THE PRACTICE AND FACTORS THAT INFLUENCE EXERCISE PRESCRIPTION BY PRIMARY CARE PHYSICIANS IN HOSPITAL UNIVERSITI SAINS MALAYSIA: A CROSS-SECTIONAL STUDY

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The practice and factors that influence exercise prescription by primary care physicians in hospital Universiti Sains Malaysia: A cross-sectional study

by

LEE ANN KEE

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CERTIFICATE

This is to certify that the dissertation entitled THE PRACTICE AND FACTORS THAT INFLUENCE EXERCISE PRESCRIPTION BY PRIMARY CARE PHYSICIANS IN HOSPITAL UNIVERSITI SAINS MALAYSIA: A CROSS-SECTIONAL STUDY is the bona fide record of research work done by Ms LEE ANN KEE during the period from July 2020 until June 2021 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Health Science (Honours) (Exercise and Sport Science).

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

Signature,

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Date: 22 June 2021

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LIST OF ABBREVIATIONS

Abbreviation	Description
ACSM	American College of Sport Medicine
BMI	Body Mass Index
EnPHC	Enhanced Primary Health Care
EIM	Exercise is Medicine
EIMM	Exercise is Medicine Malaysia
EVS	Exercise Vital Sign
FITT	Frequency, Intensity, Time, Type
GP	General practitioner
HEPA	Health Enhancing Physical Activity
MET	Metabolic Equivalent
MVPA	Moderate-to-Vigorous Physical Activity
NHMS	National Health and Morbidity Survey
PA	Physical Activity
PAE	Physical Activity and Exercise
PAVS	Physical Activity Vital Sign
PCP	Primary Care Physician
IPAQ	International Physical Activity Questionnaire
WHO	World Health Organization

AMALAN DAN FAKTOR-FAKTOR YANG MEMPENGARUHI PRESKRIPSI SENAMAN OLEH DOKTOR PAKAR PERUBATAN UTAMA DI HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRAK

Aktiviti fizikal memberi banyak manfaat kesihatan dalam mencegah dan menguruskan penyakit kronik. Nasihat daripada doktor perubatan berkenaan aktiviti fizikal adalah penting dalam penjagaan kesihatan. Tujuan kajian ini adalah untuk mengkaji pengetahuan, keyakinan dan tahap fizikal aktiviti doktor penjagaan primer (PCP) yang mungkin mempengaruhi senaman kaunseling dan preskripsi senaman di Hospital Universiti Sains Malaysia. Halangan dan faktor yang berkaitan dengan amalan PCP, preskripsi senaman dan perlakuan senaman kaunseling juga dikenal pasti dengan mempertimbangan keadaan seperti keadaan penularan COVID-19 dan Perintah Kawalan Pergerakan (MCO) di Malaysia. Sebanyak PCPs (n=64) di Klinik warga USM telah menyertai kaji selidik atas talian, yang diedarkan di Jabatan Perubatan Keluarga, USM, HUSM. PCP lebih yakin dalam memberi preskripsi senaman dan perlakuan senaman kaunseling kepada pesakit jika mereka biasa mempunyai amalan dalam menyediakan PAE. PCPs (n=16) yang mempunyai formal latihan dari PAE kaunseling and preskripsi senaman, yang tidak mempunyai formal latihan (n=48).

Majoriti PCP (n=59) melaporkan mengetahui perbezaan antara aktiviti fizikal dengan senaman berbanding dengan PCP (n= 4) yang dilaporkan tidak pasti dan tiada yang melaporkan tiada perbezaan. Semasa sesi klinikal harian, 49.7% PCP menyatakan secara purata bahawa mereka memberi konsultasi aktiviti fizikal dan senaman (PAE)

sepanjang masa. Majoriti PCPs (67.4%) merasa yakin dan mampu memberikan maklumat dan nasihat berkaitan PAE semasa sesi klinikal. Halangan yang paling utama adalah kurangnya pendidikan senaman (3.7/5.0 score, r=0.47), keutamaan pesakit lebih kepada intervensi farmasi (3.5/5 skor, r=0.45) dan kekurangan pendidikan PAE berterusan semasa berada di sekolah perubatan dan housemanship (4.0/5 skor, r=0.37), pada p <0.001. Antara halangan lain yang berkaitan dengan amalan termasuk kekurangan garis panduan dalam memberikan konsultasi PAE semasa lawatan klinikal (4.0/5 skor, r=0.32) dan PCPs memerlukan lebih banyak pengetahuan peribadi (4.6/5 skor, r=0.25). Terdapat kesan yang signifikan daripada tahap aktiviti fizikal PCP terhadap amalan PCP dalam mengesorkan PAE F=4.87 (p <0.05). PCP yang aktif secara fizikal lebih cenderung menasihati lebih ramai pesakit mengenai senaman. Halangan untuk mengesyorkan PAE semasa sesi klinikal adalah disebabkan oleh pengetahuan PAE yang tidak mencukupi dan garis panduan jabatan memberikan panduan yang lebih baik dalam menasihati pesakit mereka untuk bersenam. Oleh itu, masih banyak kajian di masa depan perlu dilaksanakan berkaitan dengan kaedah untuk meningkatkan kaunseling PAE oleh PCP untuk menggalakkan pesakit mempunyai gaya hidup yang lebih aktif.

ABSTRACT

Physical activity (PA) provides a lot of benefits and can both prevent and manage chronic diseases. A doctor's advice on PA for their patients is vital in medical care. The aim of this study is to investigate the knowledge, confidence, and physical activity levels of primary care physicians (PCPs) with regards to physical activity and exercise (PAE) counselling and exercise prescription in HUSM. Barriers and factors related to PCP's practice of exercise prescription are also identified with a consideration of conditions like Covid-19 pandemic and the Movement Control Order (MCO) in Malaysia. PCPs (n=64) participated in this study through an online questionnaire distributed through the Family Medicine Department, Universiti Sains Malaysia, HUSM. PCPs provided information on their knowledge/training, current practices, confidence, and barriers in PAE counselling and exercise prescription in clinical practices. Sixteen PCPs stated they had formal education/ training in PAE and 48 reported no specific PAE training. Majority of PCPs (n=59) know the difference between physical activity and exercise compared to the rest who were unsure. During daily clinical practice, PCPs mentioned that on average, they provide physical activity and exercise (PAE) consults to patients about 49.7% of the time. Majority of PCPs (67.4%) feel confident and able to provide information and advice on PAE during clinic sessions. The most prominent barriers to clinical PAE practice were the lack of exercise education (3.7/5.0 score, r=0.47), patients preference of pharmaceutical interventions (3.5/5.0 score, r=0.45) and the lack of continuing education on PAE in medical school and housemanship (4.0/5.0 score, r=0.37) , at $p<0.001$. Other significantly correlated barriers to practice includes the lack of standard guideline on providing PAE consultations during clinical visits (4.0/5.0 score, r=0.32) and noted

that PCPs need for more personal knowledge (4.6/5 score, r=0.25). There was a significant effect of PCPs' PA levels to the practice of recommending PAE, F=4.87 ($p<0.05$) from the one-way ANOVA analysis. Overall, majority of PCPs counselled on PAE for about half the times during their clinical sessions. PCPs that are physically active tend to advise more of their patients on exercise and the barriers on recommending PAE during clinical sessions were mainly due to insufficient PAE knowledge and department guidelines. Hence, future research could investigate on methods to improve PAE counselling by PCPs to encourage a more physically active lifestyle for their patients.

CHAPTER 1
INTRODUCTION

1.1 Background of study

The World Health Organization (WHO, 2019a) highlighted that physical inactivity or sedentary lifestyle is the fourth leading cause of death in 21st century. Physical inactivity is a public health concern worldwide. It is a prominent risk factor for several chronic diseases such as heart disease, type 2 diabetes, and certain cancers (Warburton et al., 2017). In a review of US studies, Anderson & Durstine (2019) stated that physical activity is beneficial in the prevention and treatment of chronic diseases and conditions. Regular physical activity (PA) is a primary prevention and treatment for many common non-communicable medical problems that are related to lifestyle practices (Anderson & Durstine, 2019). Regular PA also helps to improve mental health, functional capacity and quality of life (WHO, 2018). It is clear that exercise may be a very powerful tool to prevent and manage major public health problems if practiced appropriately.

Primary care physicians (PCPs) are the first stop that patients visit to diagnose and treat their illnesses and diseases. PCPs role have been described as to provide screening, diagnosis, preventive services, patient education as well as monitoring outcomes (Katon et al., 2001). In Malaysia, the term ‘physicians’ may be understood differently. PCPs are commonly known as general practitioners (GPs) locally and have similar roles as described by the former president of the Malaysian Medical Association (Lee, 2019). There may be other Malaysian medical professionals that has the similar role as described by Katon and colleagues (2001) such as family medicine specialists

and to speak in the same language globally, we will use the term PCPs to describe the described roles undertaken by GPs and other medical professionals in Malaysia.

As part of the encouragement for doctors to prescribe exercise, American College of Sports Medicine (ACSM) started the Exercise is Medicine (EIM) initiative to increase exercise in patients for better health and wellness (Sallis, 2015). PCPs are encouraged to give physical activity counselling during their patient consultation by asking the Exercise Vital Sign (EVS) questions (Sallis, 2015). The two EVS questions can easily assess if patients are achieving the recommended 150 min of moderate PA levels (Golightly et al., 2017). This is one of the efficient and simple way for PCPs to monitor their patients' PA levels. Similar care management are also encouraged and used on patients who are discharged from specialised medical care and transferred to PCPs for follow-ups (Katon et al., 2001). For these reasons, PCPs are well positioned to assess physical activity habits in their patients, convey the message to them on the risk of being physically inactive, and provide a proper exercise prescription during clinical visits. Writing a 'green' prescription to refer patients to exercise physiologists would be the next step for PCPs where their patients may have specific exercise prescriptions (Khan et al., 2011).

Components of exercise prescription is like a drug prescription with the type of exercise, dosing frequency, intensity and duration according to the patient's individual needs, goals and ability level (Moore, 2004). This could be very helpful to patients on understanding the details of how exercise prescription affects the disease or the risk of the disease and how they can incorporate exercise into their daily life (Sallis, 2015). Exercise physiologists are qualified university-graduate, exercise professionals that would ensure individualised, specific and accurate exercise for their health and disease

condition (Soan et al., 2014). However, PCPs and exercise physiologists or exercise professionals are rarely teamed up in Malaysia.

The need to have exercise physiologists be an allied health professional is akin to having nutrition and dietetics to professionally advise and consult about a healthy diet. It can be noticed that the dietetic and food service departments are set up in every general hospital in Malaysia to provide medical nutrition therapy and dietary counselling to patients by qualified dietitians (Jamaludin, 2016). This showed how the Ministry of Health Malaysia is concerned about nutritional issues in patients. Having proper nutrition is another effective way to lower the statistics and burden of chronic diseases and other risk factors such as obesity (Ohlhorst et al., 2013). Doctors concur that providing accurate nutritional advice is an important part in maintaining patient long-term health (WHO, 2017). Obviously, food intake has a significant impact on health and disease and so does physical activity and exercise. However, nutritional advice is not common in clinical setting as doctors generally lack the knowledge on nutrition education and training and time constraints during counselling (Adamski et al., 2018). These are the challenges and barriers that have been identified on why doctors are unable to provide proper nutrition recommendation to their patients. Therefore, these led to the availability of dietitians and nutritionists to assist doctors to consult and prescribe on diet. This similar scenario is occurring for physical activity advise for patients. Engaging in regular physical activity would generate multiple health benefits and long-term chronic disease prevention and treatment while improving overall global health (Anderson & Durstine, 2019). We need to understand the similar challenges doctors may face with physical activity counselling and prescription as physical inactivity is a pandemic that may lead to premature death worldwide (Kohl et

al., 2012). According to Sallis (2015), doctors have the responsibility to assess each patient's current fitness level and to let them know the risk of being sedentary. However, there are a lack of understanding and information on how to support and assist doctors to provide exercise prescription that may provide many more benefits on public health and disease management for their patients.

As this study is conducted during the Covid-19 pandemic, we took into account possible changes to patient management due to the external changes and shifts in medical and health care. Due to the recent Covid-19 pandemic, we suspect that PCPs may restructure their priority of exercise recommendations during patient counselling. Thus, we would like to investigate if there were any changes to exercise prescription/counselling due to Covid-19. Challenges and factors related to PCP's practice of exercise prescription will be based in their overall general outlook at the time of data collection. This will reflect the current challenges to promote exercise prescription in PCPs and under what circumstances (e.g. Covid-19 conditions) should we consider to increase and encourage exercise prescription among PCPs.

1.2 Problem Statement

Most patients give the highest respect and heed to their doctor's advice (Walker et al., 2018). Doctors are ideally positioned where they can impact a large population at risk of sedentary lifestyles due to their role and function in health and society. Doctors or physicians are medical professionals who practice general medicine and give definitive care to patients and it seems that doctors do not ask enough and report about exercise or PA to patient with chronic condition(s) (Lindeman et al., 2020). PCPs are knowledgeable and trained to provide routine healthcare to treat many different conditions, including common injuries. They are qualified in assessing problems and

determining a course of treatment care plans to provide to their patient (Katon et al., 2001). However, majority of PCPs are not trained and skilled in prescribing exercise in primary care for their patients (Khan et al., 2011). If indeed we hope to reverse trends of chronic diseases and management in Malaysia, we need to understand how we can incorporate more exercise advice and encouragement through the main person our community looks up to for key health and treatment advice, our PCPs. As Hospital Universiti Sains Malaysia (HUSM) is a teaching hospital along with an established exercise and sports science programme for the last 15 years, we need a better understanding of where we are in the practice and the challenges faced by our PCPs in exercise counselling and prescription. The results of this study would provide insights to how we can do things better that will in the end, benefit the most important person, that is the patients.

1.3 Research Question

1. Are PCPs in HUSM providing exercise consultations or prescriptions to their patients?
2. What are PCPs' exercise prescription practices – frequency, length and other related characteristics in HUSM?
3. Are there changes to PCPs' exercise prescription practices before and after MCO due to the Covid-19 pandemic?
4. What do PCPs in HUSM know/perceive about the benefits of exercise?
5. What are the factors influencing exercise consultations or prescriptions of PCPs in HUSM?

1.4 Study Objective

1.4.1 Main objective

To determine the association between the practice and the challenges in prescribing exercise as well as exercise behaviours in primary care physicians (PCPs) at Hospital Universiti Sains Malaysia (HUSM).

1.4.2 Specific objective

i. To identify PCPs' practices, confidence level and barriers in providing exercise counselling and exercise prescription at Hospital USM.

ii. To assess if PCPs' practices in exercise counselling and prescription changed due to Covid-19 pandemic situations at Hospital USM.

iii. To determine PCP's self-reported physical activity (PA) levels.

iv. To determine the association of confidence levels, PA levels and barriers to PCPs' exercise counselling and exercise prescription practices at Hospital USM.

1.5 Study Hypothesis

H_{O1}: There are no exercise prescription practices by PCPs in HUSM.

H_{A1}: There are exercise prescription practices at various levels by PCPs in HUSM.

H_{O2}: There are no changes to exercise prescription practices by PCPs in HUSM after the Movement Control Order period due to the Covid-19 pandemic.

H_{A2}: There are changes to exercise prescription practices by PCPs in HUSM after the Movement Control Order period due to the Covid-19 pandemic.

H_{O3}: There are no significant barriers associated to the level of exercise prescription practices by PCPs in HUSM.

H_{A3}: There are significant barriers associated to the level of exercise prescription practices by PCPs in HUSM.

H_{O4}: There is no association between the confidence level and the level of exercise prescription practices by PCPs at HUSM.

H_{A4}: There is a significant association between the confidence level and the level of exercise prescription practices by PCPs at HUSM.

H_{O5}: There is no significant association between the level of PCPs' physical activities and level of exercise prescription practices by PCPs at HUSM.

H_{A5}: There is significant association between the level of PCPs' physical activities and level of exercise prescription practices by PCPs at HUSM.

1.6 Definition of terms

PCPs are referred as the doctors including Family Medicine Specialists who are working or have worked at least four weeks in the past six months in Klinik Rawatan Keluarga and Klinik Warga HUSM during the study period.

1.7 Significance of Study

Pressure on health care professionals, hospitals and social care services are growing year to year. Prevention is crucial to improve the health of the whole population. Part of having a healthy lifestyle and to manage chronic diseases is to have

regular exercise (Petrella et al., 2007). Prescribed exercise is highly effective as treatment and prevention for major public health disease as well as for health enhancement alongside or on the absence of drug prescriptions (Pedersen & Saltin, 2015). Better health will transcend to many areas from a better quality of life to boosting the health of our economy. Through this study, we may be able to devise suitable interventions and programmes to assist PCPs to be more effective in exercise prescription. Findings from this study may inform on future practices in medical education and practices as a complimentary tool to reduce the burden of chronic disease expenditure and improve health management in Malaysia.

CHAPTER 2
LITERATURE REVIEW

2.1 The Benefit of Exercise and Physical Activity

Regular exercise may be a natural treatment for many diseases. Increased physical activity and exercise (PAE) are associated with reduced chronic disease risks like heart disease, stroke, diabetes, and breast and colon cancer (Anderson & Durstine, 2019). PAE help to lower the resting heart rate, lower blood catecholamine levels at rest and submaximal heart rate, hence they are essential help in prevention and treatment of mortality diseases (Anderson & Durstine, 2019). In Malaysia, the National Health and Morbidity Survey (NHMS) showed an increasing trend in diabetes, hypertension, and obesity rates among adult that are the common risk factors in non-communicable disease (Chua. et al., 2017).

Physical activity (PA) can help maintain optimal health and improve quality of life and regular PA are known to reduce the risk of public major health problems (Warburton et al., 2017). However, the concept of physical activity and exercise are different, and this may be confusing when defining these two terms. Physical activity is defined as the voluntary body movement carried out by the skeletal muscle that requires expenditure of energy and produce progressive health benefits (WHO, 2019a). Physical activity includes activities such as walking, playing, working household, watering plant and other recreational activities. However, exercise is a subset of physical activity. Exercise is planned, structured and consists of repetitive bodily movement (Caspersen et al., 1985) . The positive outcomes of exercise are correlated to physical fitness. The main objective of exercise is to maintain and improve the components of physical fitness.

There are two type of physical fitness component which are health-related and skill-related and these components can be measured by specific tests (Rathod, 2021). The five components of physical fitness are cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition. They can be measured by using standard tests such as shuttle-run test, resting heart rate, number of sit ups and push up in a minute, sit-and-reach and body mass index (BMI). BMI is widely used for anthropometric however, it is a poor indicator for measuring the percentage of body fat in the site of body which misleading to the effects of body fat mass on mortality rates (Nuttall, 2015).

2.2 The problem of physical inactivity and health outcome

According to the WHO (2015), 31% of adults in the world are physically inactive. There are about 3.2 million premature mortality in a year are due to physical inactivity, which does not meet the minimal level of national recommendations for PA (WHO, 2015). The prevalence of physical inactivity is higher in women, elderly individuals and among wealthier and urban countries (Ozemek et al., 2019). Chronic diseases are slow-progression and long-lasting conditions. The incidence of chronic disease increased dramatically and are considered as an underestimated epidemic in the last century. As much as 6%-10% of chronic diseases are caused by long term physical inactivity and sedentary behaviour (Ozemek et al., 2019; Thivel et al., 2018). Unfortunately, Malaysia has the highest rate of obesity and overweight among Asian countries which are 64% of male and 65% of female population with low PA levels (WHO, 2019b). Alarmingly, the statistic of prevalence for chronic disease in diabetes among adults in Malaysia has elevate from 11.6% to 17.5% over the period of 9 years from 2009 to 2015. Moreover, the prevalence in hypertension also affects about 30%

of Malaysian adults (WHO, 2019b). These high rates of chronic diseases may be better managed with increased physical activity and exercise.

2.2.1 Physical inactivity and sedentary behaviour

Physical inactivity is defined as individual who are insufficiently active and do not reach the recommendations guideline of physical activity that is 150 mins of moderate to vigorous intensity activity in a week (Golightly et al., 2017). The measurement of physical activity assessment includes International Physical Activity Questionnaire (IPAQ), and the metabolic equivalent value (MET), direct observation tracking devices such as pedometer, heartrate monitor, accelerometers, armbands and 7-day recall or diaries (Sylvia, et al., 2014). The IPAQ can be used to determine sedentary behaviour along with physical activity (McCambridge et al., 2019). Physical activity is hard to assess by scores on what has been conducted while the level of one's energy expended during PA can be assessed readily by using the metabolic equivalent unit (MET) to define intensity.

One MET is defined as the amount of oxygen or calories consumed while being resting quietly and 1 MET is equivalent to 3.5 ml O_2 used per kg per minute or 1 kcal (4.2 kJ) per kg per hour (Nazzari et al., 2016). Sedentary behaviour refers to the activities that do not increase energy expenditure much above the resting phase such as sleeping, sitting, lying down and screen time. In the other words, energy expenditure from 1.0 to < 1.5 METs is considered as sedentary behaviour (Pate et al., 2008). Light intensity activities are usually grouped together with sedentary behaviour but in fact they are distinct from each other (Pate et al.,2008). Light intensity activities are between 1.6 METs to 2.9 METs of energy expenditure. For example, of light activity such as,

washing dish, doing house chores, making meals and slow walking. While moderate-intensity activities are value of 3-6 METs and METs > 6.0 is consider as vigorous intensity activity (Piercy et al., 2018).

Hamilton and colleagues (2008) reported that “too much sitting” of sedentary behaviour might be leading to different hazard for health on metabolism in the relation of physically inactive. Sedentary behaviour such as sitting for too long is associated with all-cause mortality. By reducing the time of sedentary and replacing it with any intensity physical activity can potentially decrease the rate of mortality in non-communicable chronic disease. However, the greatest benefits occur when replacing sedentary behaviour with moderate-to-vigorous intensity PA (Dohrn et al., 2018). The greater the person change their behaviour from doing low intensity to high intensity of PA, the greater the benefits for health (Piercy et al., 2018). Thus, moving in daily life may not be sufficient to be considered as being physically active if the intensity is not sufficient, but also we need to avoid spending too much time in sedentary behaviour.

2.3 The Role of Primary Care Physician (PCPs)

A primary care physician (PCP) is a doctor that their major discipline may be in family medicine as well as doctors who practice general medicine and give medical definitive care to patients (Lindeman et al., 2020). According to American Academic of Family Physicians (2020), PCPs are often the first point of entry to serve patients in the health care system. They are the best connection to attend to patient’s needs and are responsible to provide comprehensive primary care services and an effective treatment plan for the patient that may include referrals to more specialised medical care. PCPs