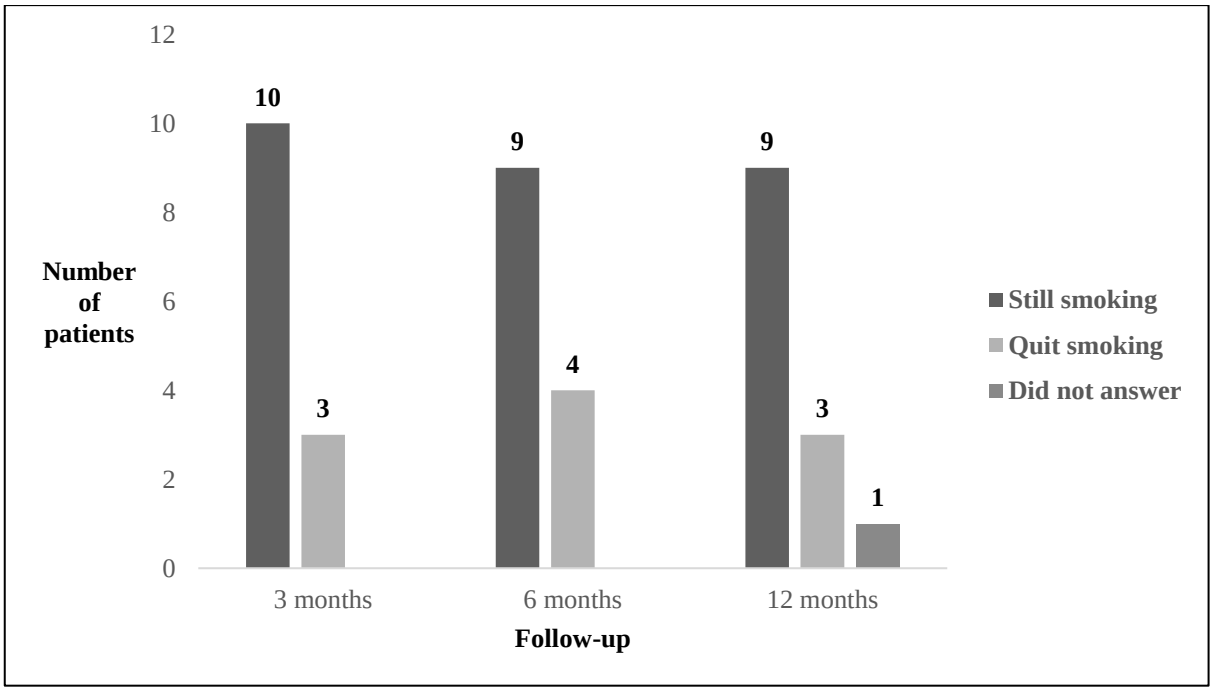

Figure 3.4: Smoking status of active smokers at follow-ups compared to baseline (n=13)

Between t1 and t3, 8 smokers decreased their daily cigarette consumption. Between t3 and t4, of these 8 patients, 1 quit smoking, and 2 further decreased while 5 increased their daily cigarette consumption. At t5, the patient who had quit smoking at t4 relapsed, one of the patients who had decreased their daily cigarette consumption at t4 quit smoking, while of the 5 patients who had increased their daily cigarette consumption, 1 further increased, 1 maintained, and 3 decreased their daily cigarette consumption. The mean daily cigarette consumption at each time point is compared in Table 3.2.

Table 3.2: Mean daily cigarette consumption of active smokers at initial assessment and follow-ups

Time point	Mean daily cigarette consumption (cigarettes per day)
Baseline	12
3 months	7
6 months	8
12 months	8

The smoking status of patients who quit smoking post-cardiac event at follow-ups is compared to baseline in Table 3.3.

Table 3.3: Smoking status of patients who quit smoking post-cardiac event at follow-ups compared to baseline (n=11)

Time point	Relapsed	Abstinent	Did not answer
3 months	4	6	1
6 months			
12 months			

The 6 patients who were abstinent at each time point were the same individuals. Of the patients who had relapsed by t3, 2 increased, 1 decreased, while 1 maintained their daily cigarette consumption between t3 and t4. The 2 patients who increased their daily cigarette consumption at t4 further increased their daily cigarette consumption at t5. The

other 2 patients maintained their daily cigarette consumption between t4 and t5. The mean daily cigarette consumption of the 4 patients who relapsed was 7 cigarettes per day at t5 compared to 28 cigarettes per day prior to quitting smoking at cardiac event.

The mean daily cigarette consumption of patients who were smoking at t3, t4, and t5, irrespective of smoking status at t1, is compared in Table 3.4.

Table 3.4: Mean daily cigarette consumption of smokers at follow-ups

Time point	Mean daily cigarette consumption (cigarettes per day)
3 months	8
6 months	10
12 months	10

3.1.8. Reasons for still smoking or relapsing

At 3-month follow-up, 14 patients were smoking, while at 6-month follow-up, 13 patients were smoking. These patients were asked to disclose their reasons for persistent smoking or relapsing (Figure 3.5).

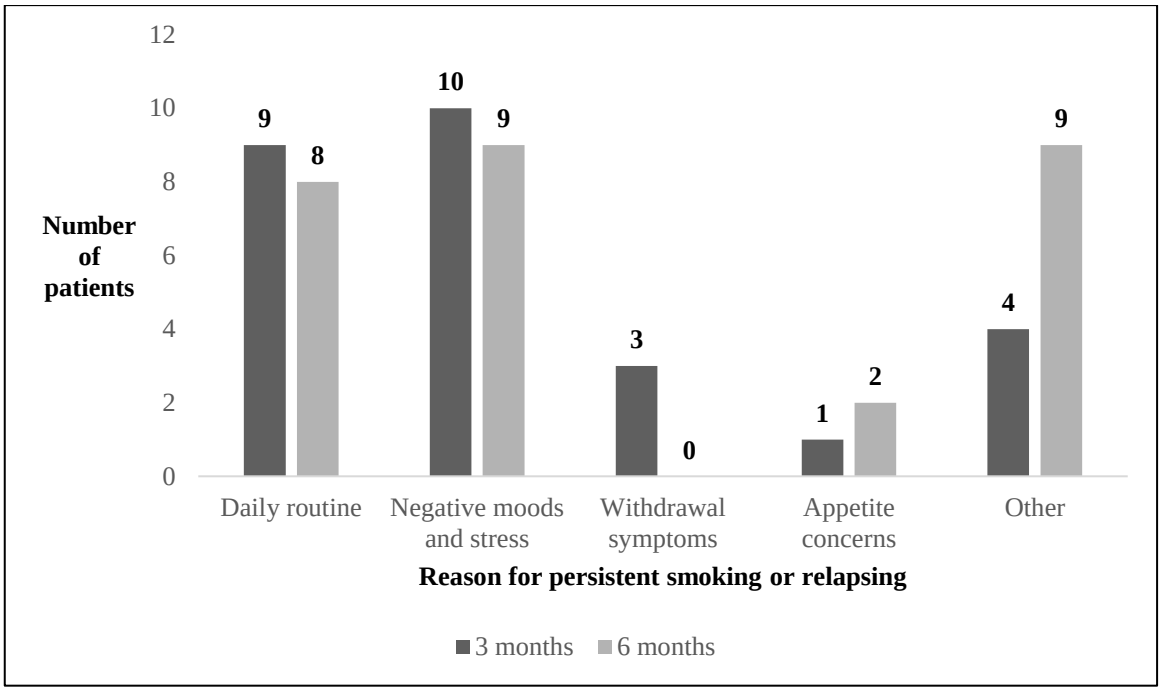

Figure 3.5: Reasons smokers gave at 3 months (n=14) and 6 months (n=13) for smoking

At 3 months, 'Other' included smoking to relieve nicotine cravings (n=3) and smoking as a form of company (n=1). At 6 months, 'Other' encompassed smoking because of the COVID-19 pandemic (n=6), nicotine cravings (n=2), and not wanting to give up smoking due to pre-existing, diabetes-related dietary restrictions (n=1).

3.1.9. Smoking cessation pharmacotherapy

Of the 8 active smokers who accepted to receive pharmacotherapy at initial assessment, only 2 followed through with this. One patient was prescribed varenicline, but stopped the medication (and switched to NRT monotherapy (oromucosal spray)) by t3 due to perceived ineffectiveness, while the other patient was prescribed NRT monotherapy (transdermal patches), which they were taking at t3 but stopped by t4 for the same reason.

Fifteen patients never started any form of smoking cessation pharmacotherapy by t3 or t4. Of this group, 9 were patients who had quit smoking post-cardiac event, with 6 of these patients being abstinent all the way to t5. Of the 6 patients who were active smokers at t1 and never took smoking cessation pharmacotherapy at t3 or t4, only 2 were abstinent at t5.

Five patients (all active smokers at t1) were taking some form of smoking cessation pharmacotherapy at t3, of whom 3 were taking varenicline and 2 were using NRT monotherapy (transdermal patches or oromucosal spray). Two of the patients who were taking varenicline were abstinent at t4, while 1 decreased daily cigarette consumption. Following stopping varenicline due to completion of treatment course, the 2 patients who were abstinent at t4 relapsed by t5, while the other patient FTA. The 2 patients who were using NRT monotherapy at t3 had stopped taking it by t4. One of them discontinued it due to not experiencing nicotine cravings, while the other patient discontinued it due to perceived ineffectiveness. The former patient was abstinent all the way from t3 to t5. The latter patient had increased daily cigarette consumption between t3 and t4, and maintained daily cigarette consumption between t4 and t5.

One patient who was an active smoker at t1 had started NRT monotherapy (inhalator) sometime between t3 and t4, but stopped taking it by t4 due to perceived ineffectiveness. One patient who had quit smoking post-cardiac event but relapsed by t3 had started NRT monotherapy (chewing gum) at t4, but by t5 they had increased daily cigarette consumption.

3.2. Outcome of exploration of remote smoking cessation service delivery

This section includes the response of the communication with stakeholders involved and the proposed framework for a telemedicine-based smoking cessation service.

3.2.1. Communication with patients

Originally, recruited patients were to be followed up via telephone by the investigator only at 3 and 6 months post-initial assessment. However, due to the pandemic, the CRU was temporarily shut down, with the CR team being called upon to assist with ward visits at the cardiac wards instead. Consequently, upon reopening, they were inundated with work, and were unable to assess patients at the 1-year follow-up. In view of this, the investigator contacted recruited patients to assess their smoking status at 12 months via telephone. The investigator asked patients whether they have ever received medical care by virtual means and whether they would be interested in participating in a telemedicine-based CR programme. Of the 22 patients reached, 17 had no history of telemedicine use. Most patients expressed interest in participating in a telemedicine-based CR programme (n=14).

3.2.2. Communication with Primary HealthCare Telemedicine Centre

The 24/7 service is run by a team of physicians (6 or more throughout the day and at least 4 during the night) consisting of general practitioners (GP) and GP trainees who take patient referrals from the Client Support Centre. An average of 2,500 calls are received by call agents daily. Daily medical consultations are held using Microsoft Teams, and include giving medical advice, providing reassurance for patient symptomatology, issuing guidance on quarantine protocols, following up patients and discussing their

investigation results, and managing minor ailments as well as mental health issues. Remote prescriptions are also issued, in which case physicians liaise with local pharmacies to ensure patient safety. Moreover, domiciliary visit calls are vetted – a procedure which has resulted in a 90% decrease in domiciliary visits carried out by GPs and GP trainees.

The Telemedicine Centre also has a significant role in the telephone and video-consultation follow-ups of specific groups of non-hospitalised patients who test positive for COVID-19 infection. The Community COVID Initial Assessment Team (CCIAT) receives a list of COVID-19-positive patients daily, either from the virology laboratory at MDH or the Public Health Department. Each patient on the list is contacted via telephone by a CCIAT physician, who determines whether: the patient is presenting red-flag symptoms which require hospital admission, in which case, 112 is called to dispatch the COVID-19 emergency transport team; the patient is unable to self-isolate at home, in which case, Public Health Department is informed; the patient is fit to recover in the community, in which case risk stratification of the presenting symptoms is performed to establish further follow-up needs.

With regard to the lattermost point, risk is categorised as ‘Low’, ‘Medium’, and ‘High’. In the case of low risk, the Telemedicine Centre is considered a safety netting should patients require further assistance. Patients who are considered medium risk are contacted by the nurses’ team every 2 days (cases are discussed with doctors as necessary). Patients at high risk are contacted by doctors daily.

The reflection that telemedicine is more economic with time and human resources came across. The limitations of telemedicine include the difficulty to pick up on non-verbal cues and the reluctance of some patients to participate in a videoconference. The older generation is not particularly familiar with Microsoft Teams. Other telemedicine platforms which may be deemed more user-friendly might be considered as an alternative.

Very positive feedback has been received with projects within the Telemedicine Centre, particularly from patients with mental health disorders. Patients appreciate that they do not have to wait for a consultation with a physician and that they do not have to mingle with other patients.

There are promising projects to incorporate telemedicine in patient follow-up. Examples discussed were in podiatry, physiotherapy, and speech language pathology. Exposure to telemedicine services to the public is being considered through media, including television programmes. An appointment-based online system for video consultations with GPs is another service that is being explored. Pharmacists could be involved in the provision of telemedicine to particular populations such as residential homes and a pharmacist-physician collaborative model could be considered.

3.2.3. Proposed framework for a telemedicine-based smoking cessation service in cardiac rehabilitation

The proposed framework considers a hybrid CR model which encompasses traditional medicine (in-person visits) and telemedicine (telephone and/or video consultations).

Patients who are active smokers at the time of attending the CR initial assessment in-person should be asked if they are willing to quit smoking. For patients who are willing to quit smoking, the "5A's" model should be implemented, whereby CRU staff: ask about tobacco use; advise quitting; assess willingness to quit smoking; assist in quitting smoking; arrange follow-up(s).

The daily cigarette consumption and breath CO of each patient should be recorded and documented. Patients should be advised in a strong, personalised way to quit smoking, and non-pharmacological support in the form of counselling and CBT should be provided. Patients are provided with the contact information of CRU, for use as a proactive and reactive counselling line. With regard to proactive counselling, patients are offered the possibility of being followed-up via telephone at the predesignated time interval(s) of their choice. The CR team could send reminders to patients so as to confirm patients' availability and interest. Patients should also be directed to the website established by the CR team during the COVID-19 pandemic, where they can find useful information.

Patients should then be asked if they are willing to use smoking cessation pharmacotherapy. Patients who are interested should be offered a choice of NRT monotherapy, NRT combination therapy, or varenicline (by prescription). Patients should be counselled on the appropriate use of the selected medication(s), and the importance of adherence to treatment should be emphasised.

In the case of patients who are unwilling to quit smoking, the "5R's" model should be implemented, which includes: relevance of quitting smoking; risks of persistent smoking;

rewards of quitting smoking; roadblocks to quitting smoking; repetition. Patients should be encouraged to indicate the relevance of quitting smoking on a personal level, and educated on the negative consequences of continued tobacco use as well as the benefits of discontinuing tobacco use. The potential barriers which are impeding smoking cessation should be delved into. Assessment of readiness to quit should be repeated. If the patient is ready to quit, the "5A's" model should be implemented.

Patients are then followed-up in-person at end-of-programme assessment and remotely via telephone follow-ups. For patients who prefer audio-visual communication, appointment-based video consultations could be held.

The smoking cessation pharmacotherapy information which was compiled by the investigator for use in the educational smoking cessation intervention was forwarded to the CR team for their perusal. This was also adapted into infographics (which explain the posology of each medication) that could potentially be uploaded on the aforementioned website for patient reference (Appendix 4).

The outline of the proposed framework for a telemedicine-based smoking cessation service in CR is shown in Figure 3.6.

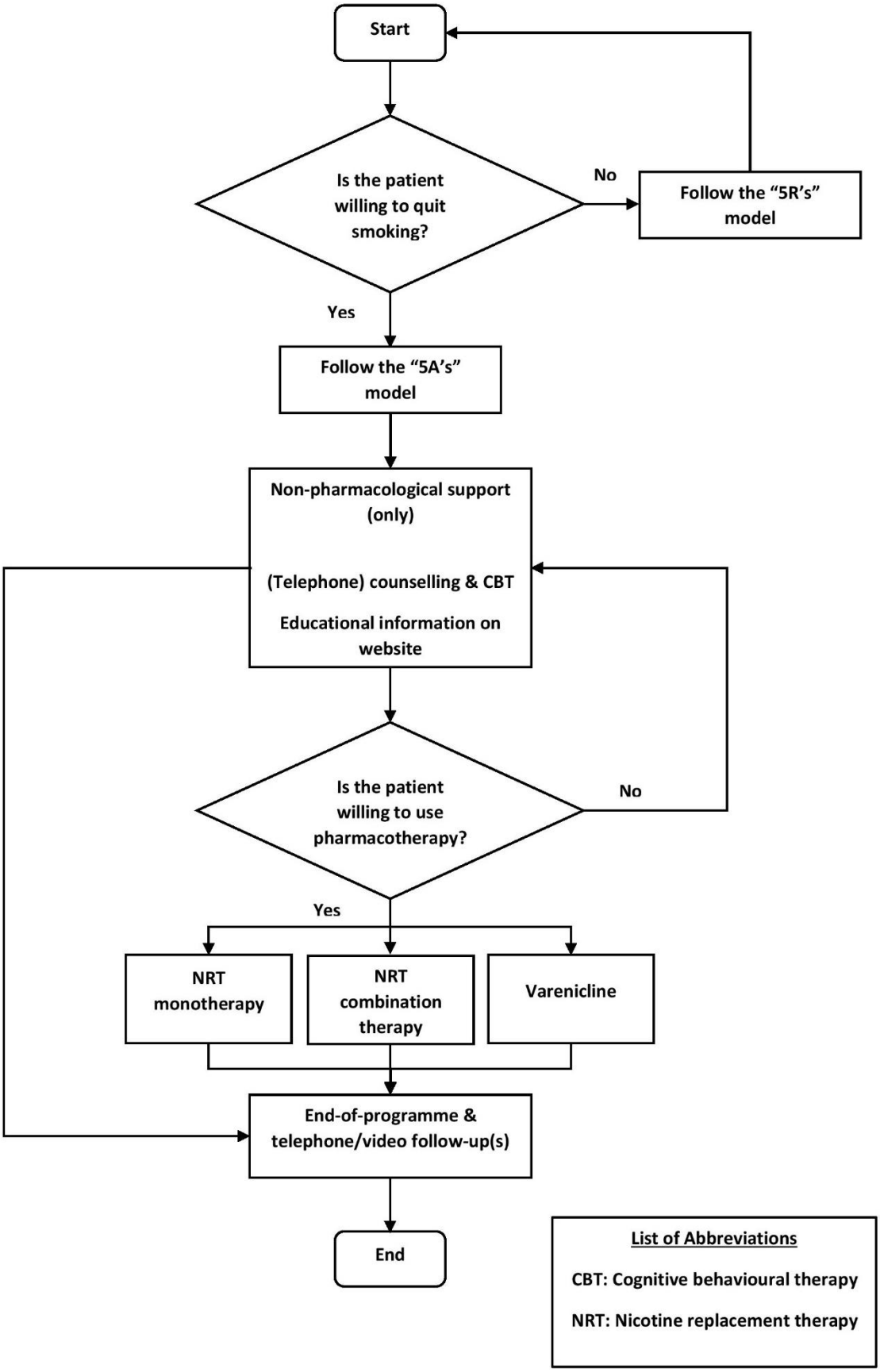

Figure 3.6: Proposed framework for a telemedicine-based smoking cessation service in CR

Chapter 4:

Discussion

4.1. Smoking cessation in cardiac rehabilitation

The health risks of smoking are grossly underestimated (Jha, 2020) and there appears to be a misconception that the tobacco problem has mostly been solved (Proctor, 2012). With more than 8 million deaths per year attributed to tobacco use[2] however, smoking remains a challenging problem. Of all the smoking-attributable diseases, CVD carries the highest burden (Jha, 2020). It is therefore imperative to campaign towards smoking cessation in all CVD settings.

With risk factor management as a core component, smoking cessation should particularly be prioritised in CR (Pipe and Reid, 2018). In spite of this, participation and smoking cessation rates within the local CR programme are not optimal, as at 1-year follow-up, of the 58 active smokers recruited between January 2016 and December 2017, 32 patients were still smoking and 20 patients did not attend.[1] In this study, due to the COVID-19 pandemic interfering with the CR's team ability to follow up patients, it was the investigator who followed up recruited patients at 1-year follow-up. Hence, local CR participation cannot be compared. That being said, the 4 patients who forewent the opportunity to attend CR were all active smokers, and of the 7 patients who FTA end-of-programme assessment, 5 were active smokers – findings which are in line with previous studies correlating a positive smoking status with poor CR attendance and adherence (Gaalema et al., 2015; Ruano-Ravina et al., 2016).

Smoking cessation rates observed in this study were low, with three-quarters of patients who were active smokers at initial assessment still smoking at 1-year follow-up. This is only a slight improvement in the smoking cessation rates observed in the study by Anders

et al. (2019).[1] However, the mean daily cigarette consumption was comparatively lower, with the patients in this study smoking an average of 4 cigarettes less per day. This finding is in keeping with an international study performed by El Hajj et al. (2017), in which participants within the pharmacist intervention group smoked an average of 3.2 cigarettes per day less than the control group.

It is also worth bearing in mind that the smoking cessation rates observed could have been impacted by the presence of the COVID-19 pandemic, which happened to coincide with the 6-month follow-up. In fact, the mean daily cigarette consumption of smokers between 3-month follow-up and 6-month follow up increased by an average of 2 cigarettes per day – an increase which was sustained till 1-year follow-up. This finding is corroborated by international studies which evaluated the impact of the COVID-19 pandemic lockdown on tobacco use (Vanderbruggen et al., 2020; Carreras et al., 2021; Gendall et al., 2021).

In addition to suboptimal CR participation and smoking cessation rates, smoking cessation pharmacotherapy is underused in the local CR programme, as evidenced by the fact that slightly more than one third of active smokers were not prescribed such medications and not all the NRT dosage forms available locally are used. Nevertheless, this was an improvement, as in the study conducted by Henry et al. (2019), close to two-thirds of patients were not prescribed smoking cessation treatment.[1] In this study, patients were also followed up on smoking cessation pharmacotherapy use. It was found that of the 8 active smokers who accepted to receive NRT or varenicline, only 2 patients commenced the recommended treatment. Patients were not questioned on their reasons for not initiating treatment, however, 2 patients freely disclosed that they were unable to

find the medication of their choice in stock. Of the 4 patients who took NRT, 2 stopped it as a result of perceived ineffectiveness. This perception could be due to incorrect use of NRT, either using less than the recommended dose or not completing the full course of treatment (Burns and Levinson, 2008; Balmford et al., 2011), as a meta-analysis by Mersha et al. (2021) has shown that only one in four people take the medication as directed.[7] Of the 3 patients who were taking varenicline at 3-month follow-up, 2 relapsed by 6-month follow-up, following treatment completion. Extended treatment with varenicline helps to prevent relapse (Livingstone-Banks et al., 2019), thus patients should be encouraged to continue treatment with varenicline for preferably 24 weeks.

4.2. Remote smoking cessation service delivery

The World Health Organisation declared the COVID-19 outbreak as a pandemic on 11th March, 2020.[8] The implementation of measures such as lockdown, quarantine, social distancing, remote working, and the obligatory wearing of masks have, to some extent, reduced its spread. It can therefore be seen why contacting patients remotely with a view to monitor their progress is a healthcare priority on a global scale. To that end, this study was concerned with the design of a telemedicine-based smoking cessation service in CR.

[7]Greenhalgh EM, Stillman DE, Ford C. Pharmacotherapies for smoking cessation. In: Greenhalgh EM, Scollo MM, Winstanley MH, editors. Tobacco in Australia: Facts and Issues [book on the Internet], 4th ed. Melbourne: Cancer Council Victoria; 2020 [updated 2021 Jul; cited 2021 Aug 11]. Available from: https://www.tobaccoinaustralia.org.au/downloads/chapters/Recent_news_and_research/Chapter_7/7.16_Relevant_news_and_research25519.pdf

[8]World Health Organisation Regional Office for Europe (WHO/Europe). Coronavirus disease (COVID-19) pandemic [Internet]. Copenhagen: World Health Organisation Regional Office for Europe; 2020 [cited 2021 Aug 11]. Available from: https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/novel-coronavirus-2019-ncov

At the time of study, the CR team had already started developing a form of telemedicine in the shape of a website from which patients could access information on various educational topics. This was due to the fact that the educational sessions were discontinued to limit patient contact.

It must be stated at the outset that it is desirable to build a good rapport with each individual patient on a one-to-one basis initially by means of face-to-face communication. Thereafter, the use of telemedicine modalities is considered an ideal adjunct. The proposed framework was therefore purposely formulated in such a way to incorporate telemedicine into traditional CR – a model known as hybrid CR.

The proactive follow-up telephone calls would preferably be delivered shortly after the patient's set quit attempt, as this is the period where relapse commonly occurs (Anderson and Zhu, 2007; Byaruhanga et al., 2020a). The call schedule could be spaced over weeks or months, before assessing the patient in-person at the 1-year follow-up. While there is limited evidence about the ideal number of calls, three or more calls are more likely to provide a measurable benefit (Matkin et al., 2019). Patients are known to be non-adherent with keeping their appointments in outpatient settings for several reasons and therefore, it would be fair to assume that there may be similar difficulties with telemedicine. Incidentally, this was observed on a personal level whilst conducting patient follow-ups during the primary objective of the study, where a particular patient seemed to take objection to being contacted, complaining that the timing was inconvenient. For this reason, it is recommended to send patients reminders with the intention of confirming

their availability and interest. This would also support patients in feeling involved in decisions surrounding their health.

Video counselling might be considered preferable as it transmits live video images, allowing healthcare workers to be more responsive to patients' verbal and non-verbal cues (Tzelepis et al., 2019). By replicating traditional face-to-face communication, video counselling also provides greater social support, and raises motivation and encouragement (Byaruhanga et al., 2020a). Furthermore, the social presence of video counselling can result in a high level of engagement with the healthcare worker (Byaruhanga et al., 2020a). In a review by Byaruhanga et al. (2020b), only 1 of the 4 studies which examined the effectiveness of video counselling on smoking cessation reported a significant difference between video counselling and telephone counselling, suggesting that both modalities are effective in smoking cessation. That being said, a study by Tzelepis et al. (2019) found that patients who received video counselling were more likely than those who received telephone counselling to recommend the programme to a friend or relative. Nevertheless, video counselling presents the issue of a greater chance of connectivity difficulties compared to telephone counselling (Byaruhanga et al., 2020).

At the time of writing, the coronavirus responsible remains a major threat to public health as more transmissible and virulent variants with increased resistance to the developed vaccines continue to emerge. Accordingly, telemedicine is more relevant than ever. Of course, there are downsides to it. From the patient's point of view, healthcare inequalities may arise due to a digital divide, particularly with the use of video counselling. From the healthcare worker's perspective, the introduction of telemedicine would disrupt their

established daily work routine and, as a result of improved patient accessibility, add to their already existing workload. Furthermore, training needs for both patients and healthcare workers might be required. Consequently, the proposed framework might not be feasible due to time constraints. If such a framework were to be introduced locally, human resources would have to be carefully considered prior to its implementation.

4.3. Study limitations

The following study limitations were identified. The sample size was small and there was no control group. The developed educational smoking cessation intervention had to be concise for logistic purposes and to keep patients engaged. Smoking status was self-reported, thereby relying on patients' honesty.

4.4. Recommendations for further study

With regard to the educational smoking cessation intervention, it is recommended to conduct prospective studies with a larger patient cohort which would also include a control group so as to investigate the association between pharmacist intervention and smoking cessation rates. It is also recommended that recruited patients have their exhaled breath CO levels measured in order to objectively assess and monitor smoking status.

As regards the telemedicine-based smoking cessation service, it is recommended to extensively validate the proposed framework with a broad panel consisting of a primary care team and specialists in order to test its feasibility, applicability, and practicality. It would be appropriate to disseminate surveys amongst patients to gauge interest in participating in a remote service, and to discover preferences with regard to telemedicine

modalities and available platforms. The smoking cessation infographics which were prepared could be revised and translated in Maltese.

4.5. Conclusion

The developed smoking cessation intervention provided at initial assessment and the telephone follow-ups were intended to complement the present service and support patients to stop smoking. However, the fact that most patients were still smoking after 1 year suggests that a more aggressive approach is required in CR to improve smoking cessation outcomes. It is possible that outcomes can be improved through remote smoking cessation delivery. The proposed telemedicine-based smoking cessation framework is a hybrid CR model that allows patients improved accessibility and flexibility.

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Scicluna G, Gauci M, Xuereb C, Desira J, Xuereb RG, Wirth F, Azzopardi LM. Smoking cessation in post-hospitalisation cardiac rehabilitation (Poster presentation, Maltese Cardiac Society Conference, 15-17 October 2020) (Appendix 5).

Appendices

Appendix 1: Educational smoking cessation intervention

Smoking Cessation in Post-Hospitalisation Rehabilitation

EDUCATIONAL INTERVENTION[1] (English version)

1. Ask patient to mention the risks s/he knows are associated with smoking.

   Discuss risks with patient using flashcards on:

   - Health (flashcards 1 – 11):

Cancer	**LUNG**, oral cavity, stomach, pancreas, liver, bowel, kidney
Cardiovascular	Angina Heart attack Stroke Poor peripheral circulation
Respiratory	Chronic obstructive pulmonary disease Asthma
Other	Cataracts; blindness Decreased immune function Dementia Diabetes Fertility issues; pregnancy complications Gastro-oesophageal reflux disease Osteoporosis Periodontal diseases Rheumatoid arthritis

   - Aesthetic (flashcards 11 – 13): stained teeth, tooth loss, yellow fingers & nails, 'Smoker's face' i.e. premature ageing, wrinkles, gaunt face, grey skin
   - Second-hand smoking: family's health negatively affected

2. Ask patient how willing s/he is to quit smoking and ask him/her to mention reasons for wanting to quit.

   Discuss reasons with patient using flashcards on:

   - Health (flashcards 14 – 16)
   - Family (flashcard 17)
   - Money (flashcard 18)
   - Other → ask patient to elaborate

3. Ask patient why s/he smokes and encourage him/her to identify situations which predispose to smoking.

   _____

   _____

4. Advise patient to set a quit date on a relatively stress-free and/or uneventful day and to inform family and friends.

   Advise patient on what to expect during his/her quit attempt:

   - nicotine cravings → provide strategies (exercise, breathing exercises, drink a glass of water, snack on healthy food)
   - withdrawal symptoms → reassure patient that these will subside within a few weeks

5. Counsel patient on how to use the smoking cessation therapy (dose and dosage regimen, proper administration, and duration of therapy – refer to pages 3 & 4) suggested by a CRU nurse.
6. Ask patient to select a flashcard which will motivate them and help them stay focused on quitting smoking.
7. Provide identified educational pamphlets issued by 'Health Promotion & Disease Prevention Directorate'.
8. Follow-up with patient after 6 weeks with the CRU team, after 3- and 6-months via telephone interview, and after 1 year with the CRU team.

SMOKING CESSATION THERAPY

	Nicotine Replacement Therapy[2]				Varenicline[11,12,13]
Dose & Dosage Form(s)	2mg/4mg chewing gum[3,4,5]	1mg/puff oromucosal spray[6]	15mg inhalator[7]	10mg/15mg/25mg transdermal patch[8,9,10]	0.5mg/1mg tablets
Posology	Commence treatment upon set quit date.				Commence treatment 1–2 weeks prior to quit date.
	Take as directed by prescribing doctor. <u>≥20 cigarettes per day</u>: 4mg <u><20 cigarettes per day:</u> 2mg Either: Use as needed to relieve or prevent nicotine cravings. Or: Use regularly. Chew one piece of chewing gum every 1–2 hours (at least nine pieces per day) for the first 6 weeks of quitting, followed by one piece every 2–4 hours for 3 weeks, and then one piece every 4–8 hours for 3 weeks. Do not exceed 15 pieces of gum daily. Gradually reduce the pieces of chewing gum used per day.	Take as directed by prescribing doctor. Use no more than 1–2 sprays as needed (generally every 30 minutes to 1 hour) to relieve or prevent nicotine cravings. Do not exceed 64 sprays per day (up to 4 sprays per hour over 16 hours). Gradually reduce the number of sprays used per day.	Take as directed by prescribing doctor. Use as needed to relieve or prevent nicotine cravings. Do not exceed 6 cartridges per day. Gradually reduce the number of cartridges used per day.	Take as directed by prescribing doctor. <u>≥10 cigarettes per day</u> Apply the high-strength patch daily for 6–8 weeks, followed by the medium-strength patch daily for 2 weeks, and then the low-strength patch daily for the final 2 weeks. <u><10 cigarettes per day</u> Apply the medium-strength patch daily for 6–8 weeks, followed by the low-strength patch daily for 2–4 weeks.	0.5mg (white tablet) once daily for 3 days, then 0.5mg (white tablet) twice daily for 4 days, increasing to 1mg (blue tablet) twice daily for 11 weeks. An additional 12-week course can be repeated in abstinent individuals to reduce risk of relapse.
Patient Advice	Chew gum slowly until a tingling sensation is felt. Stop chewing and place the gum between the cheek and gums. Chew gum again when tingling sensation starts to fade. Repeat ("chew and park") method for about 30 minutes. Avoid eating and drinking for 15 minutes before and during using chewing gum.	If using spray for the first time or if it hasn't been used for two days, prime spray by pointing it away and pressing the top of the dispenser until a fine mist appears. Point the spray nozzle as close to the open mouth as possible and press the top of the dispenser to release the spray into the mouth, avoiding the lips. Do not inhale while spraying and avoid swallowing for a few seconds after use. Each mouth spray contains at least 150 sprays	Insert the cartridge into the device. Draw in air through the mouthpiece and inhale frequently for as long as desired. Each cartridge will provide about 40 minutes of intense use.	Upon waking, apply patch to dry, hairless skin on the hip, torso, or upper arm, holding it in place for a few seconds to ensure adhesion. Remove the used patch after 16 hours of application. Apply a new patch the next day. Alternate sites daily. Do not apply patch to broken skin.	Swallow tablet whole (do not crush or chew) with a glass of water. Take with or without food.

Smoking Cessation in Post-Hospitalisation Rehabilitation

INTERVENT EDUKAZZJONALI[1] (verżjoni Maltija)

1. Staqsi lill-pazjent/a j/tniżżel riskji għas-saħħa li hu/i j/taf li huma assoċjati mat-tipjip.

   Iddiskuti riskji mal-pazjent/a bl-użu ta' leħħiet fuq:

   - Saħħa (leħħiet 1 – 11):

Kanċer	**PULMUN**, ħalq, stonku, frixa, fwied, musrana, kliewi
Qalb	Anġina Attak tal-qalb Puplesija Ċirkolazzjoni periferali batuta
Pulmun	*Chronic obstructive pulmonary disease* Ażma
Oħrajn	Kataretti; għama Immunita' batuta Dimenzja Dijabete Problemi bil-fertilita`; kumplikazzjonijiet tat-tqala Ħruq ta' stonku Osteoporożi Mard tal-ħanek Artrite

   - Estetika (leħħiet 11 – 13): snien imtebba', telf tas-snien, swaba u dwiefer sofor, *'Smoker's face'* i.e. tixjiħ prematur, tikmix, wiċċ mixrub, ġilda griża
   - *Second-hand smoking*: saħħet il-familjari tiġi affetwata b'mod negattiv

2. Staqsi lill-pazjent/a kemm hu/i lest/a j/tieqaf i/tpejjep u staqsih/a jsemmi/issemmi raġunijiet għalfejn j/tixtieq j/tieqaf i/tpejjep.
   Iddiskuti raġunijiet mal-pazjent/a bl-użu ta' leħħiet fuq:
   - Saħħa (leħħiet 14 – 16)
   - Familja (leħħa 17)
   - Flus (leħħa 18)
   - Oħrajn → staqsi lil-pazjent/a j/telabora
3. Staqsi lill-pazjent/a għalfejn i/tpejjep u inkoraġġih/a j/tidentifika sitwazzjonijiet li jidppredisponu lit-tipjip.

   _____

   _____
4. Agħti parir lill-pazjent/a biex j/tieqaf i/tpejjep fuq ġurnata pjuttost *stress-free* u/jew bi ftit avvenimenti u biex j/tavża lill-familja u lill-ħbieb.
   Agħti parir lill-pazjent/a dwar x'j/tista' j/tistenna waqt li qiegħed/a j/tastjeni:
   - *cravings* għan-nikotina → ipprovdi strateġiji (agħmel eżerċizzju, ħu nifsijiet fondi 'l ġewwa u 'l barra, ixrob tazza ilma, kul *snack* bnin)
   - sintomi ta' rtirar → assigura lill-pazjent/a li dawn ibattu fi ftit ġimgħat
5. Agħti parir lill-pazjent/a dwar kif għandu/ha j/tuża t-terapija għall-waqfien mit-tipjip (id-doża u il-kors tad-dożaġġ, l-amministrazzjoni xierqa, u il-kors tat-terapija – irreferi għall-paġni 7 – 9) rakkomandata minn infermier/a tal-*CRU*.
6. Staqsi lill-pazjent/a j/tagħżel leħħa li timmotivah/a u li tgħinu/ha j/tibqa' ffukat/a sabiex j/tieqaf i/tpejjep.
7. Ipprovdi pamflets edukattivi identifikati maħruġa mid-'Direttorat għall-Promozzjoni tas-Saħħa u Prevenzjoni tal-Mard'.
8. *Follow-up* lill-pazjent/a wara 6 ġimgħat mat-tim tal-*CRU*, wara 3- u 6-xhur permezz tat-telefon, u wara sena mat-tim tal-*CRU*.

TERAPIJA GHALL-WAQFIEN MIT-TIPJIP

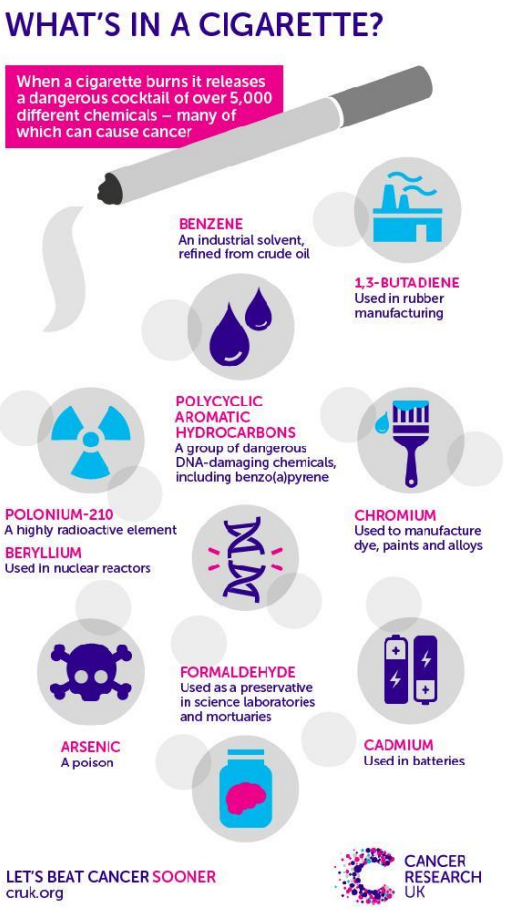
	Nicotine Replacement Therapy[2]				**Varenicline**[11,12,13]
Doża & Forma/i ta' Dożaġġ	2mg/4mg *chewing gum*[3,4,5]	1mg kull nefha sprej tal-ħalq[6]	15mg inalatur[7]	10mg/15mg/25mg garża[8,9,10]	0.5mg/1mg pilloli
Posoloġija	Ibda t-terapija l-ġurnata ta' meta ser tieqaf tpejjep				Ibda t-terapija ġimgha sa ġimghatejn qabel il-ġurnata ta' meta ser tieqaf tpejjep
	Hu skont il-parir tat-tabib li kitiblek ir-riċetta. <u>≥20 sigaretti kuljum:</u> 4mg <u>≤20 sigaretti kuljum:</u> 2mg Jew: Uża kif meħtieġ sabiex isserraħ jew tipprevedi l-*cravings* għan-nikotina. Inkella: Omgħod biċċa *chewing gum* kull siegħa sa sagħtejn (mill-inqas disa' biċċiet kuljum) għall-ewwel 6 ġimgħat ta' astinenza, imbagħad biċċa kull sagħtejn sa erba' siegħat għal tliet ġimgħat, u mbagħad biċċa kull erba' sa tmien siegħat għal tliet ġimgħat. Tiħux aktar minn 15-il biċċa kuljum. Gradwalment naqqas il-biċċiet ta' *chewing gum* użati kuljum.	Ħu skont il-parir tat-tabib li kitiblek ir-riċetta. Uża mhux aktar minn sprej wieħed sa tnejn kif meħtieġ (ġeneralment kull nofs siegħa sa siegħa) sabiex isserraħ jew tipprevedi l-*cravings* għan-nikotina. Tużax aktar minn 64 sprejs kuljum (sa 4 sprejs fis-siegħa fuq medda ta' 16-il siegħa). Gradwalment naqqas in-numru ta' sprejs użati kuljum.	Ħu skont il-parir tat-tabib li kitiblek ir-riċetta. Uża kif meħtieġ sabiex isserraħ jew tipprevedi l-*cravings* għan-nikotina. Tużax aktar minn 6 *cartridges* kuljum. Gradwalment naqqas in-numru ta' *cartridges* użati kuljum.	Hu skont il-parir tat-tabib li kitiblek ir-riċetta. <u>≥10 sigaretti kuljum:</u> Applika l-garża tal-akbar doża kuljum għal 6–8 ġimgħat, imbagħad il-garża tad-doża medja kuljum għal ġimgħatejn, u mbagħad il-garża tal-anqas doża kuljum għall-aħħar ġimgħatejn. <u>≤10 sigaretti kuljum:</u> Applika l-garża tad-doża medja kuljum għal 6–8 ġimgħat, imbagħad il-garża tal-anqas doża kuljum għall-ġimgħatejn sa erba' ġimgħat.	Ħu skont il-parir tat-tabib li kitiblek ir-riċetta. 0.5mg (pillola bajda) darba kuljum għal 3 ijiem, imbagħad 0.5mg (pillola bajda) darbtejn kuljum għal erbat ijiem, u mbagħad 1mg (pillola blu) darbtejn kuljum għal 11-il ġimgħa. Kors addizzjonali ta' 12-il ġimgħa jista' jiġi repetut f'individwi astinenti sabiex jitnaqqas ir-riskju ta' rikaduta.
Parir għall-pazjent/a	Omgħod biċċa *chewing gum* bil-mod sakemm tinħass sensazzjoni ta' tnemnim. Iqaf omgħod u poġġi ċ-*chewing gum* bejn il-ħaddejn u l-ħanek. Meta s-sensazzjon ta' tnemnim tbatti, erġa' omgħod il-biċċa *chewing gum*. Irrepeti dan il-metodu (magħruf bħala *"chew and park"*) għal nofs siegħa. Evita li tiekol u tixrob kwarta qabel ma tibda tomgħod iċ-chewing gum u sakemm qed tomgħodha.	Jekk qed tuża l-isprej għall-ewwel darba jew jekk ma ntużax f'jumejn, ipprepara l-isprej billi tippontah lil hinn u tagħfas il-parti ta' fuq tad-*dispenser* sakemm jitfaċċa ċpar fin. Ipponta n-*nozzle* tal-isprej viċin kemm jista' jkun tal-ħalq miftuħ u agħfas il-parti ta' fuq tad-*dispenser* biex johroġ l-isprej fil-ħalq, filwaqt li tevita x-xufftejn. Tiħux nifs 'il ġewwa sakemm tkun qed tisprejja u evita li tibla' għal ftit sekondi wara li tisprejja. Kull sprej tal-ħalq fih mill-inqas 150 sprejs.	Daħħal il-*cartridge* fl-apparat. Iġbed l-arja minn ġol-biċċa tal-ħalq u ħu nifsijiet ta' spiss għat-tul ta' żmien li tixtieq. Kull *cartridge* jipprovdi madwar 40 minuta ta' użu intens.	Kif tqum, applika garża fuq ġilda xotta u bla xagħar fuq il-ġenbejn, it-torso, jew il-parti ta' fuq tad-driegħ, u żommha f'postha għal ftit sekondi sabiex tiżgura li weħlet. Neħħi l-garża użata wara 16-il siegħa ta' applikazzjoni. Applika garża ġdida 'l għada. Alterna s-siti kuljum. Tapplikax garża fuq ġilda miksura.	Ibla' pillola sħiħa (tfarrakx jew tomgħod) b'tazza ilma. Ħu mal-ikel jew fuq stonku vojt.

Smoking Cessation in Post-Hospitalisation Rehabilitation

EDUCATIONAL INTERVENTION FLASHCARDS - INTERVENT EDUKAZZJONALI LEĦĦIET

Flashcard 1: Chemicals in a cigarette

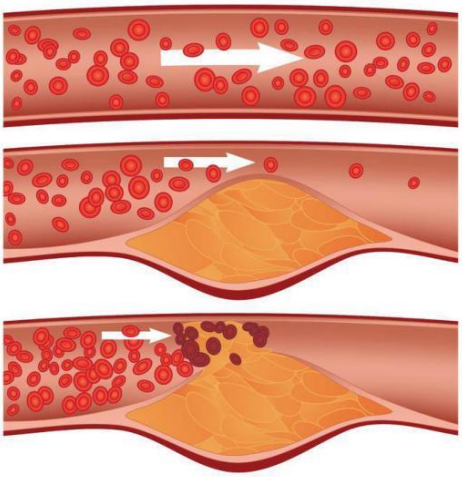
Leħħa 1: Kimiċi fis-sigarett



Adopted from: Cancer Research UK. What's in a cigarette? [Internet]. London: 2018 [cited 2019 Aug 28]. Available from: https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/smoking-and-cancer/whats-in-a-cigarette-0?_ga=2.164412927.1154414334.1567107197-1090339700.1567107197

Flashcard 2: Cardiovascular diseases

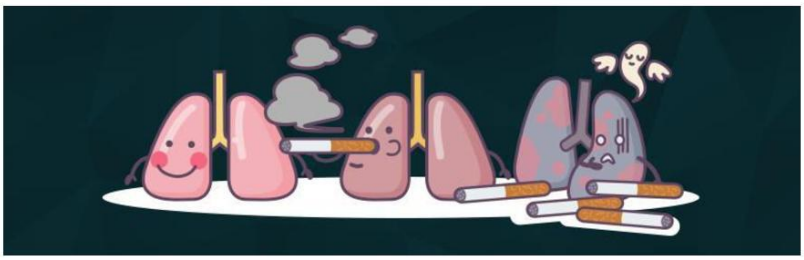
Leħħa 2: Mard tal-qalb



Adopted from: University of Rochester Medical Center. Coronary Artery Disease or Atherosclerosis [Internet]. New York: 2019 [cited 2019 Jul 22]. Available from: https://www.urmc.rochester.edu/highland/departments-

Flashcard 3: Respiratory diseases

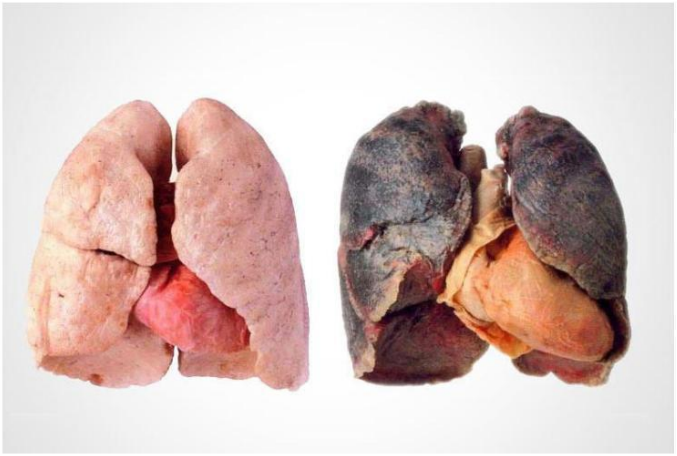
Leħħa 3: Mard tal-pulmun



Adopted from: Lung Institute. What is Chronic Obstructive Pulmonary Disease? [Internet]. North America: 2019 [cited 2019 Jul 22]. Available from: https://lunginstitute.com/lung-diseases/chronic-obstructive-pulmonary-disease/

Flashcard 4: Lungs of a non-smoker vs a smoker

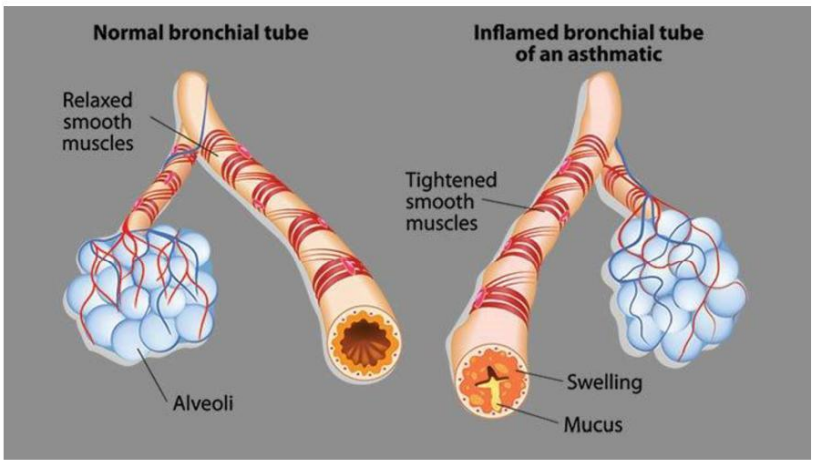
Leħħa 4: Pulmuni ta' xi ħadd li ma jpejjipx ikkomparat ma' ta' xi ħadd li jpejjep



Adopted from: Vapesterdam. Smoking Lungs: What's The Damage? [Internet]. 2015 [cited 2019 Jul 22]. Available from: https://vapesterdam.com/blog/smoking-lungs-whats-damage/

Flashcard 5: Asthma

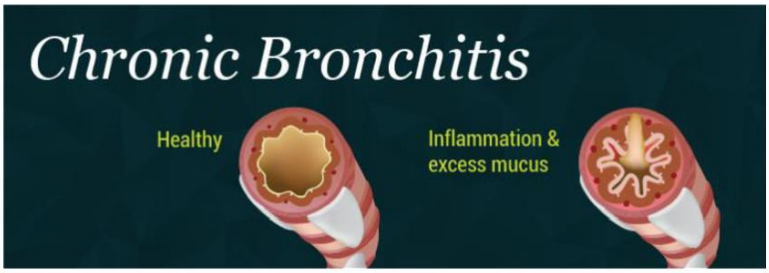
Leħħa 5: Ażma



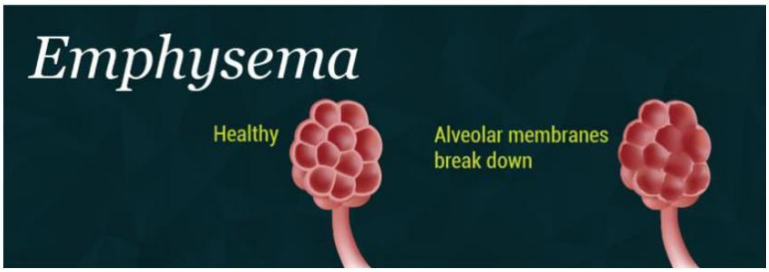
Adopted from: Everyday Health. 8 Complications of Uncontrolled Asthma [Internet]. New York: 2018 [cited 2019 Jul 22]. Available from: https://www.everydayhealth.com/hs/asthma/complications-uncontrolled-asthma/

Flashcard 6: COPD

Leħħa 6: *COPD*



Adopted from: Lung Institute. Chronic Bronchitis [Internet]. North America: 2019 [cited 2019 Jul 22]. Available from https://lunginstitute.com/lung-diseases/chronic-bronchitis/

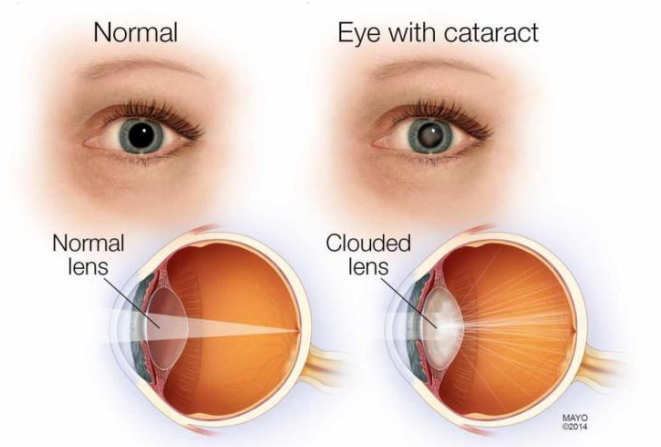


Adopted from: Lung Institute. Emphysema [Internet]. North America: 2019 [cited 2019 Jul 22]. Available from https://lunginstitute.com/lung-diseases/emphysema/

Adopted from 3: Lung Institute. COPD [Internet]. North America: 2019 [cited 2019 Jul 22]. Available from https://lunginstitute.com/lung-diseases/copd/

Flashcard 7: Cataracts

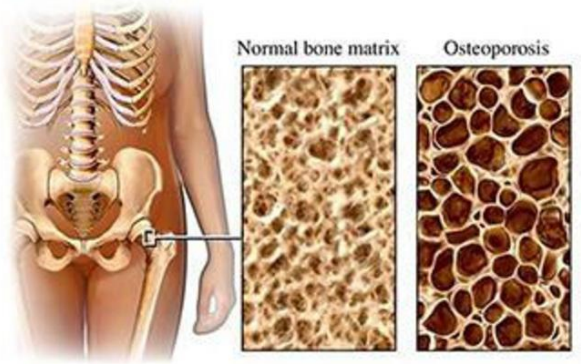
Leħħa 7: Kataretti



Adopted from: Mayo Clinic. Curing Cataracts without Surgery? [Internet]. North America: 2015 [cited 2019 Jul 22]. Available from: https://newsnetwork.mayoclinic.org/discussion/cure-cataracts-without-surgery/

Flashcard 8: Osteoporosis

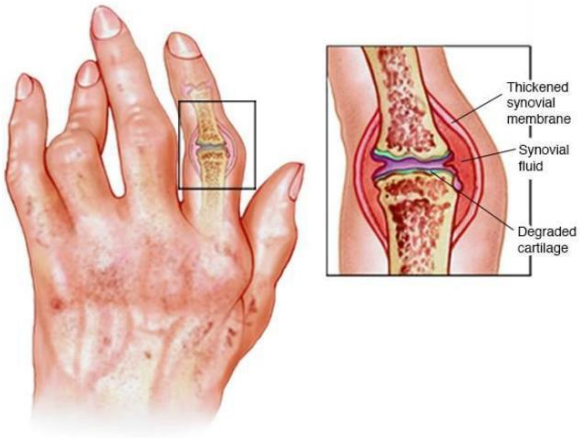
Leħħa 8: Osteoporożi



Adopted from: National Kidney Foundation. Osteoporosis: What You Need to Know [Internet]. New York: 2019 [cited 2019 Jul 22]. Available from: https://www.kidney.org/transplantation/transaction/TC/winter13/Osteo

Flashcard 9: Rheumatoid arthritis

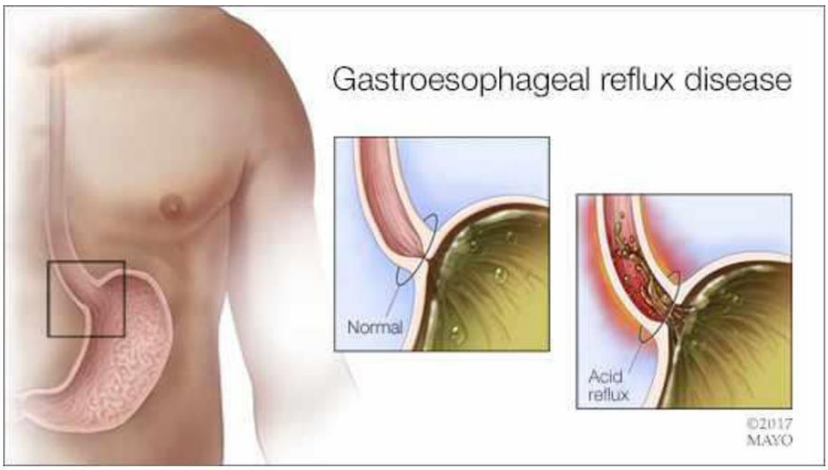
Leħħa 9: Artrite



Adopted from: Mayo Clinic. Rheumatoid arthritis [Internet]. North America: 2019 [cited 2019 Jul 22]. Available from: https://www.mayoclinic.org/diseases-conditions/rheumatoid-arthritis/symptoms-causes/syc-20353648

Flashcard 10: GORD

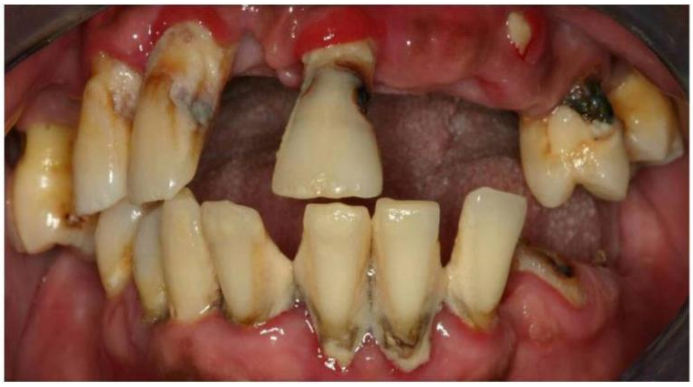
Leħħa 10: Ħruq ta' stonku



Adopted from: Mayo Clinic. Mayo Clinic Q and A: Is it heartburn or a heart attack? [Internet]. North America: 2017 [cited 2019 Jul 22]. Available from: https://newsnetwork.mayoclinic.org/discussion/mayo-clinic-q-and-a-is-it-heartburn-or-a-heart-attack/

Flashcard 11: Periodontal disease, stained teeth, tooth loss

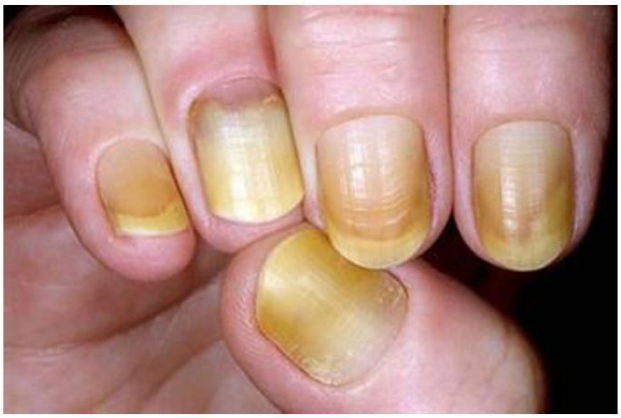
Leħħa 11: Mard tal-ħanek, snien imtebba', telf tas-snien



Adopted from: Tobacco Institute Database. Smoking, Gum Disease and Tooth Loss [Internet]. 2017 [cited 2019 Jul 22]. Available from: http://tidatabase.org/smoking-gum-disease-tooth-loss/

Flashcard 12: Yellow nails

Leħħa 12: Dwiefer sofor



Adopted from: Tobacco Free Generation. Bad breath, body odour, yellow nails? Blame your smoking! [Internet]. India: 2015 [cited 2019 Jul 22]. Available from: https://tobaccofree.org.in/bad-breath-body-odour-yellow-nails-blame-your-smoking

Flashcard 13: ‘Smoker’s face’

Leħħa 13: *‘Smoker’s face’*

Adopted from: YouTube. How Does Smoking Affect Your Face? [Internet]. California: 2015 [cited 2019 Jul 22]. Available from: https://www.youtube.com/watch?v=szbR-8-pgv8

Flashcard 14: Health

Leħħa 14: Saħħa

Adopted from: The Independent. Health warnings on individual cigarettes could deter smokers, study suggests [Internet]. London: 2017 [cited 2019 Jul 22]. Available from: https://www.independent.co.uk/news/health/cigarette-health-warnings-smokers-stop-tobacco-study-smoking-cancer-cruk-a8104001.html

Flashcard 15: Summary of health risks associated with smoking

Leħħa 15: Sommarju tar-riskji għas-saħħa li huma assoċċjati mat-tipjip

Artwork by Michelle M. Galea

Flashcard 16: Health benefits of smoking cessation

Leħħa 16: Benefiċċji tas-saħħa marbutin mal-waqfien mit-tipjip

Adopted from: International Society of Substance Use Prevention and Treatment Professionals (ISSUP). Health Benefits from Stopping Smoking [Internet]. England: 2016 [cited 2019 Jul 22]. Available from: https://www.issup.net/knowledge-share/news/2016-11/health-benefits-stopping-smoking

Flashcard 17: Family – second-hand smoking

Leħħa 17: Familja – *second-hand smoking*

Adopted from: Clinical OMICs. Secondhand Smoke Increases Unborn Babies' Risk of Congenital Heart Defects. New York: 2019 [cited 2019 Jul 22]. Available from: https://www.clinicalomics.com/featured/secondhand-smoke-increases-unborn-babies-risk-of-congenital-heart-

Flashcard 18: Money

Leħħa 18: Flus

Adopted from: Pixabay. Money Euro Cigar [Internet]. Munich: 2017 [cited 2019 Jul 22]. Available from: https://pixabay.com/photos/money-euro-cigar-smoke-smoking-2846237/

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Appendix 2: Patient data collection form

Smoking Cessation in Post-Hospitalisation Rehabilition
Data Collection Form – To be completed by researcher in presence of CRU nurses

Patient Information

Study number _____

Sex Male☐ Female☐ Other☐

Age _____

Medical Information

Diagnosis:

STEMI☐	NSTEMI☐	CAD☐	CHF☐	Valvular heart disease☐

Intervention:

CABG☐	PCI☐	AVR/MVR☐	Angiogram☐	tPA☐	Medical R_X☐	Other☐

Risk factors:

Hyperlipidaemia☐	Diabetes☐	Alcohol use☐	Sedentary lifestyle☐	BMI ≥ 25kg/m^2☐
Hypertension☐	Renal impairment☐	Psychological factors☐	TIA/CVA☐	Family history☐

Medical treatment:

Aspirin☐	Clopidogrel☐	Warfarin☐	Beta blocker☐
Statin☐	ACE inhibitor/ARB☐	Other:	

Smoking Assessment

	Date	Number of cigarettes smoked per day	Level of breath carbon monoxide (ppm)
Initial assessment			
End-of-programme assessment			
1-year follow-up			

Willingness to quit smoking: Within 30 days☐ Within 6 months☐ Not willing☐ Unsure☐

If unwilling to stop smoking or relapsed, why?

- Associated withdrawal symptoms (irritability, anxiety, depressed mood, insomnia, poor concentration)☐
- Helps cope with negative moods and stress☐
- Part of daily routine☐
- Increased appetite/fear of weight gain/desire to maintain weight☐
- Peer pressure☐
- Other:_____
  _____

Referred to a smoking cessation programme? Yes☐ No☐

Smoking cessation therapy received in the past? Yes☐ No☐

If yes, which?

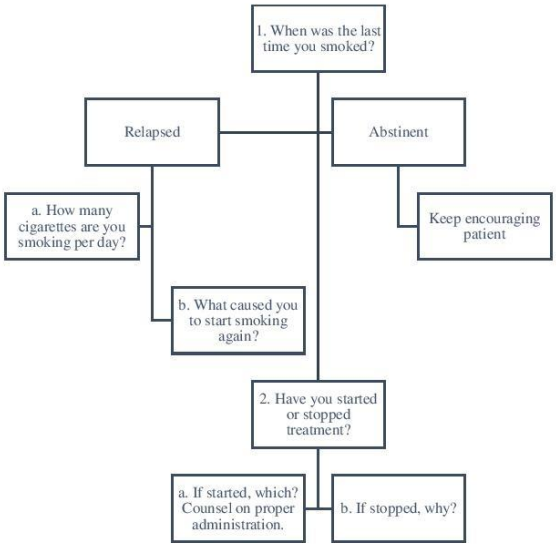
_____
_____

Smoking cessation pharmacotherapy suggested by CRU nurse:

NRT chewing gum☐	NRT oromucosal spray☐	NRT inhalator☐	NRT transdermal patch☐	Varenicline☐

Telephone interview: 3-month follow-up

Date _____



1. Relapsed☐ Abstinent☐
a. _____ cigarettes/day
b. Associated withdrawal symptoms (irritability, anxiety, depressed mood, insomnia, poor concentration)☐

   Helps cope with negative moods and stress☐

   Part of daily routine☐

   Increased appetite/fear of weight gain/desire to maintain weight☐

   Peer pressure☐

   Other:_____
   _____

2. Started☐ Stopped☐ Never started☐
a.

NRT chewing gum☐	NRT oromucosal spray☐	NRT inhalator☐	NRT transdermal patch☐	Varenicline☐

b. Finished course of treatment☐

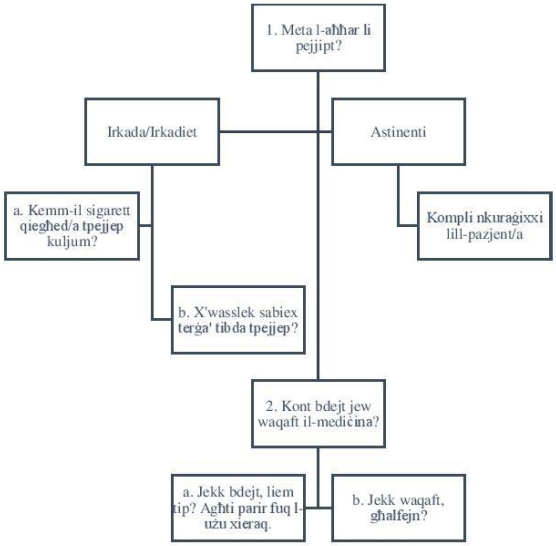
   Experienced side-effects☐

   Cost☐

   Other:_____
   _____

Intervista` bit-telefon: *Follow-up* ta' 3 xhur

Data _____



1. Irkada/Irkadiet☐ Astinenti☐
a. _____ sigaretti kuljum
b. Sintomi ta' rtirar (irritabilita`, ansjeta`, buri, nuqqas ta' rqad, nuqqasijiet fl-attenzjoni u fil-konċentrazzjoni)☐

   Jgħin bil-burdati ħżiena u stress☐

   Parti mir-rutina☐

   Żieda fl-aptit/biża' ta' żieda fil-piż/xewqa li l-piż jinżamm l-istess☐

   Influenza ħażina☐

   Oħrajn:_____
   _____

2. Beda/bdiet☐ Waqaf/waqfet☐ Qatt ma beda/bdiet ☐
a.

NRT chewing gum☐	*NRT* sprej tal-ħalq☐	*NRT* inalatur☐	*NRT* garża☐	Varenicline☐

b. Spiċċa/t l-kors tal-mediċina☐

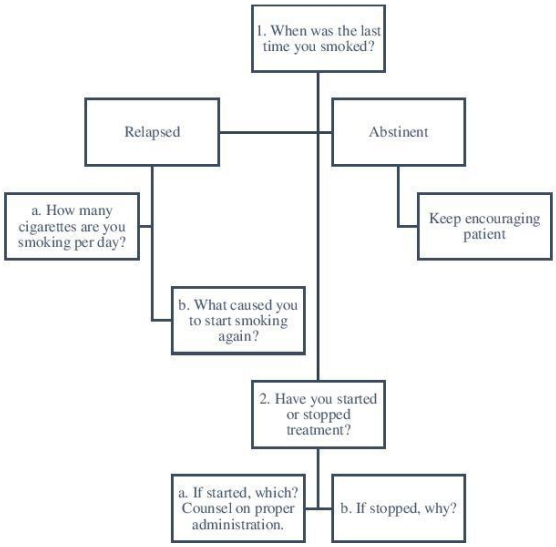
   Esperjenza/t *side-effects*☐

   Spiża☐

   Oħrajn:_____
   _____

Telephone interview: 6-month follow-up

Date _____



3. Relapsed☐ Abstinent☐
a. _____ cigarettes/day
b. Associated withdrawal symptoms (irritability, anxiety, depressed mood, insomnia, poor concentration)☐

   Helps cope with negative moods and stress☐

   Part of daily routine☐

   Increased appetite/fear of weight gain/desire to maintain weight☐

   Peer pressure☐

   Other:_____
   _____

4. Started☐ Stopped☐ Never started☐
a.

NRT chewing gum☐	NRT oromucosal spray☐	NRT inhalator☐	NRT transdermal patch☐	Varenicline☐

b. Finished course of treatment☐

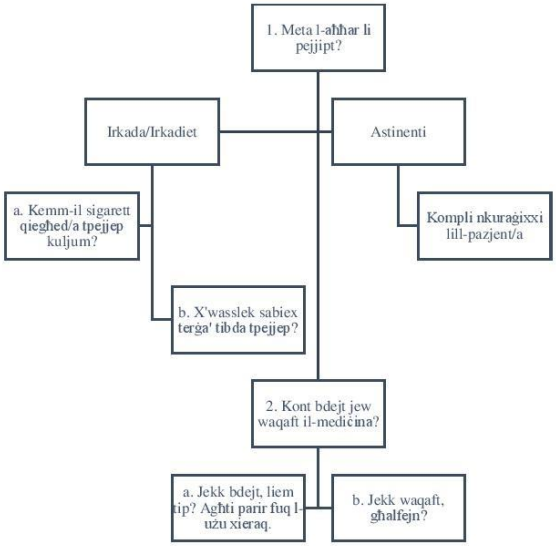
   Experienced side-effects☐

   Cost☐

   Other:_____
   _____

Intervista` bit-telefon: *Follow-up* ta' 6 xhur

Data _____



3. Irkada/Irkadiet☐ Astinenti☐

a. _____ sigaretti kuljum

b. Sintomi ta' rtirar (irritabilita`, ansjeta`, buri, nuqqas ta' rqad, nuqqasijiet fl-attenzjoni u fil-konċentrazzjoni)☐

Jgħin bil-burdati ħżiena u stress☐

Parti mir-rutina☐

Żieda fl-aptit/biża' ta' żieda fil-piż/xewqa li l-piż jinżamm l-istess☐

Influenza ħażina☐

Oħrajn:_____

_____

4. Beda/bdiet☐ Waqaf/waqfet☐ Qatt ma beda/bdiet ☐

a.

NRT chewing gum☐	*NRT* sprej tal-ħalq☐	*NRT* inalatur☐	*NRT* garża☐	Varenicline☐

b. Spiċċa/t l-kors tal-mediċina☐

Esperjenza/t *side-effects*☐

Spiża☐

Oħrajn:_____

_____

Appendix 3: FREC approval

L-Università ta' Malta

Faculty of Medicine & Surgery
University of Malta
Msida MSD 2080, Malta

Tel: +356 2340 1879/1891/1167
umms@um.edu.mt

www.um.edu.mt/ms

Ref No: FRECMDS_1819_101

Monday 13 January 2020

Ms Gabrielle Scicluna

50 'The Rainbow',

Triq is-Sienja,

Attard. ATD1974

Dear Ms Scicluna,

Please refer to your application submitted to the Research Ethics Committee in connection with your research entitled:

Smoking Cessation in Post-Hospitalisation Rehabilitation

The Faculty Research Ethics Committee granted ethical approval for the above mentioned protocol.

Yours sincerely,

Professor Pierre Mallia

Chairman

Research Ethics Committee

PATIENT INFORMATION SHEET

Dear Sir/Madam,

My name is Gabrielle Scicluna and I am a pharmacy student at the University of Malta. As part of my studies, I am undertaking a research project entitled ***'Smoking Cessation in Post-Hospitalisation Rehabilitation'*** under the supervision of Professor Lilian M. Azzopardi and Dr Francesca Wirth from the Department of Pharmacy at the University of Malta, in collaboration with the Department of Cardiology at Mater Dei Hospital.

You are invited to participate in this research which aims to follow-up on smoking cessation information provided by the Cardiac Rehabilitation Unit (CRU) nurses.

This research involves completing a data collection form with your details, medical information and smoking status, and attending an educational intervention at initial assessment. During this intervention, we will discuss the health risks associated with smoking, the benefits of quitting smoking, the reason(s) why you smoke and the situations which influence you to smoke. You will be counselled on how to administer the smoking cessation treatment suggested by a CRU nurse (if applicable), advised on what to expect while abstaining from smoking and how to cope during this time, and provided with educational pamphlets. You will then be followed-up by the cardiac rehabilitation team and myself at the end of the 6-week programme. Subsequently, you will be contacted twice by myself, after 3 and 6 months, via telephone. A year after the initial assessment, you will be followed up by the cardiac rehabilitation team and myself as part of your routine visit at the hospital.

Your participation in this research is completely voluntary. Refusal to participate will in no way affect the treatment you receive as a patient at the Cardiology Department at Mater Dei Hospital and you may withdraw from the study at any time without prejudice.

There are no foreseeable risks or discomfort to you as the study only entails data collection. The information gathered will be kept strictly confidential and used solely for the purpose of this research, according to the Data Protection Act (General Data Protection Regulation (EU) 2016/679). Access to your patient records is limited to the researcher.

Kindly sign the attached consent form if you agree to participate in this research.

Should you require additional information about this research project, please do not hesitate to contact me via email at gabrielle.b.scicluna.16@um.edu.mt or mobile on 99960485.

Thank you in advance for your consideration.

Gabrielle Scicluna

0186098M

Department of Pharmacy
Faculty of Medicine & Surgery
University of Malta

INFORMAZZJONI GĦALL-PAZJENT/A

Għażiż/a,

Jiena Gabrielle Scicluna u qed nistudja il-farmaċija fl-Universita` ta' Malta. Bħala parti mill-istudji tiegħi, qiegħda nagħmel proġett ta' riċerka intitolat ***'Smoking Cessation in Post-Hospitalisation Rehabilitation'*** iggwidata mill-Professur Lilian M. Azzopardi u Dr Francesca Wirth mid-Dipartiment tal-Farmaċija fl-Universita` ta' Malta, b'kollaborazzjoni mad-Dipartiment tal-Kardjoloġija fl-Isptar Mater Dei.

Inti mistieden/mistiedna biex tieħu sehem f'din ir-riċerka li għandha l-għan li ssegwi l-informazzjoni dwar il-waqfien mit-tipjip ipprovduta mill-infermiera tal-*Cardiac Rehabilitation Unit (CRU)*.

Din ir-riċerka tinvolvi li tiġi mimlija formola tad-*data* bid-dettalji, informazzjoni medika, u l-i*status* tat-tipjip tiegħek u li tattendi intervent edukazzjonali fl-ewwel *assessment*. Waqt dan l-intervent, ser niddiskutu ir-riskji tat-tipjip għas-saħħa, il-benefiċċji li tieqaf tpejjep, ir-raġuni(jiet) għalfejn tpejjep u sitwazzjonijiet li jħeġġuk tpejjep. Int ser tingħata parir dwar kif għandek tieħu l-mediċina rakkomandata minn infermier tal-*CRU* (jekk tapplika), avżat/a fuq x'tista' tistenna waqt li qiegħed/a j/tastjeni u kif tista' tkampa matul dan iż-żmien, u pprovdut/a b'pamflets edukazzjonali. Fi tmiem is-6 ġimgħat tal-programm, inti terġa' tiġi evalwat minni u mit-tim tal-*Cardiac Rehabilitation Unit (CRU)*. Inti terġa tkun ikkuntattjat darbtejn mingħandi, wara 3 u 6 xhur, permezz tat-telefon. Sena wara l-ewwel *assessment*, jien u t-tim tal-*CRU* nerġgħu nevalwawk bħala parti miż-żjara ta' rutina tiegħek fl-isptar.

Il-parteċipazzjoni tiegħek f'din ir-riċerka hija kompletament volontarja. Ir-rifjut ta' parteċipazzjoni bl-ebda mod ma jaffettwa t-trattament li tirċievi bħala pazjent/a fid-Dipartiment tal-Kardjoloġija fl-Isptar Mater Dei u tista' twaqqaf il-parteċipazzjoni fir-riċerka fi kwalunkwe` ħin mingħajr preġudizzju.

Ma hemm l-ebda riskju previst għalik peress li l-istudju jinvolvi biss ġbir u analiżi ta' *data*. L-informazzjoni miġbura tibqa' strettament kunfidenzjali u tintuża biss għall-iskop tar-riċerka skont l-Att dwar il-Protezzjoni tad-Data (Regolament Ġenerali dwar il-Protezzjoni tad-Data (EU) 2016/679). Aċċess għall-fajl tiegħek tal-isptar huwa permess biss għar-riċerkatriċi.

Inti ġentilment mitlub/a tiffirma l-formola tal-kunsens mehmuża jekk taċċetta li tieħu sehem f'din ir-riċerka.

F'każ li jirrikjedi li tkun taf aktar informazzjoni dwar din ir-riċerka, jekk jogħġbok ikkuntattjani permezz tal-*email* fuq gabrielle.b.scicluna.16@um.edu.mt jew mowbajl fuq in-numru 99960485.

Grazzi bil-quddiem għall-konsiderazzjoni tiegħek.

Gabrielle Scicluna

0186098M

Department of Pharmacy
Faculty of Medicine & Surgery
University of Malta

CONSENT FORM

I am a Maltese citizen and I am over eighteen (18) years of age. I have been asked to participate in a research study entitled:

Smoking Cessation in Post-Hospitalisation Rehabilitation

The purpose and details of the study have been explained to me by ***Gabrielle Scicluna*** and any difficulties which I have raised have been adequately clarified. I give my consent to the Principal Investigator to make the applicable observations. I am aware of any inconveniences which this may cause.

I understand that the results of this study in which I am participating may be used for medical or scientific purposes and that the results of this study may be reported/published. However, I shall not be personally identified in any way, either individually or collectively, without my expressing written permission. Under the General Data Protection Regulation (GDPR) and national legislation that implements and further specifies the relevant provisions of the said Regulation, I have the right to obtain access to, rectify, and where applicable ask for the data concerning me to be erased.

I am under no obligation to participate in this study and am doing so voluntarily. I may withdraw from the study at any time, without giving any reason. This will not influence in any way the care and attention and treatment normally given to me. I understand that any complications or adverse effects which may arise during or as a consequence of the study will be recorded and that any treatment which this may entail will be given within the Government Health Services.

Access to my patient records is limited to the Principal Investigator for the study duration, and will be viewed in the presence of an authorised MDH personnel who will act as an intermediate. All data collected will be anonymised at source and securely disposed of at the end of the study.

I am not receiving any remuneration for participating in this study.

In case of queries during the study I may contact: ***Gabrielle Scicluna***

Study Number	_____
Signature of participant	_____
Name of participant	_____
Contact number of participant	_____
Signature of Principal Investigator	Scicluna
Name of Principal Investigator	Gabrielle Scicluna
Email of Principal Investigator	gabrielle.b.scicluna.16@um.edu.mt
Contact number of Principal Investigator	99960485
Name of Principal Supervisor	Prof. Lilian M. Azzopardi
Email of Principal Supervisor	lilian.m.azzopardi@um.edu.mt
Contact number of Principal Supervisor	23402896
Date	_____

Department of Pharmacy
Faculty of Medicine & Surgery
University of Malta

PROPOSTA GĦALL-FORMULA TAL-KUNSENS

Jien/a ċittadin/a Malti/ja u għalaqt tmintax-il sena. Talbuni biex nieħu sehem fi studju ta' riċerka bl-isem ta':

Smoking Cessation in Post-Hospitalisation Rehabilitation

L-għanijiet u d-dettalji tal-istudju spejgathomli ***Gabrielle Scicluna*** li wkoll iċċaratli xi mistoqsijiet li għamilt. Nagħti l-kunsens tiegħi lill-persuna responsabbli għal din ir-riċerka biex tagħmel l-osservazjonijiet li hemm bżonn u nifhem li dan jista' jkun ta' skomdu għalija.

Jiena nifhem li r-riżultati ta' dan l-istudju jistgħu jintużaw għal skopijiet xjentifiċi u jistgħu jiġu ppubblikati; jekk isir hekk jiena b'ebda mod ma nista' nkun identifikat/a, individwalment jew bħala parti minn grupp, mingħajr il-kunsens tiegħi bil-miktub. Taħt ir-Regolament Ġenerali dwar il-Protezzjoni tad-Data (GDPR) u l-leġislazzjoni nazzjonali li timplimenta u tispeċifika aktar id-dispożizzjonijiet relevanti ta 'limsemmi Regolament, għandek id-dritt li tikseb aċċess għal, tikkoreġi, u fejn applikabbli titlob li d-data li tikkonċerna lilek titħassar.

Jiena m'għandi l-ebda dmir li nieħu sehem f'dan l-istudju u dan qiegħed/qiegħda nagħmlu minn rajja. Jiena nista' meta rrid ma nkomplix nieħu sehem f'dan l-istudju mingħajr ma' nagħti raġuni. Jekk nagħmel hekk xorta nibqa' nieħu l-kura li ssoltu tingħatali. Jiena nifhem li jekk ikun hemm xi kumplikazzjoniji jew effetti mhux mistennija waqt l-istudju, dawn jiġu mniżżla bil-miktub u jekk ikun hemm bżonn xi kura tiġi mgħotija mis-servizz nazzjonali tas-saħħa.

Aċċess għall-fajl tiegħi tal-isptar huwa permess biss għar-riċerkatriċi, u ser jiġi aċċessat fil-preżenza ta' persunal awtorizzat ta' MDH li ser jaġixxi bħala intermedjarju. Kunfidenzjalità ta' data ser tinżamm matul ir-riċerka kollha għaliex l-informazzjoni miġbura ser tiġi anonimizzata mill-bidu u ser tiġi abolita b'mod sigur wara li tintemm ir-riċerka.

Jiena mhux qed nitħallas biex nieħu sehem f'dan l-istudju.

Jekk ikolli xi diffikulta' waqt l-istudju nista' nistaqsi għal: ***Gabrielle Scicluna***

Numru allokat għall-parteċipant	_____
Firma tal-parteċipant	_____
Isem tal-parteċipant	_____
Numru tat-telefown/mowbajl tal-parteċipant	_____
Firma tal-persuna responsabbli għal din ir-riċerka	Scicluna
Isem tal-persuna responsabbli għal din ir-riċerka	Gabrielle Scicluna
Email tal-persuna responsabbli għal din ir-riċerka	gabrielle.b.scicluna.16@um.edu.mt
Numru tal-mowbajl tal-persuna responsabbli għal din ir-riċerka	99960485
Isem tas-superviżur prinċipali	Prof. Lilian M. Azzopardi
Email tas-superviżur prinċipali	lilian.m.azzopardi@um.edu.mt
Numru tat-telefon tas-superviżur prinċipali	23402896
Data	_____

Department of Pharmacy
Faculty of Medicine & Surgery
University of Malta

Appendix 4: Smoking cessation pharmacotherapy infographics

OTC – NRT "relievers"

- Useful if you want to mimic the hand-to-mouth action of smoking
- Puff through the mouthpiece
- Use to relieve nicotine cravings – do not use more than 6 cartridges per day
- Can be used with patches

- If you smoke 20 or less cigarettes per day → 2mg
- If you smoke 20 or more cigarettes per day → 4mg
- Chew until a tingling appears, then place gum on the side of the mouth (between cheek and gums). Chew again when tingling fades. Repeat for 30 minutes.
- Avoid eating and drinking for 15 minutes before and during chewing gum
- Use to relieve nicotine cravings – do not use more than 15 pieces of gum per day
- Can be used with patches

- Point the spray nozzle as close as possible towards the open mouth and press the top of the dispenser to release spray into the mouth (avoid lips)
- Do not inhale while spraying and avoid swallowing for a few seconds after use
- Use to relieve nicotine cravings – do not use more than 64 sprays per day
- Can be used with patches

OTC – NRT "controller""

- Discreet
- If you smoke 10 or less cigarettes per day → Step 2 (15mg) patch daily for 8 weeks → Step 3 (10mg) patch daily for final 4 weeks
- If you smoke 10 or more cigarettes per day → Step 3 (25mg) patch daily for 8 weeks → Step 2 (15mg) patch daily for next 2 weeks → Step 1 (10mg) patch daily for final 2 weeks
- Apply a new patch to clean, dry skin on front/side of chest, upper arm, or hip every morning; remove patch before going to bed.
- Change application site daily
- Controls nicotine cravings throughout the day; can be used with chewing gum, mouth spray, or inhalator if craving appears.

POM – Varenicline

- Start treatment 1 to 2 weeks before set quit date
- Days 1 to 3: 0.5mg once daily (morning)
  Days 4 to 7: 0.5mg twice daily (morning and evening)
  Day 8 onwards: 1mg twice daily
- Use for 3 to 6 months, according to your doctor's advice

Appendix 5: Poster presented at Maltese Cardiac Society Conference

Smoking cessation in post-hospitalisation cardiac rehabilitation

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Aim: To develop a pharmacist-led smoking cessation intervention in post-hospitalisation cardiac rehabilitation (CR)

Method: An educational smoking cessation intervention using 18 flashcards was developed and implemented during the initial assessment session of the current CR programme for active smokers and those who quit after the cardiac event. Patients were counselled on the posology of smoking cessation pharmacotherapy suggested by the CR nurses and provided with pamphlets from the 'Health Promotion & Disease Prevention Directorate'. Telephone follow-up was undertaken after 3 and 6 months.

Results: Twenty-four patients (13 active smokers, 11 quit following cardiac event) were enrolled (19 male, mean age 56 years, 16 referred post-percutaneous coronary intervention). Eight of the 13 smokers accepted to receive smoking cessation pharmacotherapy (NRT n=6, varenicline n=2). After 6 months, 4 patients quit smoking, 6 increased, 2 decreased and 1 maintained the same daily cigarette consumption. Of the 11 patients who quit smoking at time of cardiac event, 6 remained abstinent, 4 relapsed and 1 did not respond. Six of the 10 patients who increased daily cigarette consumption or relapsed identified stress as the main reason, particularly brought about by the COVID-19 pandemic.

Discussion: The developed smoking cessation patient intervention provided at initial assessment (mean duration 15 minutes) and the telephone follow-ups are innovative interventions to complement the present service and support patients to stop smoking.

Conclusion: A multidisciplinary approach to emphasise smoking cessation and the pharmacist-contribution to support patients in using smoking cessation aids is required to improve on smoking cessation outcomes in cardiac rehabilitation.

L-Università ta' Malta | Faculty of Medicine & Surgery | Department of Pharmacy

Smoking Cessation in Post-Hospitalisation Cardiac Rehabilitation

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INTRODUCTION

Smoking is a significant modifiable risk factor for cardiovascular disease.[1] Pharmacists as part of the healthcare team can play a pivotal role in smoking cessation services incorporating pharmacotherapy with counselling.[2]

AIM

To develop a pharmacist-led smoking cessation intervention in post-hospitalisation cardiac rehabilitation (CR)

METHOD

Active smokers and those who quit following cardiac event attending the initial assessment session (t=1) of the current CR programme were recruited

An educational smoking cessation intervention using 18 flashcards was implemented, patients were counselled on the posology of smoking cessation pharmacotherapy suggested by the CR nurses, and were provided with pamphlets from the 'Health Promotion & Disease Prevention Directorate'

Patients were followed-up via telephone after 3 months (t=2) and 6 months (t=3)

RESULTS

- 24 patients were enrolled (13 active smokers, 11 quit following cardiac event)
- 19 male, 5 female; mean age 56 (range 33-75) years
- Majority of patients (n=17) diagnosed with acute coronary syndrome and 16 patients underwent percutaneous coronary intervention
- 8 smokers accepted to receive smoking cessation pharmacotherapy (Figure 1)

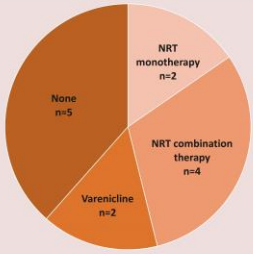

Figure 1: Smoking cessation pharmacotherapy suggested to active smokers at t=1 (N=13)

Table 1: Smoking status at 3- and 6-month follow-up (N=24)

Stopped smoking at cardiac event (n=11)			
Time point	Relapsed	Abstinent	Did not answer
3 months (t=2)	4	6	1
6 months (t=3)			

Active smokers (n=13)				
Time point	Increased daily cigarette consumption	Decreased daily cigarette consumption	Maintained same daily cigarette consumption	Quit smoking
3 months (t=2)	1	8	1	3
6 months (t=3)	4	2	3	4

CONCLUSION

The developed smoking cessation patient intervention provided at initial assessment (mean duration 15 minutes) and the telephone follow-ups are interventions to complement the present service and support patients to stop smoking. A multidisciplinary approach with a pharmacist contribution to focus on smoking cessation is required to overcome the challenge to convince patients to quit smoking.

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