

Globesity

Integrating medical and population health models for optimal chronic disease management

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Introduction

The global epidemic of obesity, or “globesity”, impacts health outcomes in all communities and attacks physical, psychological and social health, as well as health-related quality of life. The traditional use of the body-mass index (BMI) defines overweight as a BMI between 25 and 29.9 kg/m² and obese as a BMI of 30 kg/m² or greater, or obesity grade 1 between 30 and 34.9 kg/m², obesity grade 2 between 35 and 39.9 kg/m², and obesity grade 3 as 40 kg/m² or greater. In 2008, the global population was estimated to have a total of 1.4 billion overweight adults, about a quarter of the global population. This includes 500 million adults who are classified as obese. These numbers cause great concern for the economic and health burdens related to direct and indirect health effects of weight gain.

Approaching the negative effects of obesity

Several approaches can be used to alter the negative effects of obesity. First, there are disease management strategies. In general, these strategies tend to focus on the ‘medical model’, which evaluates an individual’s physical health and risk factors to determine a specific drug or intervention as a treatment plan to reduce disease morbidity, mortality, or associated complications. An alternative approach is the ‘population health model’, which targets the health of

communities and the multi-factorial health determinants that aim for long-term weight reduction through the development of lifelong healthy behaviours. Combining these models and focusing on the reduction of risk factors of these health determinants may produce effective interventions and optimal population health outcomes.

In 1997, it was estimated that 40 adults per 1 000 had diabetes mellitus type 2, compared to 59 adults per 1 000 in 2008. Interestingly, in that same period, coronary heart disease mortality decreased from 203 adults per 100 000 in 1999, to 135 adults per 100 000 in 2008. This was mainly attributed to compliance to new clinical therapeutics. Since obesity increases an individual’s risk factors for diabetes, hypertension and cardiovascular disease, treatment requires major lifestyle modifications through diet, exercise, behavioural, pharmacological, or surgical interventions. No silver bullet will eliminate excess body weight in several weeks, without a combined effort of calorie reduction and increased energy expenditure, in spite of what commercial weight loss programmes try to sell.

Example: United States’ Healthy People 2010

The Healthy People initiative was developed by the United States’ Department of Health and Human Services in 1979 to identify key health priorities and goals for the US popu-

lation for Healthy People 1990. Through these initiatives that collect data for later comparison to ten-year target outcomes, the effectiveness of health promotional campaigns may be examined, and new goals can be established. As one of the major health priorities and indicators of poor health in the US population, obesity was identified to maintain a goal of less than 15% prevalence for Healthy People 2010. Statistics from the National Health and Nutrition Examination Survey (NHANES) of the previous two decades on US obesity prevalence in adults (>20 years) showcased increasing trends, above the target prevalence, resulting from increased dietary intake of high-fat, high-carbohydrate meals and sedentary lifestyles (i.e. television, computer use). In conclusion, 78 million US adults represented 35.7% of the obese population in the US, and thus, the respective obesity goal of less than 15% prevalence of Healthy People 2010 was not achieved.

Medical Model versus Population Health Model

The medical model utilizes the concept of disease pathophysiology to develop an appropriate clinical or surgical treatment plan for obesity in order to decrease morbidity and mortality. Physicians using this approach usually utilize anthropometric measures for classification, and then measure cholesterol and glycaemia levels to evaluate overall risk, and other underlying conditions. They provide treatment interventions for weight reduction and subsequent co-morbidities. The US Food and Drug Administration (FDA) approved orlistat and sibutramine as weight loss drugs, although marketing in Europe was suspended for the latter. Another option is weight loss surgery, but invasive bariatric surgery is not only expensive, it may also result in lifelong complications. Therefore, these programmes should only be



patients with high BMI's, and multiple co-morbidities, after other non-invasive programmes have failed. The following example highlights a frequently used approach when the medical model is used to treat obesity.

Señora Gómez is a 48-year-old Dominican female who visits your office as a follow-up visit for a routine health examination. She is the mother of three children and works as a secretary. She has never smoked and frequently jokes about her "large" appetite. She has a two-year history of hypertension treated with Lisinopril 10 mg per day. During physical examination, she has a blood pressure of 120/80 mmHg, a height of 1.58 m, a weight of 80 kg, and a BMI of 32. Her waist circumference is 98 cm. Fasting lab results are as follows: Total Cholesterol 190mg/dL (N < 200 mg/dL), LDL 100 mg/dL (N < 130 mg/dL), HDL 50 mg/dL (N > 50mg/dL), Triglycerides 140 mg/dL (N < 150 mg/dL), Glucose 200 mg/dL (N 70-100 mg/dL), and HbA1c 8% (N < 5.7%). Her physician proposed the following treatment plan: Orlistat 120 mg three times per day at main meals (for weight reduction), Lisinopril 10 mg per day (for hypertension) and Metformin 850 mg per day (for diabetes mellitus type 2). In addition, her physician proposed a consultation with a nutritionist.

The population health or public health model, on the other hand, focuses on health promotion and understanding factors that may impede compliance for dietary changes, motivation or willingness to develop healthy lifestyles. The individual's and community's readiness to identify psychological, social and cultural barriers to develop positive health behaviours are essential components in health promotion campaigns for dietary modifications (smaller meal portions, low-calorie foods) and daily exercise. Once community members understand the impact of obesity on their

health-related quality of life, co-morbidities and increased mortality risk, health care providers can also identify biopsychosocial or cultural barriers in order to develop effective interventions that can be utilized to target this population. The following section is an example of the use of the population health model.

Physical: After Señora Gómez exits her ten-minute consult, she wonders, "Why do I need more medications when I feel so good?" The primary care nurse gives Señora Gómez brochures with pictorials describing obesity, cardiovascular disease and diabetes. Opening the brochure, the nurse explains where adipose tissue deposits, the impact on cardiac and metabolic functions and the mechanisms for each medication.

Psychological: Señora Gómez confesses, "I want to lose ten kilograms, but I have been stressed about my daughter's wedding planning". As the nurse assesses her willingness to comply with recommendations for weight reduction, both agree to a six-week plan with daily (medication, reduced food intake and a 30-minute brisk walk during her lunch hour) and weekly (weight measurement) goals.

Social/Cultural: Señora Gómez says, "My culture traditionally includes social activities with family and friends surrounded by 'criollo' food". The nurse negotiates a plan to remain social and healthy through reduced consumption of these fried or high-carbohydrate foods and increased physical activity with her walking team of friends every evening around the local park.

Philosopher Faust described these contrasting notions as follows: 1) the medical model portrays the 'quick fix' for measurable impact that may result in lifelong side effects, but fails to address other factors that impact an individual's health, and 2) the public health model describes the continuous process of health promotion which will have

a long-term impact on disease management. It focuses on how individuals perceive disease and barriers that prevent them from choosing healthy behaviours. Why not utilize both models to complement obesity management programmes for patients for optimal outcomes?

The following example describes this dual medical and population health model integration for a major health campaign, “A Healthier Dominican Republic: Educating our Community”.

A total of 153 medical, psychology and dental students representing the Universidad Iberoamericana (UNIBE), Universidad Central del Este (UCE), Universidad Nacional Pedro Henríquez Ureña (UNPHU) and Universidad Tecnológica de Santiago (UTESA), collaborated with university libraries, cafeterias and fitness centres to offer a multi-disciplinary health intervention toward promoting healthy aging. Teams utilized five novel didactic strategies to highlight the impact of aging on biological, social and psychological health, including educational materials, health seminars, departmental collaborations, community outreach and social media. Medical students utilized the medical model to evaluate health well-being and measured blood pressure, height-weight to calculate BMI and waist circumference to estimate cardiovascular disease risk for university students, staff and community members. Students integrated the population health model by educating over 15 300 attendees in six urban and 23 rural DR communities on risk factors for non-communicable diseases, awareness of the negative effects on health-related quality of life, strategies to develop healthy lifestyles for mental and physical health through improved diet, sufficient sleep, adequate hydration, smoking cessation, and dental hygiene to avoid caries and periodontal disease.

Conclusions

A healthy population can only result when individuals in a community select healthy lifestyles. Outcomes from a healthy population are decreased health care expenses, more productive work force and self-motivation for personal efforts to develop healthy behaviours for a lifetime. Early health intervention programmes aim to educate citizens on how obesity affects organ systems and on strategies to establish a healthier diet and increasing exercise routines (i.e. dancing), which will increase energy expenditures to lose or maintain weight. Incorporating both the medical and population health models into the prevention of obesity and long-term chronic disease management may prove to be effective in building a lifetime of healthier individuals in the global community by reducing “waistlines” and subsequent co-morbidities from cardiovascular disease and diabetes, and creating more effective non-invasive treatment interventions to ensure optimal population health and significantly reverse these obesity upward trends within the next decade.

About the author

Helena Chapman, MD, MPH, has recently graduated from the Iberoamerican University (UNIBE) School of Medicine in the Dominican Republic (DR). Currently, she is a doctoral student in One Health at the University of Florida (USA). As founding member and first President of IFM-SA-Dominican Republic (ODEM), she currently serves as Supervising Council and advises DR medical students on local and national health initiatives with a preventive health focus that motivates community members to adopt healthy lifestyle behaviours.