

# Getting to grips with the obesity epidemic in Europe

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## Abstract

Obesity is a global epidemic. It is responsible for increased patient morbidity and mortality. Significant related pathologies including diabetes mellitus compound the overall risks. Obesity is a significant financial burden. This includes direct and indirect medical costs, amounting to millions of euros each year. Multiple European studies have outlined a steady incline in obesity prevalence rates. Tackling obesity is no easy task. Policy makers aiming to reduce obesity rates should adopt an evidence-based approach. This entails adopting both micro- and macro-interventions tweaked to each country's individual requirements. The ideal way forward would be to tackle obesity from the individual, population-wide and food industry angles. The key towards a successful intervention is for each country to carry out well-planned health examination studies, in an attempt to pin point local risk factors. Having a correct individualized picture, each country can move forward and draw policies and interventional procedures. The aim should be to primarily improve the quality of life. Second, the country's capital expenditure is also reduced.

## Keywords

Obesity, burden of illness, economic burden of disease, epidemics, disease management, policy

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## The Obesity situation

Non-communicable diseases (NCDs) have been on the rise for several decades and by 2010 had been found to account for 86% of deaths and 77% of the disease burden in Europe.<sup>1</sup> Obesity is a major cause for the development of NCDs. According to the World Health Organization (WHO), the obesity epidemic has more than doubled between 1980 and 2014.<sup>2</sup> In 2014, over 1.9 billion adults (18+ years) were overweight, with over 600 million being obese. Worryingly, a similar picture was unveiled in children. Around 41 million children under the age of 5 years were overweight or obese.<sup>2</sup> In Europe, obesity accounted for more than 1 million deaths and 12 million life-years of ill health in 2010.<sup>3</sup>

Some NCDs such as type 2 diabetes mellitus (T2DM) and cardiovascular disease have been strongly linked with obesity. In fact, the prevalence rates of diseases such as T2DM are on the increase throughout all age groups.<sup>1</sup> Obesity is also one of the key factors in the development of metabolic syndrome. This affects 20%–30% of the European population.<sup>1</sup>

Obesity alone has been labelled as the contributor of 80% of all T2DM, 35% of ischaemic heart disease and 55% of

hypertension among European adults.<sup>4</sup> It has also been directly linked to the development of other pathologies. Among which, we find malignancies, gallbladder stones and impaired reproductive performance.<sup>5,6</sup> Higher health care expenditures are anticipated due to the increased rates of obesity and its association with other chronic diseases.<sup>7</sup>

Obesity is the result of multifactorial elements. Genetic, environmental and behavioural interactions each play a contributing aspect.<sup>8</sup> Before estimating the burden and the rate of increase, an accurate knowledge of prevalence (the amount of people affected at a specific point in time) and incidence (rate of new onset of obesity over time)

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is essential. Prevalence studies are way less expensive to conduct compared to incidence studies. This accounts for the wider availability of prevalence data.

The majority of European obesity prevalence studies utilize the body mass index (BMI) as their defining tool. Most are based on self-reported surveys.<sup>7</sup> The use of BMI for prevalence data can be misleading. This is the case in individuals with high muscle to body fat ratio and in certain ethnic groups.<sup>9</sup> Another possible fault is the self-reporting feature of these studies. This undermines the accuracy of the reported results. People tend to underreport their body measurements.<sup>1</sup> These can be up to 50% less than objective measurements.<sup>6</sup> Therefore, regular health examination surveys should be conducted by European countries for accurate overweight–obesity data.<sup>7</sup> For ease of comparison, homogeneous methods between different countries health examination surveys should be present. The ultimate accurate overweight–obesity data could be obtained by conducting updated pan-European studies comparing all European countries utilizing representative population samples and homogeneous methods.<sup>10</sup>

This study presents an overview of the overweight–obesity epidemic in Europe in order to provide professionals including policy makers, evidence-based literature on the epidemiological and economical burden of obesity in a single document.

## Method

A literature search using specialized libraries including PubMed and ‘Google Scholar’ was performed. The following keywords ‘Obesity in Europe’, ‘Obesity Epidemic in Europe’, ‘Europe Obesity Cost’, ‘Prevention of obesity burden’ and ‘Physical activity to prevent obesity in Europe’ were considered. These search criteria resulted in many ‘hits’. Those articles with relevant titles to the research phrases and keywords published between 2000 and 2015 were considered. Each abstract falling within these categories was reviewed and relevant articles to the study’s aim were obtained and fully analysed. Only studies that claimed to be representative of the population under study were considered. Small sample size studies with sample population less than 2000 individuals were excluded in view of low statistical power. Also any studies published outside the above year bracket were excluded.

Systematic reviews with data pertaining to European countries were given the highest consideration. Malta was the centre of focus, since it has the highest childhood (11–15 years) and adult male obesity rates in Europe and second highest in adult females.<sup>11,12</sup> Policies and strategies set up in Malta to combat this highly prevalent condition were considered in this study.

## How much of a burden?

Obesity is responsible for direct medical costs (e.g. physician’s fees, clinical tests) and non-medical costs (e.g. transporting

patients to treatment centres). Unsurprisingly, the direct per capita cost of a normal weight person is less than the overweight/obese counterpart. Costs for overweight and obese individuals were, respectively, 9.9% and 42.7% higher when compared to normal weight adults.<sup>13</sup> The whole of Europe spends between 1.9% and 4.7% of the total annual health care costs and 2.8% of the annual hospital costs in dealing with overweight or obese patients.<sup>14</sup>

In Malta, it was estimated that ill health due to obesity alone accounted for an annual cost of €20 million in 2009.<sup>15</sup> This accounted for around 5.7% of the total Maltese health expenditure.<sup>15</sup> Should the obesity rate remain stable (an underestimate), the annual health costs attributable to obesity in 2020 would amount to €27 million.<sup>16</sup>

Indirect costs attributed to the overweight/obesity epidemic relate to the person’s absence from work or disease-related productivity loss. Intangible costs, such as the person’s quality of life, including one’s social life, are also present.<sup>17,18</sup>

A study carried out in Germany estimated the costs due to obesity and related comorbidities in 2002. The authors incorporated the costs of four different comorbidities arising due to obesity. These were T2DM, hypertension, stroke and myocardial infarction. The direct medical costs were €1343–2699 million. The costs incorporating the comorbidities amounted to €2701–5682 million.<sup>19</sup>

In 2012, it was estimated that the obesity cost (direct and indirect) in Europe was around €81 billion per year. This is in keeping with the WHO estimates on obesity expenditure of 2%–8% of the total national expenditure in the 53 European countries.<sup>20</sup>

With the increasing prevalence of obesity, the total health burden expenditure has been increasing proportionately and inevitably. There is no expectation that the obesity figures will plateau anytime in the near future. This warrants immediate and effective strategies to counteract the constantly increasing financial burden and decreasing quality of life.

## Action against obesity

Governments and international organizations over the years have developed policies and programmes aiming to deflate obesity rates. Unfortunately, such action has not been effective. The factors causing uncontrolled obesity rates remain unremedied.<sup>21</sup>

Evidence-based micro- and macro-interventions have been considered. Micro-interventions are aimed at individual, localized and community levels. They can rely on at least partial scientific evidence for their effectiveness. Macro-interventions are spread against larger entities including the food industry. The food industry influence on obesity needs to be targeted in an intelligent, cost-effective manner. Measures should include price policies, industry-based action as well as taxation and marketing regulatory mechanisms.

These are aimed at reducing the high fat, high sugar (and high salt) content of food.<sup>6,22</sup>

## Micro-interventions

Micro-interventions can be further subdivided into various approaches targeting the family, school, workplace and community levels.

The family approach is aimed at young children and their families. The aim is to encourage the maintenance of a desirable weight and prevent obesity from an early age. The effectiveness is inversely proportional to the age of the child. This approach is intensive and individually targeted, as well as expensive to maintain. It has, however, shown to be effective.<sup>6,23</sup> Weight control during pregnancy is essential. Women with a pre-pregnancy overweight/obese status are at risk to develop diabetes mellitus, hypertension and preeclampsia during pregnancy.<sup>24,25</sup> This also increases the chance of instrumental delivery and caesarean sections. The child is at an increased risk of developing various health issues. These range from congenital anomalies to hypoglycaemia.<sup>26</sup>

Targeting school-age children in an attempt to promote a healthier lifestyle is a difficult feat unless the whole school environment is incorporated in the strategy. This requires multiple, simultaneous interventions. Examples are as follows: promoting a healthy breakfast prior to lessons, installing a fruit-tuck shop, banning fatty and unhealthy foods within and near school premises and many more. In conjunction with physical activity and promotion activities, this was found effective only to a variable degree.<sup>6</sup>

An example of a successful multi-component school intervention was 'CATCH' in the United States. This consisted of an individual-level behavioural classroom curriculum and cafeteria environmental changes. These resulted in positive effects on the students' dietary intake.<sup>27</sup> In Malta, a campaign 'Lunchbox' was launched in April 2015. The aim was to encourage school children to a healthier lunchbox consisting of cereals, vegetables, fruits, low-fat milk products and plenty of water.<sup>28</sup>

A holistic approach to the problem incorporates the psychological aspect. Efforts to enhance self-esteem and avoid unhealthy weight loss measures are essential. These should enhance and complement obesity prevention measures in schools. Care should be exercised in order to prevent the development of stigma associated with eating disorders and obesity.<sup>29,30</sup>

A similar approach can be adopted in the workplace. Employers are encouraged to promote healthy eating habits and increase the physical activity at the workplace.<sup>31</sup> An example of a worksite intervention was the 'Working Well Trail'. This was the largest theory-based nutrition intervention performed in 108 worksites over a 2-year period. It included individual-level and environmental interventions in a randomized portion of the worksite workers. Overall, there was a positive outcome. There was a modest increase in fruit,

vegetable and fibre intake among workers assigned to the interventional group.<sup>32</sup> Other programmes have been implemented such as the Five-A-Day research programme, which resulted in an increase in fruit and vegetable intake among the workers.<sup>33</sup>

Vending machines are a common encounter in both schools and workplaces. These are well-known sources of unhealthy food and beverages.<sup>34</sup> Interventions should target a shift towards healthier products and better display of nutritional information pre-purchase.<sup>35</sup>

## Macro-interventions

Macro-interventions are an umbrella term, incorporating all actions to tackle obesity through a population-based approach. These consist of policies, strategies and population-based obesity programmes aiming for a longer lasting change in the population. The main targets are twofold: first, to bring a change in the eating habits towards healthier food; second, to promote an increase in physical activity. Different strategies could be implemented such as the increase in the price of unhealthy food and/or decreasing the price of healthy food. These strategies worked out effectively in both China and the United States, respectively.<sup>36,37</sup>

In the US study 'Changing Individuals' Purchase of Snacks – CHIPS', the reduction in price of healthy food significantly affected the sales. The authors concluded that price is a major factor influencing the food choice. A small price reduction resulted in a major shift towards healthier food choices. A potential risk when drastically chopping food prices is a counter effect of increased food volume consumed. This results in an overall increased total energy intake, which is the exact opposite of the ideal scenario. A thorough financial evaluation is essential to address all the potential effects of a price reduction on the population.<sup>37</sup> Another option is to increase taxation on unhealthy food. This has been the theme behind a recent large debate between European countries. Among others, United Kingdom has already introduced taxation on sugar drinks.<sup>38</sup> These are long-term plans which take time to be adopted by the population. The effects are beneficial in the immediate and future time frames.<sup>6</sup>

A national strategy 'A Healthy Weight for Life 2012–2020' was set up in Malta, with the aim to assess obesity and its determinants locally and implementing action plans. Various interventions were proposed. One is to analyse the social impact of subsidies on healthy and targeted taxation on specific unhealthy foods and drinks. Another possibility is to increase the availability of healthy food outlets such as smoothie bars and at the same time restrict outlets selling fast foods. A further plan is to set up a 'Healthy Food Scheme' where food is colour coded according to the nutritional status of the item. There are plans to tackle the workplace as well. A proposed 'Healthy Workplace Scheme' was conceptualized to help and incentivize employers to promote healthy eating and support weight management programmes.<sup>16</sup>

Over the years, other European countries have also set up different initiatives to try to halt obesity and promote healthy eating and drinking. A Danish programme was set up to try to promote fruit and vegetables in the workplace, schools and restaurants.<sup>39</sup> While in the United Kingdom, a national campaign was set up by the Education and Resources for Improving Childhood continence (ERIC) to improve the access of fresh drinking water in all primary and secondary schools.<sup>40</sup>

## The food industry and obesity

The obesity epidemic requires an interdisciplinary approach involving not only the establishment of individualized and population-targeted strategies but also the involvement and the cooperation of other stakeholders including the food industry.<sup>41</sup> A critical factor in the prevention of obesity is to target the food and beverage industry.<sup>42</sup>

On average, consumers perform more than 200 food-related decisions per day but only recall less than 10% of these.<sup>43</sup> The most important motivators, determining which food is consumed, depend on the food's taste, quality, convenience and price.<sup>41</sup> It is therefore essential that the food industry applies these motivators to healthier food choices. According to the WHO, a healthy diet is one that is low in fats, sugar and salt. The total energy intake is balanced against the energy expenditure.<sup>44</sup> The role of the food industry is to favour the production of low energy dense foods as well as better nutritional quality foods. The readily available products should be evaluated and their energy content be reduced with responsible marketing and labelling of the nutrients.<sup>42</sup> Daily-recommended nutritional values and meal portions should be established as part of a normal daily food routine.<sup>41</sup> The challenge is to produce foods with lower energy contents while retaining the essential nutrients.<sup>42</sup>

It is imperative that governments work hand in hand with the food industry and science-based communities for the development of healthy food.<sup>41</sup> Food retailers and caterers also have a role in obesity prevention.<sup>42</sup> It is of utmost importance that all the different food industry players work in collaboration for a healthy food delivery with the aim to halt the burden of obesity.

Social media is a major influence to the obesity epidemic. There should be better control and guidelines as to the manner in which unhealthy food products are presented to the general public. This might mean applying restrictions to TV adverts during peak children hours. Government policies should aim to promote healthy food advertisements in an effort to reduce fast foods and sugar-rich items.<sup>45,46</sup>

Children are more sedentary nowadays during their 'free time' with the introduction of advanced and interactive technology. The obvious consequence is a higher obesity risk. Strategies targeting physical activity at schools should be implemented. School attendance is compulsory up to teenage years. Enrolling physical activity in the mainstream

curriculum safeguards a minimum level of exercise for all children in this age group.<sup>47</sup>

The Global Action Plan for Prevention and Control of Non-communicable diseases 2013–2020 has been set up. The aim is to increase the surveillance and monitoring of the NCDs that are most pressing including obesity. They plan to offer help and support to governments in developing preventative policies.<sup>1</sup> Also, in 2013, the WHO established a global monitoring framework to follow the preventative actions against the major NCDs.<sup>1</sup>

Obesity remains a major health concern for countries across Europe. Despite efforts through multiple initiatives and actions, the epidemic remains on the rise. Country-based strategies offer a valid framework but early tangible action in individual communities is generally lacking. The ideal situation would see initiatives based on and targeted towards each country's risk profile. The relationships between obesity and closely related pathologies such as diabetes and cardiovascular disease should be part of the planned strategies.

## Study strengths and limitations

The study targeted the obesity epidemic from different aspects of public health. It provided insight of how this epidemic could be prevented with the aid of evidence-based policies and strategies. Only papers and policies that were found using a set of keywords were considered. Any other literature falling outside the research criteria was not considered.

## Conclusion

The first step in the path against obesity is to obtain accurate baseline prevalence figures for all countries across Europe. These will portrait a better picture of the local risks and determinants across the different age groups. All this is only possible through well-planned health examination studies. These will help each individual country develop national guidelines based on their particular requirements. Once these are completed, a multi-level approach to promote prevention and strategies to reduce obesity will be the way forward. The establishment of clear primary and secondary care obesity preventative programmes would help reduce the large economic expenditure and improve the quality of life of obese people.

## Contribution

Both authors gave equal contribution to formulation of this article including conception and design of article as well as drafting and revising of the article. All authors approve the final article that is being submitted.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

## Ethical approval

Ethical approval was not sought for this study because this article is a review and no human subjects or in vitro studies were carried out.

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## New contribution

This article brings together the current obesity situation and preventive recommendations in one place, making it feasible for policy officials to understand the epidemiology and the health burden including medical costs attributed to obesity. As well as be equipped with evidence-based recommendations to halt the obesity epidemic from an individualized to a national perspective.

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