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Introduction of Exercise for Medicine (Exfome) Programme Among Patients In Primary Health Clinics In Malaysia

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Abstract

Introduction: Diseases due to unhealthy lifestyles such as heart diseases and diabetes are increasing in Malaysia. Heart diseases are the leading cause of deaths of patients in government hospitals, i.e. 16.1% of total deaths in 2009. A customised exercise regime called Exercise for Medicine (EXFOME) was introduced to improve and prevent chronic diseases such as diabetes, heart disease, obesity and hypertension.

Material and Methods: A total of 126 participants from government health clinics in three states of Peninsular Malaysia were selected to participate in the EXFOME. Each participant was evaluated prior to the program using an assessment protocol. Fitness assessment and evaluation with body composition measurement were taken. Exercise therapist prescribed a personalized exercise program according to conditions.

Results: Effect of exercise was measured in terms of improvement in hypertension and diabetes, body weight, body fat, lipid profile and physical fitness at three and six months.

Conclusion: EXFOME is beneficial to improve the status of hypertension, diabetes, body weight and lipid profile when it is carried out for longer period.

Keywords: exercise, medicine, hypertension, diabetes mellitus, heart disease, obesity

1. Introduction

1.1 Non-Communicable Diseases and Risk Factors

Cardiovascular diseases are the leading cause of death globally (Roth et al., 2018; World Health Organization, 2020). Non-communicable diseases (NCDs) caused 71% of deaths worldwide (World Health Organization, 2016; Bennett et al, 2018). Most NCDs are associated with modifiable behavioural risk factors or the leading underlying causes of premature death, such as smoking habit, physical inactivity, an unhealthy diet, harmful use of alcohol consumption and obesity (World Health Organization, 2019). The burden of cardiovascular diseases and other

non-communicable diseases is rising rapidly worldwide (Murray & Lopez, 1997; World Health Organization, 2010). Epidemiological studies indicate that a substantial part of the cardiovascular disease (CVD) epidemic is attributable to changes in lifestyle, depicted by abatement in physical activity and additional consumption of unhealthy foods (Lopez, Mathers, Ezzati, Jamison, & Murray, 2006; Bhatnagar, 2017). These diseases are driven by forces that include rapid unplanned urbanisation, globalization of unhealthy lifestyles and population ageing (World Health Organization, 2018).

National Health and Morbidity Survey conducted over the 30 years, reported Malaysian population have decreased perilously rates of doing physical activity, while rates of type 2 diabetes have risen 4-fold (Nor et al., 2008; World Health Organization, 2020) and obesity has risen over 200% (Rampal et al., 2007). Malaysian Adult Nutrition Survey (MANS) reported almost three-quarters of adults in Malaysia travelled by passive modes of transportation and majority (74%) spent of their time in sedentary activities (Poh et al., 2010; Norimah et al., 2008).

1.2 Initiatives and policy in Malaysia

Various initiatives and regulatory interventions have been extensively used in formulating new policies to encourage Malaysians to eat more healthily and be more physically active and create a health-promoting built-environment in Malaysia. The objectives of these initiatives are to incorporate nutrition and physical activity policy in all health awareness and promotion programmes (Ministry of Health, 2016). A national policy has been introduced to regulate and decrease the content of salt and sugar in all processed food and drink for prevention of hypertension and diabetes mellitus (Shyam, Misra, Chong, & Don, 2019; Royal Malaysian Customs Department, 2014). Electronic and mass media also play a role to create awareness in encouraging the public to use the available facilities in the community to promote physical activity and exercise in a safe environment, e.g. public parks, public sports complexes, jogging and cycling paths, and public gymnasiums; besides that expansion of an efficient public transport system throughout Malaysia to promote the use of public transport which will encourage physical activity (Malaysia, 2012; Kospenactiv, 2020; Schneider, Bassett, Thompson, Pronk, & Bielak, 2006; Iwane et al., 2000; Mansor & Harun, 2014).

Contrary to the conventional use of physical activities as defined by any type of leisure or sporting activities, there is no dose-response profile (Iwasaki, Zhang, Zuckerman, & Levine, 2003) that can trigger adaptations to treat specific diseases. Instead, there were events of sudden deaths and many injuries sustained from overuse and from over-exertion (Armsterdam, Laslett, & Holly, 1987).

1.3 Pathophysiology

The adaptations from exercises on diabetes and hypertension have been well documented. The mechanisms that reverse each of the pathological state have been clear and unchallenged. It is important that the application of such adaptations should be put to good use as a form of treatment. A good apprehension of general medical physiology, microbiology, exercise physiology and clinical exercise physiology is important to carry out such training regiments to avoid adverse effect (Schneider & Ruderman, 1990; Wasserman & Zinman, 1994).

2. Methods

2.1 Description on EXFOME Programme

EXFOME is a customised exercise regime (CER) designed to contain and prevent more than 40 chronic diseases, including diabetes, heart disease, obesity and hypertension (Exercise is Medicine, 2020). EXFOME vision is to make physical activity and exercise as a standard part of a global disease prevention and treatment medical paradigm. EXFOME programme was a collaborative initiative between Ministry of Health (MOH), Malaysia and National Association for Fitness Instructors (NAFI). EXFOME programme was conducted as a pilot project in seven government primary health clinics namely Seremban Primary Health Clinic, Bangi Primary Health Clinic, Sungai Chua Primary Health Clinic, Puchong Primary Health Clinic, Section 7 Primary Health Clinic, Jinjang Primary Health Clinic and Presint 3 Primary Health Clinic. The EXFOME programme commenced from September 2012 until February 2013. The doctors at the primary health clinics identified the patients with prediabetic or prehypertension between ages 18-60 years to be referred to Exercise Therapists (ET).

2.2 NAFI

National Association for Fitness Instructors (NAFI) provided the training modules, select the training venues, equipment, teaching facilities and organized road-shows to identified the suitable candidates as the EXFOME exercise therapist (ET). The EXFOME ET who lived nearby selected primary health clinic were recruited to undergo a 6-month in-house training and awarded with certification as EXFOME ET upon completion of training. All 6-month in-house training were conducted by industry certified instructors with moderation by external

evaluators and scheduled on Friday, Saturday and Sunday. The background of candidates for EXFOME ET could be from: (1) Hospital Nutritionist, (2) Hospital Health Officers, (3) former State and National Sportsmen or Sportswomen, (4) holder of Diploma in any discipline of Allied Health Sciences i.e.: Physiotherapist, Nursing, Paramedics and Health Care Management staff. Ministry of Health (MOH), Malaysia launched and promoted the EXFOME programme through media campaign. MOH awarded the mandatory accreditations to NAFI and training modules. Any enquiry on EXFOME programme were directed to an administrative staff as a contact person for EXFOME programme. Doctors from primary health clinic or hospital referred patients who suffered from or diagnosed as a border line cases of NCD to undergo ET. List of criteria to refer patient were as follow: (1) pre-Diabetes Mellitus (DM), (2) pre-Hypertension (HPT), (3) age between 18-year to 60-year and (4) agree to join and follow EXFOME programme for at least for 6-month in-house training. Any patient with the list of following was not fit to join the EXFOME programme: (1) chronic diseases i.e.: systematic lupus erythematous (SLE) and end-stage renal failure (ESRF), (2) Cancer patient, (3) musculoskeletal problems, (4) pregnancy, (5) mental patient, (6) neurological problems i.e.: Parkinson disease, and (7) hearts problem.

2.3 EXFOME Exercise Therapist (ET)

As for all the EXFOME ET, they had been recruited and had to undergo a 1-month in-house training course, conducted by National Association of Fitness Instructors (NAFI). Upon successful completion, they will pass as *Exercise Therapists. (ET)* which will then attach to the doctors assigned in the respective health clinics.

EXFOME ET was performed according to the Exercise Prescription Protocol (EPP) comprises with 2 components of assessment as follow: (1) the Fitness Assessment and Evaluation (PFA), and (2) the Body Composition Measurement. The selected patients undergo customised exercise regime (CER) such as 3-minutes step up test, upper body strength and endurance, abdominal or trunk endurance, and sit and reach workout. The Body Composition Assessment (BCA) contained details as follow: (a) registration number, (b) patient's name, (c) age, (d) sex, (e) height (metres), (f) body weight (kilogram), (g) fat percentage, (h) fat weight (kilogram), (i) lean percentage, (j) lean weight (kilogram), (j) bodyfat rating score, (k) skin fold and (l) body composition analysis conclusion. The Duties of EXFOME ET were prescribing a personalised exercise programme to the selected patients according to specified medical conditions, organising the frequency of trainings, monitoring and review the monthly PFA, referring the patients back to doctor for a monthly basis of evaluation.

2.4 EXFOME Flow Chart

The flow chart of EXFOME implementation at primary health clinic (Figure 1) started from the selection of patients according to list of criteria and undergo a few of laboratory tests after being referred from doctor based on list of criteria. Once registration completed, the selected patients are explained the EXFOME programme and need to signed an agreement of EXFOME programme if the patient agree to join, later referred to EXFOME ET for appointment. The selected/ agreed patients consulted by EXFOME ET for PFA, CER and date for follow-up visits for 6 months.

Reassessment interval at 3-month and 6-month by the doctor. Those patients disagree to join the EXFOME programme reassessed back 6 months later without undergo the PFA or CER.

ETs will perform Physical Fitness Assessment (PFA) which includes Body Composition and Fitness Level. Several parameters namely the Blood Pressure, Blood Glucose and Cholesterol and BMI were taken from all those patients as base line data. After the Exercise Therapist (ET) ET had performed Physical Fitness Assessment (PFA) the patient will be prescribed customised exercise regime (CER) accordingly to patients' conditions. The ET responsible to prepare the training schedules for each patient and Reviewed the patient's status every 3 weeks and finally refer the patient to the doctor after 3 months and 6 months respectively. The ET had also prescribed the "home-based exercise "in case the patients could not come for his/her schedule.

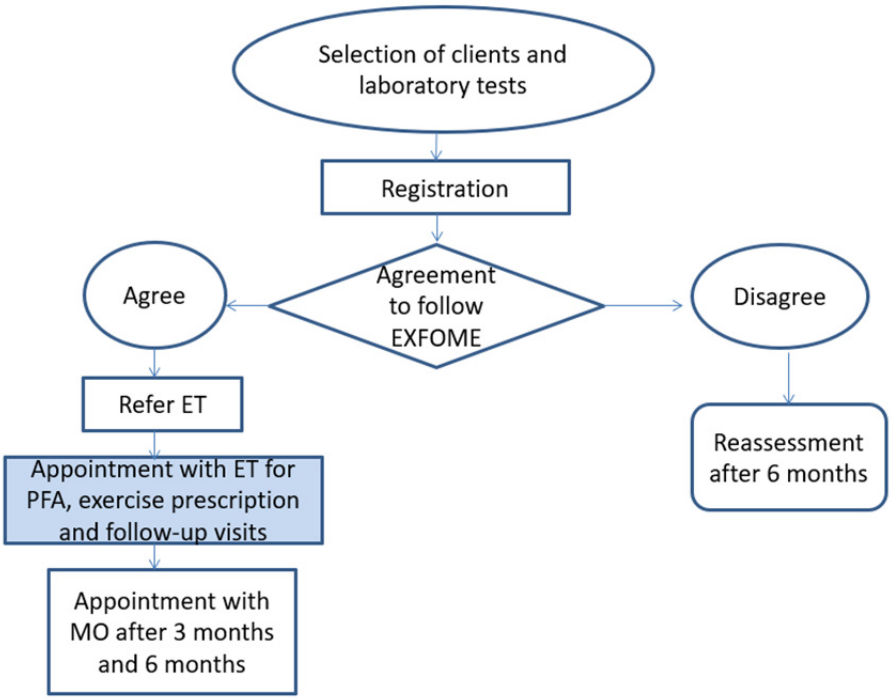

Figure 1. Flow chart of EXFOME implementation at primary health clinic

Empirically specific exercise yields specific adaptations (Green H. et al., 2000). The prescription of exercise as a treatment protocol focuses onto the change to the physiological baseline, pathological or non-pathologic. The right dosage of exercise can trigger adaptations that cause a change to the cardiac chamber size, the dynamics of the blood flow, heart rate, ejection fraction, positive turnover of endothelial cells, reduction of peripheral resistance, tissue strength, alter blood substrates and endogenous gaseous that can be used as treatment for NCD.

These changes are directly related to the intensity of each exercise category. The definition of prescribed exercise is contained to 3 categories which are resistance, aerobics and stretching. The application of each of this category is targeted to a specific disease-state-of condition of chronic disease. Exercise training performed at a right dosage rhythmically will cause utilization of specific substrates to the cells in the treatment of obesity and diabetes in general. The correct shift of the energy pathway is dependent on the intensity and the intensity is gauged through repetitions, heart rate, repetitions, range of motions and speed of execution.

Regarding assessment protocol, patient's current fitness components levels are important to be identified. The 5 components in the fitness are Cardio-vascular fitness determined by 3 minutes step up test (14/16ins board), Flexibility by Sit and Reach Board, Upper Body Strength by 1 min Push Ups, Trunk Endurance by 1 min Sit ups, Body Fat Percentage by Skin Fold Callipers and body Circumference.

The data collected in the test were fed into a Malaysian norm's software call Dr. Fit and a fitness profile report will be printed. Each of the components will be graded at Excellent, Good, Above Average, Average, Below Average and Poor. Based on the grades, customized exercise will be prescribed according to the training principles in terms of frequency which is how many times per week, intensity which is according to the repetitions and percentage of maximal heart rate (55% for *inactive* [exercise for 0-1 weekly], 60% for *moderate* [exercise for 1-3 weekly], 65% for *active* [exercise > 3 weekly]. Besides that, a stipulated time i.e. 30-45 minutes per session is also an important factor beside the type of exercise such as resistance training, aerobic and flexibility.

Exercises will be prescribed accordingly to the graph shown on each components grade. The final part after the report interpretation will be exercise prescription. Exercise prescription are done through the Dr. Fit software where it is generated automatically according to each grade of the fitness component's grading or according to the pathological disease state of as diagnosed by medical doctor in their referrals. The exercises prescribed are customized to Pre-Diabetic, Pre-Hypertension and obesity.

After EXFOME had been piloted in the 6 health clinics in a period of 6 months, 344 patients had been screened and 181 of them had been offered for EXFOME Program. Out of those being offered, only 124 patients had agreed to follow the EXFOME Program. The Exercise Therapists (ET) (Table 1). The ET had performed Physical Fitness Assessment (PFA) and followed by exercise prescriptions.

The data was analysed based on those who agreed to follow EXFOME by which there were categorised into 2 groups, those who participated ≥80% of the schedules prepared ET, then another category is those who participated EXFOME < 80% of the schedules prepared ET and practicing "home-based exercise". For those who did not follow the EXFOME, no Physical Fitness Assessment (PFA) being performed on them (Table 2).

Table 1. Screening and Registration According to Primary Health Clinics

State	Name of Primary Health Clinic	no of screened (participants)	no of registered (participants) (%)	no agreed to register (participants) (%)	no of disagree to register (participants) (%)
Negeri Sembilan	Seremban	189	48 (25.4%)	22 (45.8%)	26 (54.2%)
Selangor	Bangi	27	23 (85.2%)	21 (91.3%)	2 (8.7%)
	Sungai Chua	22	22 (100%)	17 (77.3%)	5 (22.7%)
	Puchong	25	25 (100%)	16 (64.0%)	9 (36.0%)
	Seksyen 7	28	22 (78.6%)	15 (68.2%)	7 (31.8%)
Federal Kuala Lumpur & Putrajaya	Jinjang	26	26 (100%)	20 (76.9%)	6 (23.0%)
	Presint 3	27	15 (55.6%)	13 (86.7%)	2 (13.3%)
Total		**344**	**181 (52.6%)**	**124 (68.5%)**	**57 (31.5%)**

Table 2. Retention rate of patient after 3 months and 6 months of EXFOME

No of registered patients		No of patient came during 1st visit		No of patient came for reassessment after 3 months			No of patient came for reassessment after 6 months		
Status	**No**	**No of Present (%)**	**No of Default (%)**	**No of Present (%)**	**No of Not Due (%)**	**No of Default (%)**	**No of Present (%)**	**No of Not Due (%)**	**No of Default (%)**
Agreed to follow EXFOME	124	106 (85.5%)	14 (14.5%)	64 (51.6%)	7 (5.6%)	53 (44.4%)	70 (56.5%)	7 (5.6%)	47 (37.9%)
Not agreed to follow EXFOME	57	57 (100%) at BMI & BP evaluation	0 (0%)	No assessment after 3 months			30 (52.6%)	Nil	27 (47.4%)
		50 (87.7%) at biochemistry evaluation)	7 (12.3%)						

For prehypertension patients who had agreed to participate in the EXFOME (n=65), more than 50% (56.8 – 58.8%) of patients managed to get optimum BP after 3 months and 6 months of intervention. patients who participated > 80% of schedules achieved optimum BP were 54 – 57% while patients who participated < 80% of schedules (Home-based) reached optimum BP were 57-70%. For those who did **not follow EXFOME,** out of 6 patients who came for reassessment, none achieved optimum BP, 50% remained static while 50% converted to hypertension (Table 3).

Table 3. Outcomes pre-hypertensive patients of EXFOME

No of registered patients		**No of patient came for reassessment after 3 months**				**No of patient came for reassessment after 6 months**				
Status	**No**	**No of patient came for analysis (%)**	**No of patient with optimum BP (%)**	**No of patient with still pre-hypertension (%)**	**No of patient with hypertension (%)**	**No**	**No of patient came for analysis (%)**	**No of patient with optimum BP (%)**	**No of patient with still pre-hypertension (%)**	**No of patient with hypertension (%)**
Agreed to follow EXFOME	65	34 (52.3%)	20 (58.8%)	12 (35.3%)	2 (5.9%)	49	37 (75.5%)	21 (56.8%)	12 (32.4%)	4 (10.8%)
Participated >80%	33 (50.8%)	24 (72.7%)	13 (54.0%)	9 (40.9%)	2 (9.1%)	23 (35.4%)	23 (100.0%)	13 (57.0%)	7 (30.0%)	3 (13.0%)
Participated <80%	32 (49.2%)	10 (31.2%)	7 (70.0%)	3 (30.0%)	0 (0%)	26 (40.0%)	14 (53.8%)	8 (57.0%)	5 (36.0%)	1 (7.0%)
Not agreed to follow EXFOME	57	No assessment after 3 months				24 (27.0%)	6 (25%)	0 (0%)	3 (50.0%)	3 (50.0%)

For prediabetic patients who had agreed to participate in the EXFOME (n=52), there were (34.3- 42.9%) of patients managed to get optimum Blood Glucose after 3 months and 6 months of intervention. For patients who participated > 80% of schedules achieved normoglycemic were 34.3 – 42.1% while patients who participated < 80% of schedules (home-based) achieved normoglycemic were 41.2 – 44.4%. For those who did **not follow EXFOME**, out of 25 patients who came for assessment, no patient gained normoglycemic, 100% remained prediabetic (Table 4).

Table 4. Outcomes pre-diabetes patients of EXFOME

No of registered patients		**No of patient came for reassessment after 3 months**				**No of patient came for reassessment after 6 months**				
Status	**No**	**No of patient came for analysis (%)**	**No of patient with normal blood glucose (%)**	**No of patient with remain pre-diabetes (%)**	**No of patient with diabetes (%)**	**No**	**No of patient came for analysis (%)**	**No of patient with normal blood glucose (%)**	**No of patient with remain pre-diabetes (%)**	**No of patient with diabetes (%)**
Agreed to follow EXFOME	52	28 (53.8%)	12 (42.9%)	16 (57.1%)	0 (0%)	49	35 (71.4%)	12 (34.3%)	21 (60.0%)	2 (5.7%)
Participated >80%	22 (42.3%)	19 (83.4%)	8 (42.1%)	11 (57.9%)	0 (0%)	18 (36.7%)	18 (100%)	5 (27.8%)	12(66.7%)	1 (5.5%)
Participated <80%	30 (57.4%)	9 (30.0%)	4 (44.4%)	5 (55.6%)	0 (0%)	31 (63.3%)	17 (54.8%)	7 (41.2%)	9 (52.9%)	1 (5.9%)
Not agreed to follow EXFOME	No assessment being done					36	25 (69.4%%)	0 (0%)	25 (100%)	0 (0%)

In term of body weight/obese, for those who agreed to follow EXFOME (n=103)**,** patients who had agreed to participate in the EXFOME, 30% – 57.7% of patients managed to reduce the weight after 3 months and 6 months of intervention while 41.4 % experienced increase in weight. It is also found that 43.6% - 59% of patients who participated > 80% of schedules, managed to decrease their weight. While those who participated < 80% of schedules (home-based), managed to decrease their weight, 36.8 – 53.8% managed to decrease their weight. For those who did **not follow EXFOME,** out of 26 patients who came for assessment, 38.5% still managed to reduce their weight (Table 5).

Table 5. Outcomes body weight/obese patients of EXFOME

No of registered patients		**No of patient came for reassessment after 3 months**				**No of patient came for reassessment after 6 months**				
Status	**No**	**No of patient came for analysis (%)**	**No of patient with static result (%)**	**No of patient with decrease result (%)**	**No of patient with increase result (%)**	**No**	**No of patient came for analysis (%)**	**No of patient with static result (%)**	**No of patient with decrease result (%)**	**No of patient with increase result (%)**
Agreed to follow EXFOME	103	52 (50.5%)	17 (32.7%)	30 (57.7%)	5 (9.6%)	89	58 (65.2%)	24 (41.4%)	24 (30.0%)	10 (41.4%)
Participated >80%	54 (52.4%)	39 (73.6%)	13 (33.3%)	23 (59.0%)	3 (7.7%)	46 (44.7%)	39 (84.8%)	18 (46.2%)	17(43.6%)	4 (10.2%)
Participated <80%	49 (48.0%)	13 (26.5%)	4 (30.8%)	7 (53.8%)	2 (15.4%)	43 (44.7%)	19 (44.2%)	6 (31.6%)	7 (36.8%)	6 (31.6%)
Not agreed to follow EXFOME	No assessment being done					47	26 (55.3%%)	10 (38.5%)	6 (23%)	10 (38.5%)

As for dyslipidaemia, **for those who agreed to follow EXFOME** (n=54)**,** only 9.1 – 14.3% achieved normal level after 6 months intervention. More than 60% remained dyslipidaemia. Percentage who achieved normal level after 6 higher among patients who participated > 80% of schedules. However, for those who did **not follow EXFOME,** out of 20 patients who came for assessment, 50.0% achieved normal level after 6 months (Table 6).

Table 6. Outcomes dyslipidaemia patients of EXFOME

No of registered patients		**No of patient came for reassessment after 3 months**				**No of patient came for reassessment after 6 months**				
Status	**No**	**No of patient came for analysis (%)**	**No of patient with normal result (%)**	**No of patient with static result (%)**	**No of patient with improved result (%)**	**No**	**No of patient came for analysis (%)**	**No of patient with normal result (%)**	**No of patient with static result (%)**	**No of patient with improved result (%)**
Agreed to follow EXFOME	54	31	0 (0%)	25 (80.6%)	6 (19.4%)	49	33	3 (9.1%)	22 (66.7%)	8 (24.2%)
Participated >80%	37 (68.5%)	25 (71.4%)	0 (0%)	21 (84.0%)	4 (16%)	24 (44.4%)	21 (87.5%)	3 (14.3%)	14 (66.7%)	4 (19.0%)
Participated <80%	17 (31.5%)	6 (35.3%)	0 (0%)	4 (66.7%)	2 (33.3%)	25 (46.0%)	12 (48.0%)	0 (0%)	8 (66.7%)	4 (33.3%)
Not agreed to follow EXFOME	No assessment being done					29	20 (69%%)	10 (50%)	9 (45%)	1 (5%)

As for body fat percentage, for those who agreed to follow EXFOME (n=124), 62 % managed to reduce the body fat after 3 months and 28.8% after 6 months. No different between patients who participated > 80% of schedules and those who participated < 80%. No body fat test being done for those did not follow EXFOME. For fitness, for those who agreed to follow EXFOME, 62.5% improved after 3 months and 57.9% after 6 months. No different between patients who participated > 80% of schedules and those who participated < 80%. No body fat test being done for those did not follow EXFOME (Table 7).

Table 7. Outcomes body fat patients of EXFOME

No of registered patients		**No of patient came for reassessment after 3 months**				**No of patient came for reassessment after 6 months**				
Status	**No**	**No of patient came for analysis (%)**	**No of patient with normal result (%)**	**No of patient with static result (%)**	**No of patient with improved result (%)**	**No**	**No of patient came for analysis (%)**	**No of patient with normal result (%)**	**No of patient with static result (%)**	**No of patient with improved result (%)**
Agreed to follow EXFOME	124	39	15 (38.4%)	18 (62%)	6 (15.6%)	104	51 (49.0%)	23 (22.1%)	30 (28.8%)	1 (1.0%)
Participated >80%	66 (63.5%)	32 (49.2%)	12 (37.5%)	15 (46.9%)	5 (15.6%)	52 (50.0%)	45 (86.5%)	20 (44.4%)	25 (55.6%)	0 (0%)
Participated <80%	38 (36.5%)	7 (18.4%)	3 (42.9%)	3 (42.9%)	1 (14.2%)	51 (50%)	6 (11.8%)	3 (33.3%)	5 (55.5%)	1 (11.1%)
Not agreed to follow EXFOME	No assessment being done for those who disagreed									

For fitness, for those who agreed to follow EXFOME (n=124), 62.5% improved after 3 months and 57.9% after 6 months. No different between patients who participated > 80% of schedules and those who participated < 80%. No body fat test being done for those did **not follow EXFOME** (Table 8).

Table 8. Outcomes fitness patients of EXFOME

No of registered patients		**No of patient came for reassessment after 3 months**			**No of patient came for reassessment after 6 months**			
Status	**No**	**No of patient came for analysis (%)**	**No of patient with static result (%)**	**No of patient with improved result (%)**	**No**	**No of patient came for analysis (%)**	**No of patient with static result (%)**	**No of patient with improved result (%)**
Agreed to follow EXFOME	124	56 (45.2%)	21 (37.5%)	35 (62.5%)	103	57 (55.3%)	24 (42.1%)	33 (57.9%)
Participated >80%	66 (63.5%)	32 (49.2%)	14 (33.3%)	15 (46.9%)	47 (45.6%)	40 (85%)	17 (42.5%)	23 (57.5%)
Participated <80%	50 (40.3%)	14 (28%)	7 (50%)	7 (50%)	56 (54.4%)	17 (30.0%)	7 (41.2%)	10 (58.8%)
Not agreed to follow EXFOME	No assessment being done for those who disagreed							

4. Discussion

The rates of non-communicable diseases (NCD) in Malaysia are now at an alarming stage, based on the National Health and Morbidity Survey (NHMS) since 1996 to 2015, the percentage of adults suffering from NCD risk factors keep risen substantially will further add to the burden of diseases of NCDs in Malaysia (Ministry of Health, 2016). NCDs account for an estimated 74% of deaths in Malaysia (World Health Organization, 2018). Burden of Disease Study for Malaysia reported hypertension, smoking, diabetes, high cholesterol and high BMI are the biggest contributors to both disability and deaths (Institute for Public Health, 2017). Non-communicable diseases (NCDs) continue to increase, now causing the majority of mortality and morbidity which are 17.5% of the adult population has diabetes, 30.3% are hypertensive, 47.7% have high cholesterol, 33.4% are overweight and 30.6% are obese based on National Health and Morbidity Survey (NHMS) 2015 (Institute for Public Health, 2015). World Health Organization (WHO) report revealed non-communicable diseases (NCDs) contribute most to life expectancy differences, especially in high-income countries (World Health Organization, 2019). WHO reported a 85% of premature deaths from NCDs occur in the developing countries. A total of 28 million people in developing countries die from NCDs, nearly 16 million of them prematurely died before they reach the age of 70. Since 2000, the number of NCD deaths has increased worldwide in every region, especially majority deaths, most in WHO's South-East Asia and Western Pacific Regions (World Health Organization, 2014). Cardiovascular diseases account for most NCD deaths annually, followed by cancers, respiratory diseases and diabetes. Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from an NCD (World Health Organization, 2018).

4.1 Hypertension

NHMS 2011 reported a positive association with PA level with systolic blood pressure (SBP) (Teh et al., 2015; IPH, 2011). A Korean cohort study reported that physical activity giving the lowest risk of hypertension besides other NCDs problem (Kim, Sharp, Hwang, & Jee, 2019). A meta-analysis study reported effects of aerobic exercise training among elderly adults showed statistically significant and represented a decreased of 5.3 mmHg in systolic BP and 3.7 mmHg in diastolic BP (Huang et al., 2013). Most of current guidelines recommend increasing physical activity as a means to prevent hypertension (Brook et al., 2013; Whelton et al., 2002).

4.2 Pre-Diabetes Mellitus

A recent randomised-controlled intervention trial on Malaysian government workers reported a significant reduction in blood glucose compare to the control group suggested that physical activity intervention is an effective strategy for reducing the prevalence of metabolic syndrome such as diabetes mellitus (Phing, Saad, Nisak, & Nasir, 2017). World Health Organization and Malaysian Dietary Guidelines recommend that Malaysian need to engage in at least 150 minutes per week of moderate physical activity to prevent non-communicable diseases such as diabetes mellitus (Poh et al., 2010; WHO & Consultation, 2003).

4.3 Obesity

World Health Organization reported that Malaysia is the most obese country in Southeast Asia, with about one in two Malaysians being overweight or obese (Ng et al., 2014). A recent National survey (Institute for Public Health, 2015) reported that estimated 1 in 3 overweight/ obese populations (17.7%), majority (69/0%) had at least a moderate level of physical activity (total physical activity ≥10 MET-hours/ week) (Chan et al., 2017). Programmes designed to reduce overweight/ obesity rates should encourage the practice of moderate-to vigorous-intensity physical activity. Quite a number of studies have been conducted to investigate the association between the influence of physical activity on weight and obesity impact. A clinical trial by Shaw et al. (2006) conducted to find evidence that exercise as a means of achieving weight loss for people with overweight or obesity problem. Shaw et al. (2006) supported the use of exercise as a weight loss intervention, particularly when combined with dietary change (Shaw, Gennat, O'Rourke, & Del Mar, 2006). A recent systematic review and meta-analysis to evaluate the efficacy of aerobic exercise programmes in overweight and obese populations reported that moderate-intensity aerobic exercise programmes of six to twelve months induce a modest reduction in weight and waist circumference in overweight and obese populations (Abidin, Zaibidi, & Zulkepli, 2014).

Although NCDs are often associated with a more prosperous lifestyle, the probability of dying prematurely from cardiovascular disease (CVD), cancer, diabetes and chronic respiratory disease is highest in low- and lower-middle-income countries (World Health Organization, 2019).

5. Conclusion

This programme suggests that regular exercise has been shown to improve the status of disease-related lifestyle. Further evidence is needed to establish the exercise tailors for specific condition. Exercise is a powerful stimulus

that can reduce and prevent the occurrence of cardiovascular and metabolic dysfunction. Therefore, exercise is able can improve the quality of life. Regular exercise is beneficial for health. People of all ages should be encouraged to incorporate regular exercise into their daily lifestyle.

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Competing Interest Statement

The authors declare that there are no competing or potential conflicts of interest.

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