Means to Reduce Smoking in Mental Health Patients

Literature Review

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2021 Laurea

Laurea University of Applied Sciences

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Degree Programme in Nursing
Bachelor's Thesis
10, 2021

Laurea University of Applied Sciences

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Year 2021 Number of pages 25

Abstract

Background: As we all know severe mental illness (SMI) person are at high consumption rate of cigarettes than other population. Smoking quitting interventions are limited in public health care services. The aim of this study is to collect more comprehensive and effective interventions at smoking reduction method for Peijas hospital professionals in Finland by literature review.

Method: Literature review uses to academically collect large amount of relevant information on a topic, problem or research topic in a field. In this study mainly collect and analyze measures for smoking reduction and cessation, give summarizing conclusion and opinions to the specific target group of patients.

Results: 3 medical studies proved varenicline were more effective than Nicotine replacement therapy (NRT), one article concluded both medications are effective and another one reported varenicline was safe and effective in schizophrenia; Cognitive behavior Therapy have achieved strong quitting attempt and engagement into tobacco dependence treatment, feedback of using these interventions are positive; Exercise interventions' results showed a certain reduction or had a positive effect on smoking cessation. The Counsel to Quit® training improved mental health providers' confidence in implementing AAR (ask, advise, refer) model.

Conclusion: Four effective methods on smoking reduction in mental health patient are collected as follows: Varenicline and NRT are effective medications. Further, varenicline is more efficiency than NRT; Cognitive Behavior Therapy interventions play important roles in motivating in smoking reduction, realizing of cigarette disadvantages in mental health patient. CBT interventions should be widely used in health practice. Exercise interventions are feasible and acceptable as a treatment for smoking reduction; For mental health providers, a simplified AAR model with the Counsel to Quit® training are effective on helping psychiatric patients to quit smoking. It can improve the mental health providers' confidence and related knowledge level in helping mental patients to quit smoking.

Keywords: Psychiatric patient, Smoking, Interventions of smoking reduction, Pharmacotherapy, Cognitive behavior Therapy, Mental health professionals' training

Contents

1 Introduction

We all know that people have severe mental illness (SMI) smoke more than normal population. Tobacco use is easy way for SMI patient to release stress. Robson and Potts (2016) state that SMI patient such as schizophrenia or bipolar disorder, depression and anxiety common mental disorder patient are more likely to have physical illness, one of common reason is high-rate cigarettes consumption which results in severe physical illness and high death rate. SMI patients are not receiving enough support and interventions in smoking reduction or cessation which will bring many benefits to their health.

A statement shows that current smoking in patient (72%) were twice as higher than health-care professionals (31%). Half of patients were heavy smokers (> 20 cigarettes/day), also more nicotine dependent (Heaviness of Smoking Index (HSI) 1/4 3.97/vs. 1.81), and as opposed staff only up to 6.3%. Psychiatric patients smoking prevalence and daily tobacco consumption are very high. After hospitalization, light and moderate smokers were increased, on the other hand heavy smokers decreased smoking. (Keizer & Eytan 2005.)

According to statistics in two studies state (Schroeder & Morris 2010; Velicer, DiClemente, Prochaska & Brandenburg 1985) that people with mental illness fabricate 22% of the US population, there were 200,000 mentally illness individuals died every year among 443,000 tobacco-related deaths. Psychiatric patient could reduce or quit smoking has been demonstrated (Michopoulos , Rizos, Gournellis, Karvouni, Kotsioumpa & Douzen 2015). It is necessary to provide more effective approaches to assist mental health patients to reduce the smoking consumption. We wish we could provide effective and reliable information for mental health patient in smoking reduction and cessation by evidence-based systematic literature review.

Jamal, King, Neff, Whitmill, Babb and Graffunder (2016) state that tobacco consumption is the most significant cause, it can be prevented or avoided disease and death in the United States, and adult are the group who most used tobacco product in United State. According to WHO announcement (2021) mentioned that tobacco use kills more than 7 million people worldwide each year. Data from the 2015 National Health Interview Survey (NHIS) that CDC used to assess the most recent national approximation of cigarette smoking prevalence are adults aged ≥18 years. The percentage of United State adults who smoke cigarettes reduced from 20.9% to 15.1% in 15 years (2005-2015), and the number of daily smokers declined from 16.9% to 11.4%. Nevertheless, inconsistency in cigarette smoking perseveres. Current smoking rates vary in the general population across countries and regions, ranging from 24% to 48% in men and in women (Bilano, Gilmour, Moffiet, Espaignet, Stevens, Commar, Tuy, Hudson & Shibuya 2015).

In 2010, a systematic review concludes that the use of drug therapies (e.g., nicotine replacement therapy, varenicline, bupropion) or behavioral therapy interventions was the most successful strategy in determining the clinical and cost-effectiveness of cessation and reduction strategies for severe mental illness patients (Banham & Gilbody 2010). For smokers with psychiatric disorders, a study (Hitsman, Moss, Montoya & George 2009) recommended smoking reduction as an initial goal for improving treatment effectiveness. At the same time, WHO (2010) pointed that exercise insufficiency and smoking have been widely identified as the major risk factors for non-communicable diseases during 2000-2025. In the general population, the global prevalence of exercise deficiency was 27.5%, different areas were ranging from 16.3-39.1% (Guthold, Stevens, Riley, Bull & Guthold 2018).

In this literature review we address the research questions and use descriptive method to give an explanation of what kinds of medications to treat mental patients in smoking reduction and cessation; How is cognitive behavior therapy works to make people realize the disadvantages of smoking, produce more engagement in smoking dependent treatment and counseling; How patients benefit from regular exercise on smoking reduction and cessation; Practitioners such as psychiatric doctors and nurses are also playing important role in supporting mental health patient to reduce smoking.

2 Theoretical framework

The thesis looks at interventions and methods of reducing smoking in mental health patients by narrowed literature review guidance.

2.1 The impact of smoking on mental health

There are more severe mental health symptoms have been noticed in people who smoke cigarettes. They need more time for hospitalization, psychotropic medications need to be provided more higher doses compared to people with a mental illness who has no smoking. Most of their expendable income will be spent on cigarettes, the prioritize choice of cigarettes is over food and leisure activities. Usually, the perspectives of smoking benefit heard from patients/Clients, care giver and mental health clinicians. They often believe that smoking can improve mood and reduced anxiety. However, the reality is smoking simply alleviating the influences of nicotine withdrawal that occur throughout the day. There has little constant experimental evidence to support this ‘self-medication hypothesis’ which often expressed among clinicians. (Robson & Potts 2016.)

2.2 The benefits of stopping smoking for mental health patients

Smoking cessations brings people many benefits. Excepted for immediate benefit there are long-term physical health benefits, for example, cardiovascular and respiratory health will both benefits from it, mental health improved as well. People who successfully quit smoking

are happier, the chance of having symptoms of depression and anxiety reduced if they manage to remain abstinent as longer. Patients/clients may be able to have their dosage of psychotropic medication reduced in different type of medication prescribed. Patient will have other positive behavior change after a successful quit attempt; They may use the financial savings to participate more inclusively in society. (Robson & Potts 2016.)

2.3 Definition of key concepts

Psychiatric disorder: Psychiatry is the one part of medicine. It studies and focuses on mental, emotional, and behavioral disorders. The term "psychiatric disorder" is related to a wide-ranging of problems and a person's thoughts, feelings, behavior or mood was disturbed. Also same meaning as "mental illness," and "mental health conditions." Both a person's ability to perform at work or school and the ability of maintain healthy social relationships could significantly be affected by those psychiatric disorders. It is important to noticed that mental illness is not a weakness. It is a medical condition. Psychiatric disorders are treatable, treatment outcome is varied from person to person by the most effective treatments. The prognostic is different with specific disorder and the scope and severity of the symptoms. (Pacific Health System 2021.)

Cognitive behavioral therapy (CBT): is a very important therapy that practiced in psychological treatment, it has been approved to be effective for a range of psychiatric problems which include depression, anxiety disorders, alcohol and drug abuse problems, marriage problems, eating disorders, schizophrenia, bipolar disorder etc. Abundant research studies state that CBT leads to significant improvement in people daily functioning and quality of life. In many studies, CBT has been demonstrated to be more effective than other forms of psychological therapy or psychiatric medications. It is important to emphasize that the development of CBT has been made based on both research and clinical practice. CBT is a methodology for which there is abroad scientific evidence, all the methods could produce change and this progress has been approved and well developed. So, we can tell that CBT differs from many other structures of psychological treatment. (Clinical Practice Guideline for the Treatment of Post Traumatic Disorder 2017.)

NRT: Nicotine replacement therapy (NRT) aims to replace nicotine from cigarettes to ease the transition from cigarette smoking to abstinence. It works by reducing the intensity of craving and withdrawal symptoms. (Lindson et al. 2019.)

3 Purpose and aim

The purpose of the thesis is to use literature review to describe how we could reduce smoking in mental health care patients and what kind of effective methods there are. The aim of this review is to increase the awareness of nursing staff on this important topic through the results of literature reviews

4 Methodology

A literature review is the comprehensive study and interpretation of literature that relates to a particular topic. Firstly, you need to identify the research question, then find the answer by searching and analyzing the related literatures using systematic approach. (Aveyard 2010.) The question about smoking reduction interventions is answered with a descriptive literature review. The thesis applies a literature review and utilizes descriptive methods to analyze and interpret the data. The literatures were selected from the preliminary searches: EBSCO, ProQuest, Science Direct and Google scholar and others.

4.1 Descriptive literature review

Oden (no date) states in blog that a descriptive review is a brief writing that presents the related features of a scientific or literary work step by step. According to University of Guelph MacLaughlin Library (2022) how to write a literature review, first, narrow the selected topic and choose relevant articles, then read the selected articles comprehensively and evaluate them, organize the selected papers by looking for patterns and by developing different themes, finally develop a thesis with reviewing your work by written paper.

4.2 Literature search

The thesis provides clear inclusion and exclusion criteria to keep thesis ongoing well.

Inclusion	**Exclusion**
Smoking reduction interventions or smoking cessation or smoking cessation interventions or quit smoking or stop smoking, mental health patients or psychiatric patients	Non-psychiatric patients
Age>18	Children, adolescent
Full text	Non-full text
After 2008	Before 2008
Languages: English, Chinese	Other languages than English and Chinese
Academic articles and research	Non-academic articles

Table 1

4.3 Search strategy

The databases were collected from EBSCO, ProQuest, Science Direct and Google scholar from the year of 2008 to 2021. We used the following search strings including non-grid terms suitable for each database like: "psychiatric patients" and "pharmacotherapy" or "medication intervention" and "behavior intervention" or "cognitive behavior therapy" and "exercise" and "health professionals' training" or "nurse's education" and " smoking cessation or reduction / method "or " smoking / treatment "

4.4 Study selection

Studies were selected based on the literature title and abstract. Hundreds of records were collected from the databases: CINAHL with full text (EBSCO), ScienceDirect (Elsevier), and Google scholar. Some studies were discarded if they couldn't meet the inclusion criteria. We three authors decided independently whether our collected studies meet the inclusion criteria or not. In addition, we resolved the disagreements by discussing together. We avoided the duplicate articles at the same time. Finally, 20 full-text articles were selected out and all of them were approved by the thesis instructor.

Figure 1 is a PRISMA flow chart that describes the search process of how we get these 20 included articles.

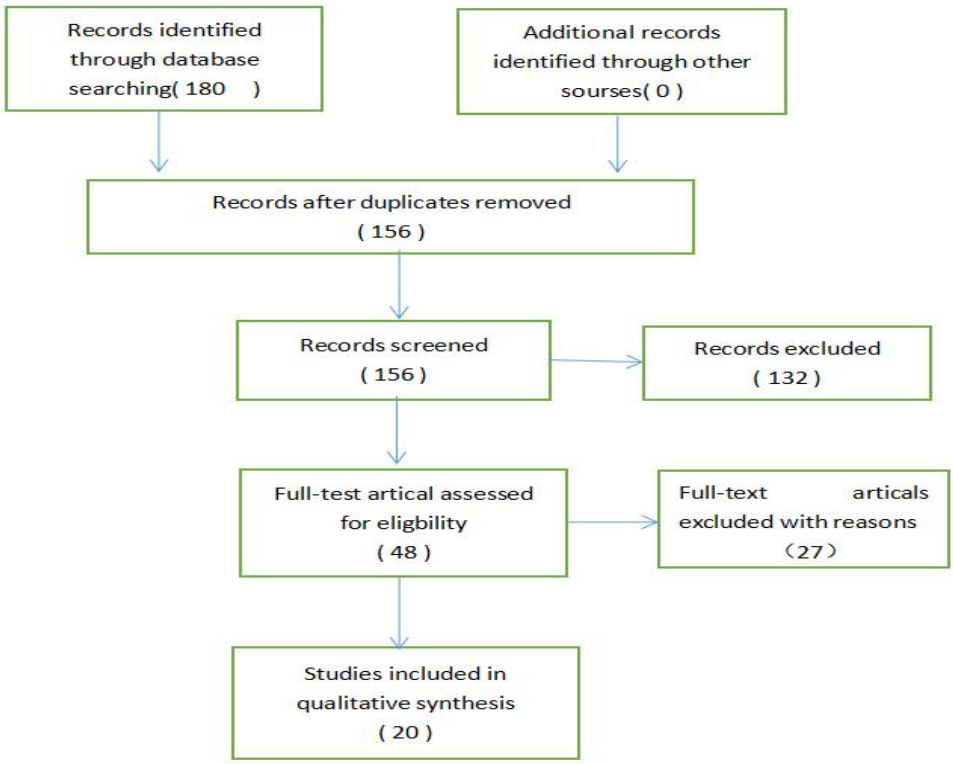

Figure 1

4.5 Conducting data gathering and analysis

4.5.1 Medical method to reduce smoking in mental health patient

We collected five studies about medical method to reduce smoking in mental health patient. The sample size ranged from 82 to 235314 smoking participants. Two studies were conducted in Spain, one in England, one in USA and one in 16 countries. Three studies recruited from outpatients, one study recruited from outpatients and inpatients, another one recruited from a mixture of inpatients, outpatients and academic center. Most of the participants in three studies are bipolar, depression, schizophrenia, borderline personality, anxiety and obsessive-compulsive disorder. One study is with schizophrenia and bipolar, one study is with schizophrenia. All the participants were in stable condition. More details are seen in Table 2.

The medications which The Food and Drug Administration approved for smoking cessation are nicotine replacement therapy (transdermal patches, lozenges, gum, inhalers, nasal sprays), bupropion and varenicline (Shawen & Drayton 2018). The evidence below has shown that transdermal nicotine patch (TNP) and varenicline are two effective medicines to reduce smoking in mental health patient.

A double-blind, randomized, placebo-controlled clinical trial was done in 16 countries from the year of 2011 to 2015. We call it Eagles' study. It aimed to know the neuropsychiatric safety and effectiveness of varenicline, bupropion, nicotine patch and placebo on smoking cessation with and without mental disorders (Anthenelli, Benowitz, West, Aubin, McRae, Lawrence, Ascher, Russ, Krishen & Evins 2016). The mental disordered participants were such as depressive disorder, bipolar, anxiety, obsessive-compulsive disorder, social phobia, schizophrenia, schizoaffective disorders or borderline personality. And all of them were in stable condition. It demonstrated that varenicline was the most effective medicine on smoking reduction in mental health patient. While nicotine patch and bupropion had better efficacy than placebo. Related details are in Table 2.

A retrospective cohort study (Jimenez-Ruiz, Pascual-Lledó, Cícero-Guerreroa, Cristóbal-Fernández, Mayayo-Ulibarri & Villar-Laguna 2018) was conducted in a clinic of Spain. All the participants were in stable stage of mental disorders. The diseases were as follows: bipolar disorder, schizophrenia, depression, obsessive-compulsive disorder, borderline personality disorder and generalized anxiety disorder. It aimed to determine varenicline and nicotine patch's safety and efficacy in helping mental health patient to reduce smoking. The safety data acquired from this study had some similarity with Eagles' study. The most common side effects were nausea and pruritus, no suicide behavior noted. At last, it concluded that both medicines were safe and varenicline was more effective than nicotine patch on smoking cessation in mental health patients. All the illustrated data and results could be seen in Table 2. In addition, Jimenez-Ruiz et al. (2018) stated that bupropion was not used because of the interaction with psychiatric medicines.

Another prospective cohort study (Taylor, G.M.J., Itani, Thomas, Rai, Jones, Windmeijer, Martin, Munafò, Davies & Taylor, A.E. 2019) was conducted in England from the year of 2006

to 2015. It also aimed to analyze the effectiveness of varenicline and nicotine replacement therapy (NRT) in helping mental disordered patient to quit smoking. The mental illnesses were bipolar, depression, neurotic disorder, schizophrenia; Or patients were prescribed medicines before, like antidepressants, antipsychotics, hypnotics/anxiolytics, mood stabilizers. It showed the similar result with the last 2 studies (Anthenelli et al. 2016; Jimenez-Ruiz et al. 2018). However, it still implicated an unclear opinion that varenicline was more likely to lead to depression in schizophrenia patients. But that estimates in the propensity score matching and instrumental variable analysis were imprecise (Taylor et al. 2019). More details are in Table 2.

Therefore, we continued to review the related articles in schizophrenia. A small double-blind randomized study (Smith, Amiaz, Si, Maayan, Jin, Boules, Sershen, Li, Ren, Liu, Youseff, Lajtha, Guidotti, Weiser & Davis 2016) was done in clinic and hospital of USA. It was to evaluate the efficiency of varenicline on smoking cessation, cognition in stable schizophrenia. It concluded that varenicline didn't worsen patients' psychiatric symptoms, like depression or other symptoms. No significant suicide or depressive episodes were noted. Varenicline was proved to be a safe and effective medicine on smoking reduction in stable schizophrenia. But it didn't work in improving patients' cognitive function. Further, in December 2016, the Food and Drug Administration (FDA) removed the black box warning label of varenicline and put bupropion into the warning box because of its serious neuropsychiatric side effect on smoking cessation patient (Kelley 2016).

In addition, there were 82 patients who were schizophrenic and bipolar disorders participated into another study. It was a non-randomized, open-label, prospective and 9-month follow-up study which was conducted in the community of Spain. It aimed to investigate the real clinical setting's efficacy, safety and tolerability in helping smoking cessation of stable mental health patient (Garcia-Portilla, Garcia-Alvarez, Sarramea, Galvan, Diaz Mesa, Bobes-Bascaran, Al-Halabi, Elizagarate, Iglesias, Saiz Martínez & Bobes 2016). Varenicline and transdermal nicotine patch (TNP) were used by participants in this study. No suicide, no worsen psychiatric symptoms and even no hospitalization reported in this study. It had proved that in real clinical agency, it was safe and feasible to help stable mental health patient to reduce smoking. Furthermore, both drugs are effective on treating smoking cessation in stable psychiatric patient. More results concluded by Garcia-Portilla et al. (2016) can be seen in Table 2.

4.5.2 Cognitive Behavior Therapy method (CBT)

According to Table 3 (Spanakis, Peckham, Bailey, Gilbody, Young & Heron 2020), below was described the study characteristics.

One study (Khazaal, Chatton, Prezzemolo, Hoch, Cornuz & Zullino 2008）was studied by a preliminary naturalistic trial, two studies was studied by a Patient-Randomized Controlled Trial (Steinberg, Williams, Stahl, Budsock & Cooperman 2015；Minami, Brinkman, Nahvi, Arnsten, Rivera-Mindt, Wetter, Bloom, Price, Vieira, Donnelly, McClain, Kennedy, D'Aquila,

Fine, McCarthy, Hecht & Brown 2018). Minami et al. (2018) was conducted by an open-label pilot feasibility study with a pilot RCT. one was studied by a pilot randomized trial (Myers, Strong, Chen & Linke 2019). All studies (Steinberg et al. 2015； Rogers, Smelson, Gillespie, Elbel, Poole, Hagedorn, Kalman, Krebs, Fang, Wang & Sherman 2016; Minami et al. 2018; Myers et al. 2019) were done in one single country in different places, they did their study in the public psychiatric hospital, in mental health clinic, and an outpatient psychiatric clinic. Four studies carried out in United states, one study conducted in Switzerland (Khazaal et al. 2008）.

Steinberg et al. (2015) recruited participants who diagnosed severe mental illness (SMI) with schizophrenia, schizoaffective disorder, or bipolar disorder. Myers et al. (2019) in their study with participants who were military Veteran who get a referral to the outpatient tobacco cessation clinic for smokers with mental illness. Rogers et al. (2016) chose participants who diagnosed with mental health problem. Khazaal et al. （2008) recruited participants from psychiatric hospital unit. Minami et al. （2018) participants' recruitment was from an outpatient psychiatric clinic.

There are two Motivational Interviewing (MI) intervention-based studies was designed separately for mental illness patient and SMI patient compared to another intervention without MI (Steinberg et al. 2015; Myers et al. 2019). One MI intervention (Myers et al. 2019) was delivered by one single telephone contact. One MI intervention (Steinberg et al. 2015) was individual, 45-minute, single sessions, were guided by a manual, and were audio-recorded for assessment of treatment allegiance. One study (Khazaal et al. 2008) was game delivered to mental illness people by asking questions based on cognitive, behavioral and motivational therapeutic approaches without comparison group. Two other studies (Rogers et al. 2016; Minami et al. 2018) were telephone-based counseling intervention for mood disorder patient. One is a smartphone-assisted, mindfulness-based intervention with contingency management (SMI-CM) compared with another group without same intervention (Minami et al. 2018). Rogers et al. (2016) used telephone smoking-cessation specialized counseling protocol intervention compared with group only with telephone quit-line intervention.

According to Rogers et al. (2016), all participants received assistance from medications NRT or bupropion when they have the enrollment. Minani et al. (2018) provided Nicotine patches for participants.

All study (Khazaal et al. 2008；Steinberg et al. 2015；Rogers et al. 2016；Minami et al. 2018; Rogers et al. 2016 & Minami et al. 2018) participants were receiving individual intervention. There is no group intervention during the process of all the studies.

According to Table 2 (Spanakis et al. 2020), below was describes the main smoking cessation outcome.

Rogers et al. (2016) stated that participants were very possible to report 30 days abstinence at 6 months after intervention. Myers et al. (2019) recruited participants reported 7-day point abstinence at 3 months after intervention. Khazaal et al. (2008) reported their outcome

shows that participants had more strong intention to stop smoking after complete intervention. One study (Steinberg et al. 2015) participant expresses high possibility to make a quit attempt by the 1-month follow-up assessment. There are not statistically significant on smoking cessation and therapeutic alliance on the comparison group, but people were more likely follow-up on referral for tobacco dependence treatment. One study (Minami et al. 2018) participants reported that interventions were helpful for both mood management and quitting smoking.

4.5.3 Physical exercise methods

Table 3 describes the study purposes of the selected 4 articles. 1 article is literature review with schizophrenia participants. 3 studies are conducted by randomized controlled trials, 2 of them are schizophrenia participants and another one is from depressive disorders or schizophrenia and other psychotic disorders. All sample sizes range from 21 to 380. 3 articles are from EU countries and one from Singapore.

4 different studies were reviewed separately due to the heterogeneity of study design. More details could be seen in Table 4.

From the selected 4 articles, the primary outcome is concluded: the participants could reduce or quit smoking after the exercise intervention at the end of the follow-up. Three studies' intervention duration varied from 8 weeks to one year. One of studies measured smoking consumption, motivation, nicotine dependence and so on.

In one study (Bernard, Esseul, Raymond, Dandonneau, Xambo, Carayol & Ninot 2013), the process was divided into 3 stages: Before intervention, 8 weeks' intervention and 6 weeks' follow-up. The intervention included 5 times smoking reduction consultations and 3 moderate-intensity exercise sessions for 8 weeks period which showed a significant increase in the motivation of quit smoking.

One study (Pinho, Rocha & Vieira-Coelho 2021) was done by literature review, they selected 9 research articles from 208 articles. This study showed that patient smoking rate reduced after multiple model intervention, the intervention include exercise.

In a 6-month study (Vancampfort, Probst, Scheewe, Herdt, Sweers, Knapen, Winkel & Hert 2012), all participants underwent a physical examination and baseline electrocardiogram test. They were divided into two groups. One group was healthy participants with smoking, another one was schizophrenia participants with smoking. They filled out a physical activity questionnaire and conducted a set of fitness test. The fitness test was as follows: total body balance, limb speed, flexibility, explosive power, static strength, abdominal muscle endurance, and running speed. One result reported that people with schizophrenia obviously did less physical exercise compared to those health group of people. And the second result showed inactive patients smoked more than highly active patients in schizophrenia. It showed the importance of exercise to help mental patients reduce smoking.

Another study (Seet, Abdin, Asharani, Lee, Roystonn, Wang, Devi, Cetty, Teh, Verma, Mok & Subramaniam 2021) was investigated by Global Physical Activity Questionnaire (GPAQ) and analyzed according to GPAQ guidelines for mental health patient in aged 21 to 65. In this questionnaire, Exercise physical activity was divided into three main fields: work or physical exercise, walking and/or cycling and leisure activities. The findings of this study could be used to identify mental health patient who were lack of physical activity and frequent sedentary behavior, increasing exercise and avoiding sedentary behavior in treatment will improve the smoking reduction clinical outcomes for psychiatric patients.

4.5.4 Training of mental health providers to reduce smoking

Mental health providers (MHPs) also have some existed problems in helping psychiatric patients to quit smoking. Therefore, we searched six articles not only present the existed problems of MHPs, but also find some better methods to help them. Two articles are about the attitudes of MHPs on smoking cessation or smoking-free policy, one article is a survey result about the professionals' training contents and three articles are about smoking cessation advice in helping mental health patients. Three articles (Sheals, Tombor, McNeill & Shahab 2016; Ratier-Cruz, Smith, Firn & Rinaldi 2020; Dixon, Medoff, Goldberg, Lucksted, Kreyenbuhl, DiClemente, Potts, Leith, Brown, Adams & Afful 2009) are from Google Scholar; Another three articles (Simonavicius, Robson, McEwen & Brose 2017; Mitchell, Vancampfort, Hert & Stubbs 2015; Chavarria, Liu, Kast, Salem & King 2019) are from Science Direct.

A systematic review was done by Sheals et al. (2016**). I**t aimed t**o** know the attitude held by MHPs and why they couldn't help patient to quit smoking successfully. According to Sheals et al. (2016), 42.2% of MHPs (nurses and psychiatrists) reported perceived barriers to smoking cessation interventions, 40.5% held negative attitudes on smoking cessation and 45.0% agreed patients to smoke. It revealed that MHPs lacked comprehensive smoking cessation knowledge and confidence to help them quit smoking.

Another study (Ratier-Cruz et al. 2020) was conducted by a cross-sectional survey in UK. It aimed to know staff's attitude on smoking policy. 631 staff who worked in clinical and non-clinical mental health settings finished this survey. According to Ratier-Cruz et al. (2020), we can know that smoking-free policy was not welcome by most of staff in mental health settings; Further, it's very important to put more attention on MHPs' training.

In order to assess practitioners' knowledge, practice and training needs on helping patient to quit smoking, an online survey was done in UK (Simonavicius et al. 2017). 717 practitioners who supported smoking cessation finished this questionnaire. It reported that the practitioners who had professional knowledge were more confident in supporting mental health patient to quit smoking. Most of the health providers were interested in training, particularly about smoking cessation effect on psychiatric medications (84.3% of n=632) and how to tailor smoking cessation support for mental health patients (82.4%), 51.9% wanted to know how to ask clients about mental health and how to ask about the medication clients were prescribed (52.7%) (Simonavicius et al. 2017).

Since mental health patients experience many barriers to quit smoking, it is very important for MHPs to educate and encourage them to quit smoking. Therefore, the MHPs' smoking cessation advice training could be a better idea on helping psychiatric patient to quit smoking. (Mitchell et al. 2015.)

A so called "4A" (Ask, Advise, Assist, and Arrange) was mentioned to train MHPs in one systematic review. The training content are as follows: Ask about the patient's smoking habits, clearly advise the patient to quit smoking, offer the patient psychological support during smoking cessation and explain pharmacological aids and arrange follow-up visits to check that the patient is still abstinent *(*Mitchell et al. 2015).

Other adaptions like 3A's or 5A's (Ask, Advise, Assess, Assist and Arrange) was also acceptable. A study was conducted in 6 community mental health centers of USA. It aimed to test whether 5A's was effective or not on smoking reduction of serious mental health patient. 156 participants with severe mental disorders proved that 5A's could be effective on smoking cessation when implementing it over 12 months. (Dixon et al. 2009.)

Furthermore, a pilot study (Chavarria et al. 2019) was done in USA. It aimed to test the effectiveness of Counsel to Quit® training on supporting AAR (Ask, Advise, Refer) model. It mentioned that due to 5A was a time-consuming model (Chavarria et al. 2019, cited in Edwards, Freeman, Litt & Roche 2006), a simplified AAR model was produced (Chavarria et al. 2019). The AAR model contents are as follows: asking about tobacco use status, advising all tobacco users to quit, and referring tobacco users to evidence-based tobacco treatment, including behavioral counseling and pharmacotherapy (Chavarria et al. 2019).

Although AAR was an effective model in smoking cessation with mental health patient, many health care professionals still lacked knowledge and confidence in implementing it. Then the 60-90 minutes Counsel to Quit® counselor training program came out to help the professionals. 291 participants who were medical, mental health and other professionals joined this training and finished the pre- and post-training surveys. The trainers described the benefits of smoking cessation, DSM-5 criteria for nicotine use disorders, the stages of change model and motivational interview methods, screening protocols, information and questions about the seven FDA approved pharmacotherapy for tobacco cessation, evidence that a combined pharmacotherapy and CBT proved most effective in helping patients quit smoking, and local cessation resources for patient referrals. It focused on practical learning, participants played the roles as interviewer and simulated patient, guided by motivational interview techniques, then group discussion of experiences. Finally, teaching the knowledge of e-cigarettes, acupuncture and hypnotism. Overall, the Counsel to Quit® training improved providers' confidence on using AAR model to help patient quit smoking. It also increased the professionals' confidence in advising using e-cigarettes. (Chavarria et al. 2019.)

5 Conclusion

Varenicline and NRT are safe and effective medications on treating smoking cessation in mental health patient. Furthermore, varenicline is more efficiency than NRT on smoking reduction in mental health patient. It is also important to keep in mind that these five medical studies excluded those patients with unstable condition.

Although FDA has removed the varenicline label of severe psychiatric adverse effects and Smith et al. (2016) proved varenicline's safety, Taylor et al. (2019) has an unclear result that varenicline was more likely to cause depression in schizophrenia. Therefore, further large studies need to be conducted to determine whether varenicline could lead to server psychiatric side effects or not on smoking cessation of mental health patient.

Two studies (Aubin, Rollema, Svensson & Winterer 2011; Peckham, Brabyn, Cook, Tew & Gilbody 2017) have emphasized some of smoking cessation interventions for people with SMI, including medication interventions. In this updated review, cognitive behavioral therapy interventions were analyzed to know whether cognitive behavioral therapy interventions or support can form part of an effective intervention on smoking quitting in mental health group which over the world has high rate of smoking. Five studies were recognized that met the inclusion criteria, examining one game intervention, two telephone tailored smoking cessation interventions and two motivation interventions, with or without adjunctive pharmacotherapy.

Overall, the discussed studies seem not directly impact the final smoking abstinence by those cognitive behavior therapy-based interventions. it was good that all psychiatric problem participants were satisfied with the different contents of interventions. All interventions have possibility to be implemented into the real life. Further study needs to be held for psychiatric patient because many study points out they are smoking more than people who didn't have mental illness. There are some limitations to this review. First, the review only includes English language publications and grey literature are not searched, potentially excluding relevant studies in other languages or not published through traditional academic channels. Secondly, we were not able to determine the most effective intervention elements due to the great differences in the contents of intervention all over studies. The strengths of this review are that it followed an exact process with strict inclusion criteria. The review followed a pre-specified protocol and studies were qualified for inclusion if they used a biochemically proved smoking cessation measure. This is also done by maximumly to avoid reviewer bias.

Cognitive behavioral therapy method mainly by different contents of interventions to make mental health patient change in attitude and realize the disadvantages of smoking, increasing compliance of treatment, give psychological support in their life. Interventions fully need the implementation in health care service by professionals. Implementations need specific and comprehensive training with the quitting or cessation programs. This is an important topic for further research.

One study (Vancampfort et al. 2013) confirmed that inactivity or low activity patients smoked more than those who were highly physically active in schizophrenia. The remaining two studies (Bernard et al. 2013; Pinho et al. 2021) proved exercise can reduce the smoking rate and further research need to be conducted on how exercise interventions effectively help patients to achieve long-term smoking cessation. The left one study (Seet et al. 2021) showed participants' daily insufficient physical activity and physical activity plan should be part of the intervention treatments to improve the clinical outcome.

Not all the health care providers hold positive attitude on smoking cessation in mental health patient. Also, not all of them support the smoking-free policies. Therefore, according to the existed problems of health care providers themselves, we find some better methods to train health providers on helping psychiatric patient quit smoking. According to the survey (Simonavicius et al. 2017), we can get some instructions about the professional knowledge training direction, like the Counsel to Quit® training program or any other lesson's training. As for the smoking cessation advice in mental health patient, AAR is a very effective and time-saving model. Furthermore, The Counsel to Quit® training program is also feasible and effective on improving AAR belief, confidence and related knowledge information among healthcare professionals. Therefore, a simplified AAR model with the Counsel to Quit® training on mental health providers is effective on helping psychiatric patients to quit smoking.

6 Ethical considerations

Ethical considerations in research are a set of principles that guide your research designs and practices. Ethical issues are such as voluntary participation, informed consent, Anonymity, Confidentiality, and avoid potential harm and plagiarism. (Bhandari 2021.)

Research misconduct includes fabrication, falsification, plagiarism, and misappropriation. Fabrication refers to presenting observations or results that have been invented; Falsification (misrepresentation) refers to deliberate modification of original observations; Plagiarism refers to presenting someone else's work as one's own without appropriate references; Misappropriation refers to the unauthorized presentation of another person's results, ideas, observations, or data as one's own. (Räsänen & Moore 2016.)

We have an agreement with Peijas Hospital of Vantaa in Finland for our thesis study. We avoid research misconduct behaviors and follow the evidence-based knowledge. We present the original data correctly and put references into our thesis carefully and cautiously. Later we will use the tool of Urkund to test thesis.

7 Reliability and Relevance

This research has done a valid and reliable literature review. We have evaluated this research according to Reading Craze (2017) how to evaluate source for reliability. This research was checked by different ways to ensure the reliability. All online journals with 20 articles are published after peer-review. Some of the articles are published on Laurea Applied Science University website. All other related source websites are used have .com extension and no personal website are used in this research. All the articles are online sources, this thesis considered more authoritative database from CINAHL with full text (EBSCO), ScienceDirect (Elsevier) and Google scholar which are reliable sources.

Based on the statement of University Library Groningen publication (2022), the information could answer research question, the level of the information are appropriate for this research question and the aim of this research. Data collection criteria are well matched after reviewing by thesis advisor for subjection selection. All the studies reviewed were used accurate tools and measurements in their study methods to ensuring the validity of the results.

All the collected data is based on the keywords related to the study topic and questions. It also ensures the relevance of our research topics to the greatest extent possible. The sample of participants were meet the research topic target group which provide us well organized and constructive categories with ideal quality data. All the research articles analyzed were from trusted data sources. Three reviewers has been critically read through the articles to ensure the relevance, we did data collection, extraction and analysis to ensure the valuable data will not left out. Sources referenced correctly in the end of this review and can be easily followed. As these three reviewers have not systematically trained to be a researcher which could eliminate the possibility of errors. (Atashili & Abamukong 2016.)

8 Tables

Table 2 Comparison of outcomes of nicotine replacement therapy (NRT), bupropion therapy, and varenicline therapy versus placebo trials conducted in mental disorders.

Study and intervention	Design	Smoking cessation outcomes	Safety
Anthenelli et al. (2016) VAR (1mg, 2/d) vs BUP (150mg, 2/d) vs TNP (21mg with taper, 1/d) for 12wk. A double-blind, randomized, placebo-controlled clinical trial	1.8144 adult participants from 16 countries in clinic trial center, academic center and outpatients with and without mental disorders. 52% from USA. Mean of smoking =21 cigarettes per day. 2.4116 in psychiatric cohort (meet DSM-IV-TR diagnostic criteria and in stable condition). 3. Intervention duration: 24 weeks.	1.abstinence rates (OR) in psychiatric cohort: VAR vs PLA: OR=3.1 VAR vs NRT: OR=1.68 VAR vs BUP: OR=1.75. BUP vs PLA: OR=2.07 NRT vs PLA: OR=2.15. 2. CO ≤ 10 ppm.	No significant increase of neuropsychiatric adverse events during using these medicines.
Jimenez-Ruiz et al. (2018) NRT (21mg/d for 6 weeks, 14mg/d for next 4 weeks, then 7mg/d for 2 weeks) vs VAR (0.5mg/d for 3 d, followed 0.5mg/ 12h for 4 days, then 1mg/12h for day 8th to 12th week) + CBT. A retrospective cohort study	1. 349 adult outpatients with stable mental disorders in Spain. 2. Mean of smoking =28.3 cigarettes per day; Mean level of CO =28.4 ppm. 3. 24 weeks.	1. Varenicline vs NRT: OR =1.64. 2. Level of CO in exhaled air OR=0.98. 3. Number of cig./day OR=0.98.	General adverse effects were noted, no suicidal ideation or behavior reported.
Taylor et al. (2020) VAR vs NRT. A prospective cohort study	1. 235,314 adults participated and 78457 of them were mental disorders. England. 2. 4 years.	Varenicline vs NRT: 95% CI=1.19, 19% greater odds of quitting at 2 years.	Not clear evidence was showed that varenicline maybe could worsen psychiatric symptoms in mental health patient.

Garcia-Portilla et al. (2016) BUP SR (eg.150mg/d for 6days, followed 150mg 1/12h) vs NRT (eg.14,21,28, or 35mg for 12 weeks) vs VAR (0.5mg/d for 3 days, followed 0.5mg 1/12h for 4th-7th day, then 1mg 1/12h for the remaining 11 weeks). A non-randomized, open-label, prospective, 9-month follow up, multicenter study	1.82 adult outpatients with stable schizophrenia and bipolar disorder in community. Spain. Smoking ≥15 cigarettes/day. 2.36 weeks.	A previous 7-day self-reported CPD = 0; CO levels ≤ 9 ppm at 24 weeks and 36 weeks.	1. No significant differences between groups. 2. no suicidal ideation and behavior or hospitalization happened.
Smith et al. (2016) VAR (0.5 mg to 1 mg daily for 1wk, then 2mg daily for 7wk) vs PLA A randomized, double-blind, placebo controlled study	1. 87 adult outpatients and inpatients with schizophrenia. USA. 2. Smoking ≥6 cigarettes/day or in non-smoking hospital.	Cigarettes smoked decreased P =0.010. CO levels P =0.003. Plasma nicotine levels decreased P =0.045. Plasma cotinine levels decreased P=0.001. Brief urge to smoke decreased P ≤0.022.	No worsen psychiatric symptoms and not improve cognitive function.

Table 2

OR: odds ratio. 95% CI: 95% confidence interval for the OR. p: degree of significance. Ref.: reference category; cig./day: cigarettes/day. CPD=cigarettes smoked per day; BUP=bupropion; VAR = varenicline; PLA=placebo; CO = exhaled carbon monoxide.

Table 3 Study characteristics

Study/design	Population	Intervention delivery	Smoking absence or quit attempt outcome	Secondary outcome
Khazaal et al. (2008) A preliminary naturalistic trial	51 hospitalized adult smokers (18–65 years old) in the public psychiatric hospital	‘‘Pick-Klop’’ game aim to assess the attitudes regarding stopping smoking 1. stop smoking 1 day 2. the smoking prohibition in hospital 3. assess the patients’ option of the game 4. Smoking dependence was evaluated by: time-to-first cigarette after waking-up and the number of cigarettes smoked per day.	The intention on quit smoking increased after the game session	This study showed the possible use of the game in psychiatric hospitals in order to offer patients more aware of subjects with nicotine addiction.
Steinber et al. (2015) A Patient-Randomized Controlled Trial	98 individuals with Schizophrenia, Schizoaffective disorder, or Bipolar I disorder	Motivation Interviewing with personalized feedback. Individual, 45-minute, single sessions, were guided by a manual, and were audio-recorded Group interactive education with quit advice and referral for treatment	Smokers remarkably make a quit attempt at the 1-month follow up after received an MI intervention.	Smoking abstinence didn’t reach after these quit attempts
Rogers et al. (2016) A Patient-Randomized Controlled Trial	577 mental health clinic participants	a specialized counseling protocol developed by the study for mental health patient Comparison group state quit-line counseling	Most participants in both groups planned to quit smoking in the next 30 days, were very motivated to quit, and had tried to quit in the prior 12 month. Participants in the specialized counseling arm were more likely to report 30-day abstinence than participants in the quit-line arm	Both group participants were satisfied with the interventions provided

Minami et al. (2018) An open-label pilot feasibility study + a pilot RCT	60 outpatient psychiatric individuals	smartphone-assisted mindfulness smoking cessation intervention with contingency management (SMI-CM)	None	All participants reported reductions in the number of cigarettes smoked per day from baseline to 2- week, 4-week, and 3-month post-quit follow-up. the program was helpful overall, and that daily mindfulness practice was helpful for both managing mood and quitting smoking.
Myers et al. (2019) A pilot randomized trial	85 military Veteran mental illness individuals	a tobacco cessation consult clinic and randomized to receive either a MI-based treatment engagement intervention (TE; *n* = 48) a non-MI assessment and information control (CON; *n* = 38) condition. Intervention was delivered during a single brief telephone contact.	more TE than CON participants reported 7-day point abstinence at 3 months post-intervention	No significant differences were observed in making a 24-h quit attempt and self-reported 7- day point abstinence at 3 months post intervention. Thus, initial findings support evidence for success of the TE intervention in effecting increased utilization of smoking cessation counseling plus medication use.

Table 3

Article name	Study Country	Purpose of the study	Participant	Exercise Intervention	Main Result
Relationships between physical fitness, physical activity, smoking and metabolic and mental health parameters in people with schizophrenia	Vancampfort et al. (2013) Belgium and the Netherland	Discuss the relationship between physical activity, smoking, physical health, and mental health in patients with schizophrenia	Over a 6-month period, 100 patients with schizophrenia	Eurofifit test	Patients who were highly physically active smoked less than those who were inactive or less active
Counseling and Exercise Intervention for Smoking Reduction in Patients with Schizophrenia: A Feasibility Study	Bernard et al. (2013) France	To discuss the feasibility of exercise intervention in patients with schizophrenia	Over a 1-month period, 21 inpatients who smoked and had a diagnosis of schizophrenia or schizoaffective disorder within one psychiatric clinic	physical activity (walking, moderate intensity)	A significant increase in motivation to quit smoking was observed after exercise intervention
Physical activity, sedentary behavior and smoking status among psychiatric patients in Singapore – a cross-sectional study	Seet et al. (2021) Singapore	It investigates the effects of smoking on physical activity in psychiatric patients	380 Participants were recruited from a tertiary psychiatric hospital	Physical activity (walking)	There is insufficient physical activity among current, former and non-smoker participants and programmes aimed at increasing physical activity should be incorporated into treatment plans
Effectiveness of multimodal interventions focused on smoking cessation in patients with schizophrenia: A systematic review	Pinho et al. (2021) Portugal	To discuss the effectiveness of multimodal smoking cessation interventions in adult smokers with schizophrenia	None	None	Multimodal interventions, including exercise interventions, reduced smoking and did not worsen psychiatric symptoms

Table 4

Table 5 Cognitive Behavior Therapy Smoking Cessation outcome in mental health patient

Study	Quit attempt	7-day point prevalence of quit rate (%) in main intervention (I) and comparison (C)	Engagement for Tobacco Dependence Treatment (%) in main intervention （I) and comparison (C）	Reduction of cigarette 2-week, 4-week, and 3-month post-quit follow-ups	Satisfaction of the intervention
Khazaal et al. (2008)	strong intention at quitting and more likely quit 1 day	no report	no report	no report	well prized
Steinber et al. (2015)	likely to make a serious quit attempt by the 1-month follow-up (I: 34.7% vs. C:14.3%)	I: 16.3% C:10.2% not statistically significant.	I:32.7% C: 20.4%	no difference	no report

Rogers et al. (2016)	more likely to report 30-day abstinence and 24h quite attempt,long term quitting attempt improved	no report	more likely report to the use of cessation counseling	no report	satisfied
Minami et al. (2018)	no report	I: 12.5% C: no report	no report	the number of cigarettes smoked per day from baseline to 2- week, 4-week, and 3-month post-quit follow-ups , 84%, 84%, and 46% reduction from baseline.	helpful and comfortable
Myers et al. (2019)	at least one quit attempt of 24-h or longer	3-month assessment I: 30% C:18%	I:47% C:45%	no report	no report

Table 5

The First Author	Study Design	Exercise Intervention	Outcome	Suggestion
Pinho et al.	None	None	Patients quit smoking and reduced smoking at the end of treatment and at follow-up	Further research is needed if patients want to quit smoking in the long term.
Seet et al.	For one year, 21 to 65 years with initial diagnosis of depression or schizophrenia spectrum and other psychosis make use of the GPAQ and analyzed according to the GPAQ guidelines, applying the boundaries of the GPAQ guidelines, physical activity was divided into three levels of —— high, medium, and low (WHO,2020)	In this questionnaire, physical activity was divided into three main areas: —— work or training, travel (through walking and / or cycling), and leisure activities	The findings of this study could be used to identify people who are more prone to physical inactivity and sedentary behavior, and could in turn facilitate treatment design to improve clinical outcomes for psychiatric patients	Clinical treatment of patients with mental disorders should be improved by incorporating physical activity into treatment plans.
Vancampfort et al.	For 6 months, all participants underwent physical examination and baseline ECG before testing, participants completed a physical activity questionnaire and performed a set of physical tests, control experiments in healthy group and schizophrenia	European Fitness Test (full body balance, body movement speed, flexibility, explosive, force, static strength, abdominal muscle endurance and running speed)	The lack of physical activity in schizophrenia was almost 3.5 times higher than in healthy controls. Second, Patients who smoked daily smoked more than those who were highly physically active	None
Bernard et al.	Over an 8-week period, a single-group prospective study design was assessed at baseline, at the end of the intervention, and at the 6-week follow-up	five smoking reduction consultations and three moderate-intensity exercise sessions	Smoking cessation motivation has increased significantly	There are more effective findings on smoking reduction, and larger trials are needed to test interventions

GPAQ：Global Physical Activity Questionnaire

Table 6

9 Reference

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