Review

Guidelines for Prevention and the Contrast of Overweight and Obesity: State of the Art and Future Perspectives

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Guidelines for Prevention and the Contrast of Overweight and Obesity: State of the Art and Future Perspectives

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Abstract: In this particular historical moment, the increase in mortality for cardiovascular disease in adults, the increase of metabolic diseases linked to overweight and obesity, it is necessary to focus the attention of medical doctors, researchers and policy makers on the promotion of correct lifestyles and prevention. The "prevention" and "cure or treatment" have long been considered distinct strategies, the almost exclusive prerogative of the public health authorities for the preventive aspects and of the clinician for the treatments. This approach has led, and still leads, to very high healthcare costs, without having a significant impact on obesity incidence. The promotion of correct lifestyles in the population and in subjects at risk in the fight against obesity/overweight, to contrast the reduction of physical activity and sedentary lifestyle, to promote the consumption of fruit and vegetables, to the reduction of the excessive consumption of salt as "Strategic lines of intervention" need to be pursued in all western countries. Actually, the preventive actions undertaken were not very effective, especially for the individuals in pediatric age. In this narrative review, based on published data, the critical points for obesity prevention will be discussed focusing on action needed during life from pre-conception to childhood, adulthood and in geriatric age to contrast obesity.

Keywords: obesity; overweight; prevention; lifestyle; diet; physical activity

1. Introduction

Obesity is a complex disease resulting from the interaction between behavioral, social-economic and biologic (including genetic) determinants, with a strong effect of environmental "triggering" factors [1]. The impact of obesity and its consequences requires urgent and decisive interventions to counteract its spread. In fact, obesity has a profound effect on health as it is accompanied by a wide disease panel such as type 2 diabetes mellitus, high blood pressure, ischemic heart disease and other morbid conditions which worsen the quality of life increasing mortality risk [2]. Indeed, overweight and obesity are also among the main oncological risk factors [3]. The types of cancer made more likely by factors such as obesity and overweight are those of the intestine (colon and rectum), kidney, esophagus, pancreas and of the gallbladder, and for women breast cancer is added (in postmenopausal women), of the endometrium and ovary [4,5]. The prevalence of obesity has increased over time, reaching epidemic proportions, and is now one of the major public health problems worldwide at any age, with a worrying expansion in childhood which can cause an early

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onset of chronic non-communicable diseases. Additionally, overweight or obese children are more likely to become obese adults, than those with a weight in the normal range [6]. It is necessary to fight overweight and obesity also in the elderly, not only to reduce the risk of cardio-metabolic, but above all to reduce the disability related to them and preserving a good quality of life [7].

It is well known that nutritional habits, physical activity attitude and in general life style have an important effect on the development of obesity/overweight. Obesity is closely related to lifestyle. It is therefore important and possible to take measures to prevent weight gain and the health problems that follow. Regular exercise, healthy eating and an active life are essential for a correct body weight [8]. Keeping weight under control also helps prevent extra weight gain because it allows to check the situation and notice small weight gains before they become a problem.

In the present narrative review, we have focused the attention on overweight/obesity prevention by age range in available data/ and international guidelines and trying to highlight strengths and weaknesses. We suggest that the specific strategies in health, social and economic models might be improved in different manner during the life. Furthermore, the prevention and treatment strategies should be separate pathways and it is important that prevention strengthens awareness of the health risks associated with obesity at population level.

2. Preconception, Pregnancy and Breastfeeding Period

Preconception care is defined as a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management, emphasizing those factors that must be acted on before conception or early in pregnancy to have maximal impact [9]. The number of pregnant women who are overweight or obese has increased in both high- and middle-income countries based upon country-level data collected from the World Health Organization, the World Bank and the Food and Agricultural Organization [10]. For example, in the United States, 41.2% of women aged 20 years old and older were obese in 2015–2016 and about half of women (48%) start their pregnancy being overweight or obese [11,12]. Limited attention and interest in preconception counseling regarding risks of overweight or obesity by health care professionals were noted, which may contribute to women's unawareness of these risks on preconception health [13,14].

Systematic reviews have shown there are missed opportunities to provide lifestyle interventions to address pregnancy risks in women who are overweight or obese, as well as those who may be prone to excess weight gain in the preconception period and pregnancy [15–17]. Intervention for maternal and fetal health are usually initiated after conception and results are often unsuccessful [18,19]. There is a great need for obesity-specific preconception counseling to reduce risk associated with excess weight prior to and during pregnancy [19]. Evidence from this review supports women's unawareness of the risks related to overweight or obesity prior to pregnancy and the low attention paid to preconception counseling by health care professionals [13,19].

The FIGO Pregnancy Obesity and Nutrition Initiative [14] provided an overview of the evidence for preconception clinical guidelines to reduce the risk of NCDs in mothers and their offspring encouraging healthcare practitioners to initiate a dialogue on women's health, nutrition, and weight management before the conception, indicating that a simple set of recommendations for clinical practice that can be used even in short consultations. The recommendations should be contextualized based on local cultural and dietary practices as part of a system-wide public health approach to influence the wider determinants as well as individual factors influencing preconception health [14,20]. Healthcare practitioners should prioritize attention to common comorbidities and nutritional issues in their settings to improve women awareness about nutrition, weight management, and healthy lifestyle. It is well known that excessive gestational weight gain has been shown to relate to high postpartum weight retention and the development of overweight and obesity later in life.

The Stockholm Pregnancy and Women's Nutrition (SPAWN) study is a long-term follow-up study of women who delivered children in 1984 to 1985 (n = 2342) showed that weight retention one year after the postpartum predicts future overweight 15 years later [21,22]. Currently, many guidelines for pregnant women focus on a proper weight increase in pregnancy (based on the pre-

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pregnancy weight) but from the moment of delivery onwards, there are no indications. As suggested by some authors [22] pregnancy may represent a "*teachable moment*" for obesity prevention and to reinforce advice for healthy eating and physical activity habits.

The American Academy of Pediatrics recommends breastfeeding the child for the first year to ensure the benefits both for the mother and the newborn, and these recommendations are present in many national and international guidelines [23,24]. The beneficial effect of breastfeeding against obesity, which is highly increased if children has never been breastfed or has been breastfed for a shorter period is now a global recommendation [24]. Despite the consistent flow of research evidence showing the health benefits from breastfeeding, along with numerous policy initiatives aimed at promoting optimal breastfeeding practices, the adoption of exclusive breastfeeding remains below the global recommendations and it needs to be encouraged, to reach the target endorsed by the WHO Member States at the World Health Assembly Global Targets for Nutrition of increasing the prevalence of exclusive breastfeeding in the first 6 months up to at least 50% by 2025 [25].

Actions needed:

- ✓ To raise awareness among the population on the importance of weight control, with nutrition and physical activity, on reproductive and pre-conception health of women, couples, parents;
- ✓ To stress the importance of adequate weight gain during pregnancy for maternal and newborn health;
- ✓ To promote exclusive breastfeeding at least for 6 months;
- ✓ To carry out interventions aimed at promoting breastfeeding;
- ✓ To pay more attention of maternal weight after one year postpartum.

Figure 1. Action needed for obesity prevention during preconception, pregnancy and breastfeeding period.

3. Childhood Age

Prevention of obesity is particularly important in children. Childhood obesity is a worldwide major public health issue, in fact between 1980 and 2015, the global prevalence of obesity in children in the 2 - 4 years age group rose almost twofold, from 3.9 to 7.2% in boys and from 3.7 to 6.4% in girls [26]. Children who are overweight in early childhood are more likely to still be affected by overweight or obesity in later childhood, adolescence, and adulthood [27]. Obesity in childhood can affect health as well as educational attainment and the quality of life. Since 2006 the WHO European Office has promoted the Childhood Obesity Surveillance Initiative (COSI) to collect comparable data on the prevalence of excess weight allowing for a comparison between countries (more than 30) participating in European surveillance [28,29]. To counteract obesity in childhood age there are many eating habits that need to be improved: for example, in 2019, 8.7% did not eat breakfast every day and 24.3% did not eat fruit and/or vegetables on a daily base, 55.2% had a large mid-morning snack and 25.4% consumed sugary and/or carbonated drinks daily [29–31]. Additionally, the 20.3% of the children had not done physical activity the day before the survey and 44.5% of the children spent more than 2 hours a day in front of TV/Tablet/Mobile phone [29–31]. Finally, 40.3% of overweight or obese children were perceived by their mothers as under or with a normal weight [29–31].

The Action Plan on Childhood Obesity 2014-2020, aimed at implementing national policies to fight obesity despite the efforts made, have had predominantly sectoral and fragmentary actions, without connection with a general strategic plan having mixed/modest results [32,33]. Interventions including a community component are at present considered to be the most effective, as demonstrated by the IDEFICS study (Identification and prevention of Dietary- and lifestyle induced health Effects In Children and infantS) a prospective cohort study with an embedded community and school based intervention [34]. Schools are underestimated settings for implementing interventions for children health, however further high-quality research needs to focus on identifying specific program characteristics predictive of success in this setting of childhood life [35].

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The CDC reports that "the goal for children who are overweight is to reduce the rate of weight gain while allowing normal growth and development. Children should not be placed on a weight reduction diet without the consultation of a health care provider" [36]. Providers should encourage small everyday changes supporting regular vegetables, fruits, and whole-grain products consumption, including low-fat or non-fat milk/dairy products, choosing lean meats, poultry, fish, lentils, and beans for protein, encouraging the whole family to drink lots of water and limiting sugary drinks, simple sugars/sweets and saturated fats.

A recent survey in Argentina demonstrated that the prevalence of childhood overweight and obesity in children is associated with multi-causal risks factors: children with obesity had a lower level of physical activity, a lower consumption of processed foods, a higher risk for sleep disorders, higher levels of chronic stress (in both children and their caregivers), and higher rates of peer rejection together with a widespread use of screens before bedtime [37]. The family should be the core of the action in childhood obesity prevention for shaping and improving eating habits and the general lifestyle [38].

In the prevention of childhood obesity, it should not be forgotten that the causes of obesity with a very early onset could lie in monogenic genetic mutations, often not considered, then focusing only on endocrine dysregulations. The diagnosis of monogenic obesity must be made on the basis of a careful clinical history evaluation and confirmed with genetic analysis at present more accessible to new genetic screening technologies [39]. Today there are very widespread centers of excellence and research for this type of screening.

Figure 2. Action needed for obesity prevention during childhood age.

4. Obesity Prevention in Adults

The spread of overweight/obesity is one of the major public health problems worldwide. In Europe there was a recent revision of definition for overweight, now defined as a "pre-obesity condition" that as for obesity deserve attention and care [40]. Although it is essential to improve treatments, too little has been done on obesity prevention. Among the strategic objectives of the fight against obesity, the worldwide implementation of actions for the obesity of the adult aim at the raise of awareness among the population on the importance of health, promote the conscious adoption of healthy and active lifestyles in life and in work settings, integrating individual change and social transformation through the development of health promotion programs. The prevention of obesity should identify early and take charge of subjects in conditions of increased risk for noncommunicable diseases and/or suffering from different pathologies, in connection with the actions already available for chronic diseases. At community level is crucial to encourage the creation of contexts sustaining health and heathier lifestyle, together with sustainable mobility and the creation of green areas and public spaces that are safe, inclusive and accessible to encourage healthy lifestyle and regular physical activity. A systematic review of mass media campaigns targeting obesity prevention found that this kind of campaigns can have an impact on intermediate outcomes such as knowledge and attitudes, however there was limited evidence at long term [41].

In Australia the LiveLighter® campaign established in 2012 represent a good value-for-money obesity prevention intervention and could be considered as a model of an evidence-based obesity prevention strategy [42]. It was mainly based on mass media campaigns, advertising, spots and

broadcastings targeting diet related health behaviors and community awareness on healthy habits, and resulted in a decrease in sugar rich drink consumption. In this context the reasoned reading of food labels, a fundamental element for buying and consuming low energy density foods and controlling sugars and saturated fats, remains to be reinforces and encouraged [42].

A new emerging action in prevention of obesity of the adulthood is the focus on "Workplaces that promote health" including the implementation of actions aimed at preventing and fight overweight and obesity in work places. Work represents an important aspect of life for the vast majority of people in the adult age and, together with the hours of sleep, it takes a significant part of the day. Like school in childhood, the workplace is like a microcosm of the adult world, full of aspects that can promote health or, conversely, can decrease it. This makes the workplace an ideal setting for improving health and addressing many of the key drivers of the obesity epidemic. "*Since it is WORK to be sick, it is work that needs to be treated to prevent workers' sickness*". These are the inspiring words of Prof. Luigi Devoto (1864-1936) a pioneer of Occupational Medicine in Italy. If it is work which must be treated, then the first question to arise is: how can it be done? In our opinion we should follow a double track: first, take care of a healthy workplace and of its environment and second, take care of people's wellbeing by promoting health culture. People spend 60% of their waking hours in a working site at least until the age of retirement and it is absolutely normal that they are influenced, almost shaped by it. In recent years, many scientific studies, demonstrated that increasing physical activity in employees could foster a healthier workforce, improve employee's productivity, reduce healthcare costs, sick leaves and absenteeism at work [43–48]. A healthy workplace makes a good business sense: it is a much-quoted line that unfortunately often falls on deaf ears. The workplace has a good potential for developing health and wellness not only for workers, but also for their families.

Waddell and Burton [49] demonstrated that "good work" is beneficial for both physical and mental health and being out of work has significantly adverse health consequences. There is no "one size fits all" solution for the workplace health issue, therefore many suggestions have been put forward. As for the environment some researchers have proposed larger and brighter work sites, trees and flower outside, easy accessibility to the workplace, parking places and bicycle-stands. For the workers' wellbeing several suggestions have been taken into consideration, but two were the most viable ones: perform physical exercises at work or at home. The former has given better results. One explanation could be that at the workplace the break is scheduled and is a moment of relax and sociability that could improve the general psychological and physical well-being. On the contrary, physical exercises at home are not a priority, they may be postponed because of the urgency of other occupations, ending sometimes in not being performed at all [50]. It seems also that gym time for female workers falls in this category. Another study [51] confirmed that compliance was higher in the work-based exercise program. Moreover, this study also observed a reduction in anxiety and depression symptoms in both the groups, but further studies are required to confirm these data. Finally, studies demonstrated that workplace programs seem to be more effective in the long run, but they could be more expensive. Certainly, home exercises programs are less costly for companies.

Therefore, the question is: how can we promote a successful physical activity plan in workplaces? The Institute for Help and Productivity Studies (John Hopkins Bloomberg School of public Health) suggests some guidelines [52,53]. First, it is necessary to build an overall company culture of health, providing policies that support and motivate workers to believe in physical activity. Leaders may provide visible support, by participating themselves to healthy initiatives and being a model for coworkers. Furthermore, experts recommend businesses to take advantage of local resources (like for example a local gym) in order to create partnerships. Business and local governments may also work together to increase opportunities for physical activity and encourage "active transportation" (e.g. development of green areas, cycle paths etc.). Finally, it is necessary to tailor physical policies to workers' needs, values and interests. It is also important to take advantage of any opportunity to exercise in everyday life (*e.g.* avoiding elevators and so on).

Some guidelines are herewith provided to promote physical activity during working hours. It is possible to distinguish three different types of activities:

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- Simple activity breaks, feasible at the desk or nearby (e.g. rolling shoulders backward and forward, stepping side to side, walking in place and so on);
- Medium level activities requiring some time to be prepared (exercises in group or dancing);
- More complex activities that requires more time, but they could also be fun. Pantomimes are a peculiar type of exercise where people make gestures without words. The aim of pantomimes is to encourage physical movement and creativity. Movements accompanied by music or free dancing could be a way to foster activity and fun during a break.

Finally, in order to prevent obesity at work, companies should organize interventions that could make people (and possibly their families as well) more aware that a sedentary life and eating styles could profoundly affect the general wellbeing and increase the risk of obesity and other associated disease (such as diabetes, hypertension etc.). According to this, it is also necessary to promote a healthier diet for workers by improving the quality of the food offered by vending machines and by the company canteens (with special attention to shift workers) and organizing events to promote wellbeing also for workers' families. Diet groups and motivational support may be further interventions to be taken into consideration [54].

Actions needed:

- ✓ Provide indications to company canteens about portions, calories, lipid content of the foods served;
- ✓ Enhance food quality offered by vending machines and free water dispenser availability
- ✓ Improve food quality for shift workers during nocturnal hours (such as fresh fruits);
- ✓ Organize exercise breaks or classes (dance, relaxation etc.) during working hours;
- ✓ Organize walking or sport initiatives;
- ✓ Health assessment and advice;
- ✓ Diet groups, counseling or psychological support.

Figure 3. Action needed to obesity prevention in workplaces.

Obesity prevention in adults should be encouraged in people with familiar risk for cardiometabolic diseases. For instance, obesity management can delay the progression from prediabetes to type 2 diabetes and is beneficial as the first treatment of type 2 diabetes. Diet, physical activity, and behavioral therapy designed to achieve and maintain at least the 5% of weight loss is recommended for patients with type 2 diabetes [55]. Only modest amounts of weight loss are needed for diabetes prevention, but moderate or more weight loss may be needed, especially where the goal is to reduce inflammation (as in NASH) or to reduce fat burden (as in obstructive sleep apnea and knee pain and osteoarthritis) [55]. In individual patients' physicians must judge not just success at achieving a weight loss goal, but also success in reaching targeted health outcome goals. Targeted health outcome goals may be reached by an individual with weight loss of less than 5% or more than 10%. What is meaningful for the patients is the message that patients with obesity need not to reach a BMI <25 kg/m^2 in all instances, but can be healthier at any weight, as long as it is a reduced weight [55].

In the adult with obesity treated with bariatric surgery, to date the most effective therapy for the remission of obesity and associated complications, the prevention of weight regain is of fundamental importance. The triggers of a weight regain after bariatric surgery are multiple, some of them are well identified: the loss of control eating, the binge eating, increased food urges, excessive nocturnal eating, lower levels of physical activity, lower social support, life stressors, problematic alcohol use and depressive symptoms [56]. All these factors need to be controlled/monitored with regular follow-up.

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Actions needed:

- ✓ Identification of obesity risk factors early;
- ✓ Support and stimulate healthy lifestyle and healthy food choices;
- ✓ Facilitate physical activity;
- ✓ Improve healthy habits in workplaces;
- ✓ Avoid weight regain in case of bariatric surgery- assure a regular follow-up;
- ✓ Proper dissemination on the importance of an appropriate and stable body weight with the support of policy programs;

Figure 4. Actions needed for obesity prevention in adults.

5. Elderly

It is important to prevent obesity also in the elderly, not only to reduce the cardio-metabolic risk, but above all to reduce the related disability and preserve the quality of life in advanced age. The elderly represents one of the fastest growing segments of the population worldwide in western countries, and the proportion is expected to grow to 19% to 26% by 2025 [57]. The effect of BMI on mortality has been reported to vary in different age groups, and some of these are controversial in cause, interpretation, and significance in the elderly. In these patients, we can register fluctuation of body weight in all directions. In fact, weight loss has been reported to decrease, increase, and to have no effect on mortality in elderly and results are not conclusive [58]. In this age range weight loss may be unintentional or result from a state of illness and this may play a role in understanding the effect of weight loss in the elderly [59]. On the contrary, the causes of weight gain in elderly are mainly physiological, but even in the absence of a normal decline in physical capacity there are many factors that can lead to obesity, including excessive sedentary lifestyle, eating disorders related to depression and less social life, lack of attention to the quality of the food consumed, socioeconomic status [60]. In elderly difficulty of concentration, memory loss, muscle aches, fears, insecurities, hypochondria, increased frequency of irritability, self-isolation, may represent markers of depression triggered by changes that are typically experienced from the age of 65 onwards, such as: retirement, economic worries, deaths in the family, loss of autonomy, memory problems and other events [60].

In elderly the prevention of overweight and obesity should focus on control of obesity complications rather that weight loss. In particular it is of crucial importance to avoid the so called sarcopenic obesity (SO). Sarcopenic obesity is a syndrome more frequently present in the elderly population, associated with an increased risk of disability, morbidity and mortality, characterized by an alteration of body composition in which there is a coexistence of excess of fat mass and a deficit of muscle mass (sarcopenia) [61]. There is currently no single definition of this pathology in terms of diagnostic criteria and cut-offs; for this reason, it is still not possible to determine its precise prevalence, nor its actual clinical and functional relevance. In fact, the estimated prevalence varies from 2.75 to over 20% [62]. In 2022 The European Society for Clinical Nutrition and Metabolism (ESPEN) and the European Association for the Study of Obesity (EASO) launched an initiative to reach expert consensus on a univocal definition and diagnostic criteria for SO, to be implemented in clinical practice [63,64]. The diagnostic procedure should then be encouraged in all patient with obesity with sedentary behavior and in all patient with obesity at geriatric age to have a clear view of the real incidence. The tendency to develop sarcopenia with age is linked to the physiological gradual reduction of muscle mass that occurs as early as the third decade of life [63,64]. Several studies show that the conditions of obesity and sarcopenia worsen the prognosis of various pathologies (such as neoplastic, organ failure) and it is possible that sarcopenic obesity involves an even higher risk, derived from the cumulative effect of the two single conditions [63,64]. A correlation between sarcopenic obesity and an increased risk of hospitalizations and all-cause mortality has been reported [65].

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While most nutrient intake goals were similar to those for the general adult population, other aspects were identified where nutritional concerns of ageing require more specific food-based dietary guidelines. These include, a more protein-dense diet using high-quality protein foods to preserve muscle mass; weight maintenance in overweight or obese older adults with no health issues and, where weight-loss is required, that lean tissue is preserved; the promotion of fortified foods, particularly as a bioavailable source of B vitamins and the need for vitamin D supplementation [66].

Actions needed:

- ✓ Promote healthy and active lifestyles;
- ✓ Monitoring weight changes and nutritional state;
- ✓ Encourage screening for the diagnosis of sarcopenic state;
- ✓ Preservation of lean body mass with diet and physical activity programs;
- ✓ Early correction of micronutrients deficits.

Figure 5. Action for obesity prevention in elderly.

6. Future Directions of Overweight Obesity Prevention

We are living in a society centered on the pathology and it is may be time to move to and consider the concept of "*salutogenesis*". Even if salutogenesis is an anthropologic concept never accepted in medical sciences, it may represent for the best the contrast to pathogenesis' risk factors, focusing on 'salutary factors that actively promote health'. The salutogenesis is based on the sense of coherence, crucial for healthy lifestyle habits in the long term [67,68]. A process of health promotion and protection must be based on the early identification of individual and collective risk factors both. For instance, the genetic variants and epigenetic changes may affect some subjects who are more susceptible to the obesogenic environment, leading to obesity and its complications more easily than others. There is great interest for epigenetic markers with regard to their future beneficial application in the promotion for health. Thank to genome wide analysis and high throughput sequencing the identification of genetic and epigenetic alterations must be part of the risk factors identifications in obesity onset. The genetic make- up may change the response to behavioral and lifestyle risk factors, such as diet, alcohol consumption, and physical inactivity: the impact and the direct influence of these factors, alone or coupled, on obesity onset is only at its early stage of investigation. This is the so-called approach of "precision medicine" [69,70].

For the future prevention of obesity and obesity complications the influence of processed and ultra-processed food will receive increasing attention in nutrition research filed. There is convincing evidence that the assumption on a daily base of specific ultra-processed products (such as processed meat, sugar-sweetened beverages) and components of ultra-processed foods (such as trans fats, sodium) increase the risk of metabolic syndrome, hypertension, type 2 diabetes, overweight and obesity trajectories, and cardiovascular disease. In this context, food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP) could be designed to incentivize the consumption of nutritious, minimally processed foods and restrict the use of benefits for non-nutritious ultra-processed foods such as sugar-sweetened beverages [71].

7. Conclusions

The prevention and control of overweight and obesity require intersectional and multidisciplinary approaches with coordinated interventions at different levels, to prevent its onset, ensure an early management of subjects at risk or still in the initial stage of this disease, to slow down their progression, in order to avoid or delay, as much as possible, the use of pharmacological or surgical therapies. National and international dedicated prevention guidelines are still needed considering age related risk factors to move for the future toward new approaches of precision medicine.

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