

Student No./Name: Jemma Harding
Module: Introductory Exercise Physiology
Module Code: SHSS4072
Hand-In: by 10th January 2020

Personal Evaluation – to support your academic progress please complete the section below **BEFORE** submitting your work

What do you consider to be the best aspects of this work?									
Which aspects do you consider could have been improved in this piece of work?		Descriptions of methods							
What have you found most satisfying whilst undertaking this submission?		Aspects of health -related fitness							
ASSESSMENT CRITERIA	Learning outcome	GRADE							
		Poor 0 - 25%	Unsatisfactory 26 - 39%	Satisfactory 40 - 49%	Good 50 - 59%	Very Good 60 - 69%	Excellent 70 - 85%	Exceptional 86 - 100%	
Introduction (5%)	1, 2								
Description of the methods of assessment (30%)	1, 2								
Summary of health-related fitness profile (30%)	1, 2								
Discussion of the health-related fitness of the subject (30%)	1, 2								
Academic writing and referencing (5%)	1, 2								

It is expected that students will present work that is proof read and follows the School **Reference Guide** and **Assessment Checklist**. Therefore a range of 0 – 10 marks will be deducted for non-completion of any of the points on the **checklist below**.

TUTOR COMMENTS:

Submission date: 10/01/2020	Return date: (within 4 weeks of submission date)	Tutor: Dr Simon Williams	Mark:
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SHSS4072
Introductory Exercise Physiology
Assessment 1

1.0 Introduction

Health is defined as a good state of complete physical, mental and social well-being (Health.org.uk,2020). Health related fitness is a number of components that involve exercise activities to maintain and improve physical health. These components include cardiovascular endurance, muscular endurance, muscle strength, flexibility and body composition (Yourdictionary.com,2020). The components combined increase the quality of life by reducing the risk of developing chronic diseases such as cardiovascular disease, diabetes, hypertension and obesity leading to a longer sustainable life.

2.0 Aim

As physical activity appears to provide the most diverse health benefits (W L Haskell, 2020). The objective of this report is to analyse and review a number of tests that have been carried out on a subject in the lab to define the relation of health-related fitness and how each component affects another and how the subject could improve depending on their results.

2.1 Methods

Some of these assessments include body composition. This is a method to describe the percentage of fat, bone, water, minerals and muscle in the human body. It also describes weight more accurately than BMI. It accurately analysis' changes in fat mass, muscle mass and percentage body fat which helps pin- point what needs to be targeted if changes need to happen in the body to create better health (InBody USA,2020).

2.1.2 BMI stands for body mass index and is calculated by weight (in kilograms) divided by height (in metres), it is used to categorize weight in epidemiology which include "underweight" with a BMI of 18.5 and under, "normal or healthy" between 18.5 and 24.9, "overweight" 25.0 to 29.9 and "obese" 30.0 and over (Lean, 2017). Height was measured with a seca 213 portable stadiometer and weight was measured with a seca digital scales.

2.1.3 Measuring the waist- line is another way of assessing weight. Carrying mass amounts of abdominal fat can have a major effect on the vital organs, increasing the risk of high cholesterol, high blood pressure diabetes and coronary artery disease. To measure Waist size the subject's abdomen had to be clear, they were stance with feet should-width apart, the tape measure was then placed around the abdomen just above the hip bone, ensuring the tape is not too tight to compress the skin. The subject then took two to three breaths to get an accurate and final measurement at the end of a normal expiration.

2.1.4 Skinfolds is a useful measurement used to measure body fat content. Measurements were taken by a body care Harpenden skinfold calliper at the specific four sites; subscapular, supra-iliac, mid biceps and mid triceps. Three measurements are taken from each site to calculate a mean and the added together to calculate the fat mass using the Durmin and Womersley skin fold regression equation (1974). The mid -point of the biceps and triceps is found by using a tape measure and measuring from the shoulder bone down the elbow,

dividing the number in half and marking the mid- point. The skinfold is taken lengthways along the arm, skin is taken firmly between the thumb and forefinger, avoiding underlying muscle. The callipers are applied about 1cm below the fingers holding the skin and the fold is held throughout the measurement.

2.2 Next the subject took part in a muscle strength and endurance assessment, both are important components of health related and performance related fitness. Muscle strength is the maximum force that is generated through the muscles when they are contracting. Endurance is the physical effort that is performed during a task, this can be split into two categories, relative endurance and absolute endurance.

2.2.1 One repetition max was the first to be performed; this was completed on the technogym leg press. First the subject warmed up by stretching and lifting with a light weight, the subject then lifts below the max repetition estimated, rests for 2 minutes and then increases the weight by 5kg and then repeated until failure. To record the result the final weight is divided by the weight of the subject to get their one repetition max. This test is an example of relative endurance.

2.2.2 The standardised push up test was completed as an example of absolute endurance. The subject performed repetitions until exhaustion.

2.3 To measure flexibility of the subject the sit and reach test was performed, this assesses the flexibility of the lower back and hamstrings. The subject placed their feet against the sit-and-reach box with legs against the floor, reached forward and recorded the value at the fingertips. The test was repeated three times and the maximum value was recorded.

2.4 The subjects blood pressure was measured with a bosco medicus machine. Blood pressure is the pressure of blood in your arteries to pump the blood around your body. It is important to have stable blood pressure. Hypertension which is known as high blood pressure can be caused lack of exercise and being overweight, this is where health related fitness is important.

2.5 The Astrand cycle ergometer test was performed on a peak bike by monark to measure cardio-vascular endurance. The subject wore a polar Bluetooth smart heart rate monitor and pedalled at a semi-constant workload for the duration of 6 minutes. The heart rate was measured on a stop- watch every minute and then the VO2 max was determined by a published table of estimations. VO2 max is the maximal oxygen uptake which is the best measure of functional limit of the cardio -vascular system and is commonly interpreted as an index to cardiorespiratory fitness (S3.amazonaws.com, 2020).

2.6 Open-circuit spirometry was used in the assessment of resting metabolic rate, this method provides a simple way of measuring oxygen consumption. First the subjects resting energy expenditure was estimated using the Harris-Benedict method, the barometric pressure and room temperature was recorded. The subject was in a lying resting position while breathing into a Douglas bag through a mouth- piece. The O2 and CO2 concentration percentages in the Douglas bag was analysed using the Servomex gas analyser then the Douglas bag was emptied through the Harvard dry gas meter to measure the volume of gas expired.

3.0 Assessments of physical activity and sedentary behaviour were carried out on the subject. Sedentary behaviours are things that require little energy expenditure for example,

working in an office, watching television, travelling in car, reading, anything that involves a person sitting or lying down. The subject completed two questionnaires, the international Physical Activity Questionnaire which is used world- wide to compare and gather data for health -related fitness. The second questionnaire completed was the SIT-Q-7d by the MRC Epidemiology unit. Both questionnaires have the same objective and ask similar questions such as, “During the last 7 days, on how many days did you travel in a motor vehicle?”

4.0 Results

Variables	Data	Normative value or criterion	Classification
Sex	Female		
Age	25 years		
Weight, kg	60.4	56.0-75.4	Average
Height, cm	174		
BMI	19.9	18.5-24.9	Average
Blood pressure (systolic/diastolic), mmHg	116/60		Normal
Resting heart rate, bpm	74		
Biceps skinfold, mm	8		
Triceps skinfold, mm	15		
Subscapular skinfold, mm	9		
Suprailiac skinfold, mm	8		
Fat mass, kg	12.4	12.8-23.5	Under
Fat-free mass, kg	48.0		
Muscle strength	3.1 1RM		
Flexibility	16		

5.0 Conclusion

After analysing the results the subject is quite an active candidate with the majority of results being in the recommended ranges for their category. Making the subject fit and healthy, reducing any risks of chronic diseases developing. Their body composition is very good with a BMI of 19.9 on the lower scale but still in the recommended value. The cardiorespiratory fitness was assessed by the blood pressure and resting heart rate with are good, again blood pressure on the lower end of the scale but still having a good rate of Vo2 max, showing good cardiovascular endurance, therefore should maintain their fitness levels. The subject had very good muscle strength and a very good low -fat mass applying them in the thin and muscular physique rating. Muscle strength is a great factor for bone development and making bones stronger in older age, reducing the risk of osteoporosis. They also had an average sedentary rate and advised if possible to walk to activities instead of using the car to increase their result. However the subjects flexibility result was quite low for their range which may be linked to their muscle strength and lack of stretching. Overall the subject had a good result

with all health- related fitness components but was advised to participate in more stretching activities especially before and after exercise to increase their flexibility result.

6.0 References

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WORD COUNT: 1427

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Which aspects do you consider could have been improved in this piece of work?	Methods								
What have you found most satisfying whilst undertaking this submission?	Benefits of flexibility								
ASSESSMENT CRITERIA	Learning outcome	GRADE							
		Poor 0 - 25%	Unsatisfactory 26 - 39%	Satisfactory 40 – 49%	Good 50 – 59%	Very Good 60 – 69%	Excellent 70 – 85%	Exceptional 86 – 100%	
Overview of health-related fitness profile of subject (5%)	1, 2								
Aims and objectives of the physical activity programme (10%)	1, 2								
Description of responses to exercise (20%)	1, 2								
Physical activity programme (60%)	1, 2								
Academic writing and referencing (5%)	1, 2								
It is expected that students will present work that is proof read and follows the School Reference Guide and Assessment Checklist . Therefore a range of 0 – 10 marks will be deducted for non-completion of any of the points on the checklist below .									
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SHSS4072: Assessment 2

Introduction

A health-related fitness profile was carried out on a 25 year old female with a height of 174cm and body weight of 60.2 kg. The subject had a very good body composition result being a healthy weight with a low BMI of 19.9. A high rate of cardiovascular endurance as keeping a steady heart rate and blood pressure while resting and active. A good physical activity rate as met the amount recommended by the UK Government. Good muscle strength and endurance but a low flexibility rate.

Aim

The objective is to design a mobility and stretch programme for the subject to increase flexibility while still maintaining good cardiorespiratory fitness and slowly increasing muscle mass and strength. To see improvement the subject would be expected to complete the programme on a regular basis of 2-3 times a week.

Method

Flexibility is how well a group of joints have the ability to move in a range of motion effectively (verywellfit, 2020). Flexibility gives a wide range of health and physical benefits such as reducing the risk of injuries during physical activity as stretching before a work-out is often part of a warm-up to increase body temperature and prepare the body for the movements. Stretching reduces pain as your muscles are less tense which also reduces muscle cramps from occurring and improves blood flow and circulation. Posture and balance can be improved, as poor posture can develop through long period of time being seated causing the muscle to become tense and contracted which makes them less strong and supple (Matthews, 2020). Stretching can also improve strength and physical performance (healthline, 2020).

There are a number of ways flexibility can be improved by attending classes such as pilates and yoga. Yoga also uses and improves mental capabilities as there is a balance between the body and the brain. It also increases toning of the muscles and improves lung capacity (Fitness.com, 2020) which maintains a good fitness level. The subject is advised to include a yoga class into their work out regime.

However, as the subject has a busy life-style it is recommended that a few stretches must be carried out before and after the subject completes their daily workout or first thing in the morning to relax muscles to increase flexibility levels as a few minutes each day can make a difference (Verywellfit, 2020). Another quick and easy way recommended to increase muscle motion is by self-myofascial realising using a foam roller after a workouts. Apply pressure to trigger points using a foam roller can be like having a sports massage, boosting blood flow in muscles and helps elasticity recover quickly for quicker recovery and better performance (healthline, 2020)

There are three main types of stretching; static stretching where you hold the position for 150 60 seconds on the target muscle. Dynamic stretching which involves moving in and out of a position to lengthen the target muscle and lastly active isolate stretching, moving the joint through a complete range of motion. It is important to use correct technique while stretching

to prevent any injury as incorrect stretching may be harmful to muscles (Shcs.ucdavis.edu, 2020).

First the downward- facing dog stretch which works the hamstring, deltoids, glutes, triceps and quadriceps. The subject should come onto all fours with their hands under their wrists and their knees under their hips. Press into hands and tuck toes under and lift knees, keeping heels lifted. then extend through the spine and lift sitting bones up toward the ceiling then bend knees slightly and press into hands. Bring the head in line with upper arms or relax neck and tuck chin into chest. Focus on stretching and strengthening the body. Hold this pose for up to a minute at a time (healthline, 2020).

The sun salutation position works the spinal extensors, trapezius, abdominals, quadriceps and hamstrings. First hands should be brought together in prayer pose at the front of your chest then inhale as you lift up your arms and bend back slightly. Exhale and hinge at the hips. Fold forward until your hands are touching the ground. Inhale to bring right leg back to a low lunge, Inhale to bring your left foot back into Plank, exhale to lower knees, chest, and chin to the floor, Inhale as lifting the chest up into Cobra. Exhale to press into Downward-Facing Dog then Inhale to bring right leg forward and exhale to step the left foot forward into a standing forward bend. Inhale to lift up arms and bend back slightly and finally exhale and return to first position (healthline, 2020).

The triangle pose works the latissimus dorsi, internal oblique, hamstrings and quadriceps. Feet should be brought apart so they're wider than the hips with the right toes turned to the right and the left toes slightly turned to the right, then lift arms so they're parallel to the floor with palms facing down. Hinge at the right hip to extend forward, reaching out through the right fingertips. Then, lower the right hand to your leg, a block, or the floor. Extend the left arm up toward the ceiling with palm of the hand facing away from the body, look into that direction the repeat on the opposite side (healthline, 2020).

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