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1. MENTAL HEALTH DEFINITION AND GLOBAL SITUATION

According to World Health Organization - WHO (2012a), the definition of mental health is complex and is defined as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community”. Mental or psychological wellbeing is influenced by individual characteristics or attributes, socioeconomic circumstances and environmental factors, being important to refer that these determinants interact with each other in a dynamic way and they can work in favor or against individual's mental health state (WHO, 2012b).

Globally, 450 million people have mental or behavioural disorders, it is estimated that one in five persons will suffer from a mental illness in a given year and, over a lifetime, one in two persons will experience mental illness (World Federation for Mental Health (WFMH), 2011). As stated by WHO (2012a), mental, neurological and substance abuse represent 13% of the global burden disease and the most important causes of disability. According to this, mental disorders have become the leading cause of incapacity, morbidity and they are in the top ten causes of premature death more than any other group of illnesses, namely cancer and heart disease, especially in developed countries (WFMH, 2011; WHO, 2012a). Depression is the most common mental disorder representing 4.3% of the global burden disease (WHO, 2012a), estimated to affect 350 million people worldwide (Marcus, Yasamy, Ommeren, Chisholm & Saxena, 2012). By the year of 2030, is estimated that depression will become the world leading cause of Disability Adjusted Life Years (DALYs) and the second leading contributor to the global burden of disease (WHO, 2011; Marcus et al., 2012).

In Europe, the estimated number of individuals affected with mental disorders is substantially increasing (82.7 million in the 2005 vs. 164.7 million in 2011) (Wittchen et al., 2011) leading to approximately 20% (excluding dementia) of individuals with disability (Mathers, 2006 cited by Stuckler, Basu & McDaid, 2011). Hereafter in 2011, it was estimated that in Europe, 69.1 million citizens suffer from anxiety disorders, 30.3 million from unipolar depression, 29.1 million from insomnia, 20.4 million from somatoform disorders (excluding headache symptoms), 14.6 from alcohol, 1 million from opiate and 1.4 from cannabis dependence, 6.3 million from dementia (Wittchen et al., 2011).

Associated with these disorders, are economic consequences not only for national health care costs but also for workplace operations, lost productivity, family budgets and individual incomes (WFMH, 2011). When the 2008/2009 economic crisis started, it has raised fears of adverse impacts on mental health in population (Catalano, 2009; WHO 2009 cited by Stuckler et al., 2011). Currently, the scenario of global financial crisis is getting harmful (WHO, 2012a). A substantial body of research

in psychology and public health has, unsurprisingly, revealed that people who experience unemployment, impoverishment, and family disruptions have a significantly greater risk of depression, alcohol abuse, and suicide than their unaffected counterparts (Clark, 1994; Murphy, 1999; Dee, 2001; McKee-Ryan, 2005; Dorling, 2009 cited by cited by Stuckler et al., 2011). For instance, depression accounts over one third (€120 billion) and affective disorders (depression and bipolar disorder together) represent nearly half of all costs (Vieth, 2009).

2. EUROPE SITUATION

Due to these stated facts, mental health is a public health problem that the majority of European countries have recognized as a priority area in recent years. In response to this situation, The Declaration and the Mental Health Action Plan for Europe, approved in 2005, defined the scope of mental health policy and practice: promoting mental well-being; tackling stigma, discrimination and social exclusion; preventing mental health problems; providing care for people with mental health problems and providing comprehensive and effective services and interventions, offering service users and careers involvement and choice; rehabilitating and including into society the people who have experienced serious mental health problems (WHO Europe, 2008a).

In 2008, has been created a European Pact for Mental Health and Well-being who recognizes that primary responsibility for action in this area rests with Member States and aims to inform, promote best practice and encourage actions by members and stakeholders and help address common challenges and tackle health inequalities. This pact focus on five priority areas such as prevention of depression and suicide; mental health in youth and education; mental health in workplace settings; mental health of older people; and combating stigma and social exclusion (WHO Europe, 2008b).

Activity in policy and legislation has flourished, since 2005, 57% of countries have adopted new mental health policies and 48% have introduced new legislation. Only four countries do not yet have a strategy and only five of the countries still have legislation that is more than 10 years old (WHO Europe, 2008a).

3. PORTUGAL SITUATION

Although short, existing evidence suggest that the prevalence of mental health problems in Portugal is not quite differently than that encountered in European countries of similar characteristics (Almeida, 2009). Currently, is in action the Portuguese Program on Mental Health (PPMH) 2007-2016, aimed in promoting “decentralization of mental health services, to enable the provision of care

closer to the people and to facilitate a greater participation of communities, users and their families” (PPMH, 2008), that is possible by the creation of psychosocial rehabilitative structures, including home support teams, socio-occupational units and residential units (PPMH, 2012).

Since the last year, this plan as already assured some progress, namely the reduction by 40% in the number of patients institutionalized in psychiatric hospitals, the most part of the healthcare services in mental health has been transferred to the local services integrated in the national health system, the launching of the bases in continuing care in mental health and the successful creation of the firsts residential programs and services (PPMH, 2012).

The definitive evaluation of the PPMH will be concluded in December 2017, but there are constant evaluations to the implementation of this plan, which are crucial to its success, allowing the identification and correction of eventual errors and deviations from the schedule (PPMH, 2012).

4. RELATIONSHIP BETWEEN MENTAL DISORDERS AND OBESITY

Around two-thirds of people with a mental disorder have one or more comorbid health conditions (Jones, Macias, Barreira et al. 2004; Dickerson, Brown, Daumit et al. 2006 cited by Knol, Pritchett & Dunkin, 2010). Mental disorders are responsible and simultaneously affected by various chronic diseases like cancer, cardiovascular disease and diabetes, raising the probability of disability and premature mortality. In this context, literature mentions that people suffering from depression are more vulnerable to develop myocardial infarction and diabetes, and in the other hand, myocardial infarction and diabetes increases the chance of depression (WHO, 2012a). Several risk factors namely high blood pressure, high plasma cholesterol, obesity, smoking, self-neglect tendencies, unhealthy lifestyles, medication side-effects and low socio-economic status lead to the burden of these non-communicable diseases (Bonfioli, Berti, Goss, Muraro & Burti, 2012). Obesity, as one of the risk factors, deserves a special attention since according to evidence contributes to major non-communicable diseases (Verhaeghe, Maeseneer, Maes, Heeringen & Annemans, 2011).

As shown by the most recent systematic reviews, there’s a bi-directional association between obesity and common mental health disorders that turns these an important public health issue as this relationship is considered complex and multi-factorial (National Obesity Observatory (NOO), 2011). The prevalence of obesity reaches higher numbers in people with severe mental disorders than in the general population (Filik, Sipos, Kehoe, Burns et al., 2006; Esop, Young & Taylor, 2004 cited by Verhaeghe et al., 2011), in which over 42% of adults with a serious mental illness are obese comparing with those without severe mental illness (27%) (De Hert et al., 2011; Allison et al., 1999 cited by Bartels & Desilets, 2012). Evidence concluded that obese persons have

a 55% increased risk of developing depression overtime while depressed persons have a 58% increased risk of becoming obese (Luppino et al., 2010 cited by NOO, 2011).

4.1. MODERATING AND MEDIATING FACTORS

According to the NOO (2011), there are moderating and mediating factors specific to adults that make these a multi-factorial problem. The **moderating** factors include gender, where some studies demonstrate a positive association for women and negative for men, this can be explained by the fact of them being more concerned about obesity, specially more stigma in relation to this and a bigger pressure to be slim. Research also found that people with lower socioeconomic status and lower level of education are more likely to experience depression and obesity that has a negative impact on their health-related quality of life. In what concerns to age, younger woman and older people have an increased risk of both obesity and mental health disorders. These risk factors affect the direction and/or strength of the association between these two conditions.

In what concerns to **mediating** factors, there are a wide range of behavioural, biological, in social, psychological factors that clarify this relationship (NOO, 2011). When talking about the **behavioural changes**, is important to mention the adoption of sedentary lifestyles, namely insufficient physical activity and poor diets (Luppino et al., 2010 cited by NOO, 2011); individuals usually use food as a coping strategy to regulate their emotion and that potentially causes overweight or obesity in those experiencing negative mood; excessive eating occurs in response to this mood, which became a cycle of weight gain and further negative mood; depression predicts reluctance to weight-loss programs, preventing people from engaging in the diet planning and physical activity necessary to lose weight (Markowitz, Friedman & Arent, 2008 cited by NOO, 2011). In a **biological level**, changes in weight are allied to anti-psychotic medications in the treatment of severe mental disorder (NOO, 2011); the type of antipsychotic medication influences the degree of weight gained (Parsons, Allison, Loebel et al., 2009 cited by Verhaeghe et al., 2011; Bonfioli et al., 2012). Regarding **psychological changes**, in depression, individuals may have low expectations of their capacity to lose weight, which may affect any weight loss attempts (Markowitz et al., 2008 cited by NOO, 2011). At least, these changes can be due to **social factors**, particularly in depressed individuals that may have lack of support from family and friends, which difficult their adherence to a weight loss program (Markowitz et al., 2008 cited by NOO, 2011).

5. PROMOTION OF MENTAL HEALTH AND PREVENTION OF MENTAL DISORDERS

Regarding to the consequences underlying mental disorders and since it is a health public problem, promoting mental well-being and preventing mental health disorders can be an effective

strategy to decrease the burden of mental disorders (Jané-Llopis, Barry, Patel & Hosman, 2005; WHO, 2004 cited by Jané-Llopis & Anderson, 2006; WHO, 2012a,b). With this approach, is essential to incorporate a wide public health framework that understands the social, economic, cultural and political forces at work in a particular situation, and embraces other sectors, particularly education, housing, employment and social welfare/protection (WHO, 2012b).

Therefore, is essential putting together a co-ordinated team-based individualized with other health services and with generic, social and community services, to promote patients recovery, good quality of life and community re-integration (Mental Health Commission (MHC), 2010). A multidisciplinary team is as important to high quality care as other aspects of clinical governance like risk management and clinical effectiveness (Tait, 2004 cited by MHC, 2010), being cost-effective (Knapp, Beecham, Koutsogeorgopoulou, Hallam et al., 1994 cited MHC, 2010). As stated by the Australian Physiotherapy Association (APA) (2011), in the mental health care context, **physiotherapy** plays an important role on the non-pharmacological management of pain, in which physiotherapists are experts in the prescription of individualized exercise programs that allow improvements in mood, promote wellbeing and attend to co-morbidities associated with mental health diagnoses (Craft & Perna, 2004; Babyak, Blumenthal, Herman, et al., 2000 cited by APA, 2011). Moreover, Physiotherapists have expertise in motivating patients and promoting self-management in what concerns to mental and physical health, and are experts in addressing damaged body awareness and diminishing dissociation from aspects such as thoughts, feelings, memories or sense of identity that is in correlation with poor mental health (Gyllensten, Ekdahl & Hansson, 2009; Hedlund & Gyllensten, 2010; Gyllensten, Gard, Hansson & Ekdahl, 2000 cited by APA, 2011). They can also develop and deliver individually-tailored lifestyle and weight management advice and programs. These interventions address physical issues of people with mental health diagnoses which hinder social participation and recovery, like minimizing or counteracting the side-effects of some psychotropic medications (Gracious & Meyer, 2005; Misra, Papakostas & Klibanski, 2004; Bolton, Targownik, Leung, et al., 2011 cited by APA, 2011).

6. PHYSICAL ACTIVITY IN MENTAL HEALTH

Lifestyle health promotion programs of longer duration (3 or more months), that subsist of a manualized and a combined education with an activity-based approach, and incorporate both nutrition and physical exercise, are expected to be the most effective in dropping weight, improving physical fitness and improving psychological symptoms and general health (Bartels & Desilets, 2012).

Relating to physical activity, there is no single mechanism established yet adequately explaining the varied range of mental health effects possible brought by physical activity participation. As stated by Gorczynski and Faulkner (2010) in a Cochrane Systematic Review, there are plausible mechanisms for psychological change through physical activity and exercise that are based in one of three wide perspectives, namely biochemical changes characterized by an increase of neurotransmitters levels just as endorphins or serotonin; physiological changes like improvements in cardiovascular and muscle function, and in weight management, thermogenesis; finally psychological changes such as social support, autonomy, perceptions of competence, enhanced body image, self-efficacy and distraction (Mutrie, 2003 cited by Gorczynski & Faulkner, 2010; Wolff et al., 2011).

6.1. HEALTH FACTORS AFFECTED BY EXERCISE

In comparison with physical effects, the evidence on the mental health benefits of physical activity is scarce (Taylor & Faulkner, 2008 cited by C3 Collaborating for Health, 2011). Nonetheless, the body of evidence is increasing fast, as several studies and clinical trials are showing specific benefits counting: improved mood, reducing symptoms of stress, anger and depression (Taylor, Sallis & Needle, 1985 cited by C3 Collaborating for Health), alleviating anxiety (Taylor et al., 1985 cited by C3 Collaborating for Health, 2011) and slowing cognitive decline.

- **Emotion and mood**

There's a consistent connection between the performance of physical activity/exercise, and positive mood and affect (Bingham, 2009). Meta-analytic studies demonstrate that aerobic exercise directs to a small to moderate increase in vigor, tension, depression, fatigue, confusion and a small decrease in anger (Bingham, 2009). Likewise, experimental trials sustain the positive effect promoted by exercise of moderate intensity on psychological well-being (Biddle, in Biddle, Fox, & Boutcher, 2000 cited by Bingham, 2009). An increase of positive mood and a consequently decrease in negative mood can be enhanced by the practice of low, moderate or high intensity aerobic physical activity between 25 to 60 minutes (Matsalla & Warners, 2012).

- **Quality of life (QoL)**

There is a considerable increase in descriptive, prospective, and clinical trials, existing several contemporary reviews of this literature that explain the relationship between physical activity and QoL. (Rejeski & Mihalko, 2001; McAuley & Elavsky, 2006 cited by McAuley & Morris, 2007). In people with mental disorders, higher levels of physical activity were associated with greater health-related quality of life (Bingham, 2009). Rejeski and Mihalko (2001 cited by McAuley & Morris, 2007)

conclude that physical activity and QoL relationship is positive and is consistent across subgroups, activity settings and activity mode, despite the range of instruments being used to evaluate the QoL.

In a systematic review by Bartels & Desilets (2012) including 10 studies measuring QoL, 5 of them reported significant improvements using a combined education and activity intervention design, including both nutrition and exercise.

- **Self-esteem**

Aerobic and resistance physical activity seems to have a higher effect on self-esteem than other kinds of physical activity (Fox, in Biddle, Fox, & Boutcher, 2000 cited by Bingham, 2009). Studies show that there is a stronger effect in self-esteem increases for those who have lower self-esteem (Kravitz, 2007 cited by Matsalla & Warners, 2012). It promotes feelings of self-efficacy, self-determination, personal control and body image (Bingham, 2009).

All age groups have benefits on self-perception, but evidence shows that the strongest relation is in children and middle-aged adults (Bingham, 2009). It is possible that physical activity can have negative effects, essentially in relation to bad activity experiences such as embarrassment, loss of control and sense of failure (Whitelaw, Swift, Goodwin & Clark, 2008).

- **Social activity/sense of mastery**

As indicated above, practicing physical activity/exercise has a positive effect on mental health outcomes for adults and children. One of these outcomes is the emotional benefits and feelings of wellbeing, and they come up with an increased social interaction as the practice of solitary exercise might not get better from depression. Therefore, is essential having access to public space so that exercise can be adapted to suit people's choices and needs. Also, is fundamental the creation of welcoming environments so that individuals can enjoy and benefit from adhering to physical activity. In addition, greater intersectoral cooperation between health, and recreational as well leisure sectors is recommended (Public Health Group, 2006).

In what concerns to sense mastery, exercise is predominantly effective for those with low self-esteem and has the maximum potential once presented in a style that will support mastery and self-development (Fox, 2000 cited by Whitelaw, Swift, Goodwin & Clark, 2008). Positive effects are allied to increases in self-worth and personal control that arrive with the mastering of new physical activity tasks (Whitelaw et al., 2008).

- **Sleep**

Individuals who practice physical exercise tend to fall asleep faster, sleep, longer and deeper, also have lower risk of disturbed sleep than those who are inactive, but the causal relations are less well established for the last one (Bingham, 2009). Those with disturbed sleep patterns may have improvements with regular exercise training, although no clear consensus in this subject was established (Youngstedt & Freelove-Charton, in Faulkner & Taylor, 2005 cited by Bingham, 2009).

Dream content seems to reflect the mood state (Barrett et al., 1992 cited by Palagini & Rosenlicht, 2011), hence reductions in the quality of dreams or the presence of nightmares may affect and predict suicidal tendencies especially if they are repetitive and persistent (Agargun & Cartwright, 2003 cited by Palagini & Rosenlicht, 2011).

- **Cognitive functioning**

A large amount of cross-sectional studies show that older adults who are on top form present better cognitive performance when compared with those who are less healthy (Bingham, 2009). There is a task-dependence between fitness and cognitive function, in which tasks that are fast and require attention, like reaction-time tasks, have the most pronounced effects (Bingham, 2009). Meta-analysis indicates a short but statistically significant improvement in cognitive functioning along with older adults who enhance their aerobic fitness (Boutcher, 2000 cited by Bingham, 2009). The engagement in moderate intensity physical activity between 30 to 40 minutes per day, at least 3 or 4 days per week will delay cognitive decline by 10 to 15 years (Matsalla & Warners, 2012). According to Ratey and Hagerman (2008 cited by Matsalla & Warners, 2012), aerobic physical activities reveal more benefits; however, resistance physical activities may also be beneficial.

- **Weight**

A systematic review by Bartels and Desilets (2012) including 24 studies shows that intervention participants in 22 studies experienced an overall mean weight loss and/or decrease in Body Mass Index (BMI). Total body weight loss percentage was stated in 19 of the research trials, with a median of 2.6%. All of the controlled studies reported differences in weight and/or BMI between the intervention and control groups, but those differences were statistically significant in 10 of the controlled studies, 5% or greater weight loss for overweight or obese individuals is considered clinically significant.

In summary, further developments will be needed in order to achieve a clinically significant weight loss but lifestyle interventions appear to be successful in achieving clinically significant results (Bartels & Desilets, 2012).

6.2. PHYSICAL ACTIVITY IN SPECIFIC CONDITIONS

▪ Depression

Several reviews investigated the efficacy of exercise interventions for the reduction of **depressive symptoms** (Wolff et al., 2011). Evidence is weak for almost all groups of disorders with the exception of major depressive disorder (Wolff et al., 2011). However, evidence indicates that physical activity decreases the risk of developing depression as well the fact that there is no negative effect in the depressed population by using exercise therapy (Mutrie, 2000 cited by Bingham, 2009).

Experimental studies have been showing that exercise based in aerobic and resistance may be used for treating moderate to severe depression in conjunction with a standard treatment (Bingham, 2009). It is also proved that the effects of exercise, specifically anxiolytic and antidepressant properties (Salmon, 2000; Mutrie, 2000 cited by Bingham, 2009), are equal with the ones we have in psychotherapeutic intervention (Mutrie, 2000 cited by Bingham, 2009; Wolff et al., 2011). Otherwise people who participate in exercise programs reduce symptoms of anxiety and are less probable to have a relapse than the ones receiving medication (Babyak et al., 2000 cited by Bingham, 2009; Weinstock, Wadeson & VanHeest, 2012).

▪ Bipolar disorders

Referring to **bipolar disorders**, recent review articles settled that interventions focused on physical activity can certainly be feasible, decreasing stress, depressive and anxious symptoms (Wright, Everson-Hock & Taylor, 2009 cited by Wolff et al., 2011). Moreover, is well established by the evidence the benefits of exercise on glucose metabolism for this disorder (Barbour, Edenfield & Blumenthal, 2007 cited by Alsuwaidan & McIntyre, 2009) and a plausible homeostatic effect (Alsuwaidan & McIntyre, 2009).

▪ Substance use disorders

Since the 1970s, eight studies about **substance use disorders** have been published and nine in **alcoholic** patients, which mostly point to favorable effects of exercise (Wolff et al., 2011). As a result, based on the guidelines suggested by American College of Sports Medicine and American Heart Association, individuals with ages between 18 and 65 years suffering of **opiate dependence disorders** can be beneficiated in including exercise to the treatment program (Weinstock et al., 2012). In what concerns to smoking cessation, the literature states that in order to effectively support

patients, exercise programs must start previously to **smoking cessation** (Wolff et al., 2011).

Preliminary evidence also shows that exercise can increase abstinence and in addition the comorbid symptoms of both depression and anxiety (Wolff et al., 2011).

- **Schizophrenia**

In what concerns to **schizophrenia**, there is speculative evidence that participating in exercise is associated with an alleviation of negative symptoms, such as, depression, low self-esteem, and social withdrawal (Faulkner, 2005 cited by Bingham, 2009). Exercise-induced neurogenesis is a plausible mechanism of action in schizophrenia and has shown decreases in positive and negative symptoms, but also increased hippocampal volumes after 3 months of aerobic exercise. There is presently no evidence about the use of physical exercise treatment in schizotypal, delusional, or schizoaffective disorder (Pajonk et al., 2010 cited by Wolff et al., 2011).

7. BARRIERS AND COST-EFFECTIVENESS

The adherence in the general population to physical activity programs decreases to half of the original number of participants after six months. We cannot expect better results from programs for mentally ill persons, who have additional barriers than general population (Richardson et al., 2005 cited by Bingham, 2009). These barriers include side effects of the medication, the mental disorder itself, lack of motivation (psychotic disorders), stigmatization by society and limitations of the mental health service (McDevitt et al., 2006 cited by Hodgson, McCulloch & Fox, 2011). In a study of perceptions of barriers to and benefits of physical activity among patients with severe mental disorders, participants saw exercise as positive and desirable, with benefits for both physical and mental health (McDevitt, Snyder, Miller, Wilbur, 2006 cited by Verhaeghe, De Maeseneer, Maes, Van Heeringen, & Annemans, 2011).

Additionally, the use of exercise as an intervention in the field of psychiatry has been small, because the lack of knowledge about the therapeutic benefits of exercise by the mental health clinics resulting in a low application of this treatment. Another barrier stated in evidence is the incompatibility of exercise programs with traditional treatments (Faulkner & Biddle, 2001 cited by Bingham, 2009).

Recently, more attention is given to health economic evaluations of preventive health care. In persons with severe mental disorders, no studies examining the cost-effectiveness of interventions targeting physical activity and eating habits were found. But prevention has an economic cost, saving money by avoiding diseases and complications from mental disorders (Verhaeghe, De Maeseneer, Maes, Van Heeringen, & Annemans, 2011).

8. ELEMENTS OF A SUCCESSFUL PROGRAM OF PHYSICAL ACTIVITY

Physical activity programs that are accessible and affordable, close to public transportation and that no special skills are required for participation are recommended. It is important to have appropriately trained professionals who know how to support and motivate patients using reinforcements, such as prizes, is a strategy that cannot be underestimated. Who prescribes and leads exercise need to be enthusiastic, knowledgeable and supportive, which is proved to be as important as the actual exercise program (Richardson et al., 2005 cited by Bingham, 2009). Making the program voluntary is also vital to its success (Camann, 2001 cited by Bingham, 2009).

Effective interventions need to be focused to assist in educating, motivating and empowering individuals with mental illness to adopt and maintain healthier lifestyles. They should be designed to improve patients self-efficacy, to support the improving of skills, to involve the individual in a collaborative process of behaviour change and self-management (Mental Illness Fellowship, 2011).

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