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GOJAZNOST – PANDEMIJA NAŠEG VREMENA OD POSEBNOG ZNAČAJA

Sažetak: Prevalenca gojaznosti brzo raste u svim regionima sveta. Ovo je od velikog značaja za javno zdravlje jer morbiditet povezan sa gojaznošću i njenim komplikacijama smanjuje očekivani životni vek i nameće neodrživa ekonomska opterećenja kako društvu tako i zdravstvenim službama. Smanjena fizička aktivnost i nezdrave navike u ishrani dovele su do povećanja gojaznosti među mladim ljudima u mnogim zemljama koja predstavljaju značajan rizik po zdravlje. Gojaznost značajno povećava rizik od razvoja nezaraznih bolesti. Dijabetes tip 2 se sve više dijagnosticuje kod gojazne dece i adolescenata a prekomerna težina u detinjstvu je povezana sa lošim kardiovaskularnim ishodima i povećanom smrtnosti kod odraslih. Praćenje promena u prevalenci gojaznosti i njene budućeg uticaja na hronične bolesti i očekivani životni vek je od suštinskog značaja za razumevanje izazova i potencijalnih koristi od intervencija.

Ključne reči: Gojaznost, epidemija, prevencija, hronične nezarazne bolesti

Uvod

Prevalenca gojaznosti i prekomerne težine brzo raste u svim regionima sveta. Ovo je od velikog značaja za javno zdravlje jer projekcije sugerišu da će, kako dođe do značajnog povećanja gojaznosti, morbiditet povezan sa gojaznošću i njenim komplikacijama ugroziti povećanje očekivanog životnog veka i nametnuti neodrživa ekonomska opterećenja kako društvu tako i zdravstvenim službama. Stoga postoji hitna potreba da se interveniše kako bi se zaustavila rastuća epidemija (1). Gojaznost je prvobitno definisana analizom koja se odnosi na mortalitet, a ne morbiditet, koju je sproveda američka kompanija za osiguranje života Metropolitan (US Metropolitan Life Insurance Company) pre Drugog svetskog rata. Vrednost indeksa telesne mase

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(BMI) (kg/m^2), prilagođena za odeću i obuću osobe kojoj se određuje, od približno 25 definisala je granicu iznad koje se povećava stopa smrtnosti (2).

Vrednost BMI od 30 bila je 20% iznad ove gornje normalne granice BMI. 1995 godine je Svetska zdravstvena organizacija (1995) je prihvatila BMI kao metod za procenu stepena pothranjenosti i prekomerne težine i prihvatila je donju granicu BMI od 18,5 za razlikovanje normalne od nedovoljne težine (3). Ova vrednost BMI je postala granična tačka koja označava pothranjenost (4). Nakon niza stručnih konsultacija SZO o gojaznosti, 1997 godine, prekomerna telesna težina i gojaznost prihvaćene su kao globalni problem (5).

Uticaj gojaznosti na zdravlje

Identifikovanje uticaja prekomerne telesne težine na povećanje mortaliteta zahteva mnogo godina praćenja sa značajnim brojem subjekata i oprezom da se isključe druge pristrasnosti (6). Velike studije sa dugim periodima praćenja pokazuju da su stope smrtnosti od svih uzroka pa i ishemijske bolesti srca povećane u grupi ispitanika sa prekomernom težinom (7) a integrisane analize 33 kohortnih studija su pokazale da se rizik od nefatalnih i fatalnih kardiovaskularnih bolesti progresivno povećava sa povećanim BMI, dok uticaj na hemoragični moždani udar nije bio očigledan sve dok BMI nije bio preko 30 (8). Kolaborativne analize 57 prospektivnih studija koje su uključile oko 900.000 odraslih su otkrile da je kod oba pola smrtnost bila najniža na oko 22,5–25 kg/m^2 (9) i da je svako povećanje BMI od 5 kg/m^2 povezano sa oko 30% većom ukupnom smrtnosti.

Komorbidity kao što su hipertenzija i dijabetes u kombinaciji sa većom telesnom težinom označavaju stepen oštećenja ćelija i organa i daleko su snažniji prediktori rane smrti nego sam BMI (10). Invaliditet koji nastaje povećanjem telesne težine predstavlja ogroman društveni teret i utiče na mlađe pojedince i može da ih onemogućava fizički, mentalno, psihički, socijalno i ekonomski. Dijabetes tip 2 se sada sve više dijagnostikuje kod gojazne dece i adolescenata (11) a prekomerna težina u detinjstvu je povezana sa lošim kardiovaskularnim ishodima i povećanom smrtnosti kod odraslih (12). Komorbidity koji su suštinski povezani sa povećanim BMI, na primer, dijabetes, hipertenzija, kamen u žučnoj kesi i koronarna bolest srca su linearno povezani sa porastom vrednosti BMI (1).

Postoji snažan genetski uticaj na distribuciju masti, ali pušenje i konzumacija alkohola takođe povećavaju sklonost ka abdominalnoj gojaznosti. Rani nutritivni i drugi hendikepi, koji se delimično otkrivaju niskom porođajnom težinom, takođe su povezani sa kasnijom abdominalnom gojaznosti. Indijska, kineska i latinoamerička populacija sa izraženom istorijom neuhranjenosti u ranom detinjstvu posebno je sklona abdominalnoj gojaznosti sa visokim vrednostima obima struka čak kada je

BMI i niži od 25 (1). SZO je razvila statističke kriterijume za određivanje premale i prekomerne težine kod dece (3).

Dete koje ima manju telesnu težinu za svoje godine, uzrast ili manju težinu za visinu klasifikuje se kao abnormalno ako ne odstupa i iznad -2 standardne devijacije za svoj uzrast i pol. Stoga je više od 2 standardne devijacije za težinu za visinu uzeto kao pokazatelj prekomerne težine sa referentnim podacima iz složenih, preciznih podataka istraživanja u SAD, ali zasnovano na pretežno hranjenim bebama za koje se smatra da su zdrave. Iako je gojaznost, merena kao BMI, indeks viška telesne masti, postoji nekoliko načina za merenje viška telesne masti, kao što su bioimpedansa, denzitometrija i pletizmografija, ali poslednja dva su veoma skupa i nisu korišćena. za populacione studije. Dokazi iz niza zemalja pokazuju da težina ima tendenciju progresivnog povećanja kako pojedinci stare, sve dok ne dostigne vrhunac, a zatim počne da opada — obično nakon šeste decenije života. Većina podataka o BMI zasnovana je na visini i težini koju osobe same procenjuju, što potcenjuje prevalencu i otežava poređenje sa izmerenim podacima u studijama. Prekomerna težina i gojaznost su sada postali globalni problem i opasnost od viška kilograma počinje da odgovara teretu kardiovaskularnih bolesti, gde zemlje u razvoju sada imaju oko 80% svetskog tereta nezaraznih bolesti (1).

Izveštaj SZO preporučuje globalno praćenje prevalencije prekomerne težine i gojaznosti kod adolescenata (definisanih prema kriterijumima rasta SZO) i BMI izmerenih kod odraslih (13). Ekonomski razvoj zemlje, a posebno urbanizacija stanovništva, povezan je sa velikim porastom prevalencije gojaznosti (14). U siromašnijim zajednicama, žene srednjih godina su prve koje dobijaju višak kilograma, a zatim, kako se ekonomija razvija, žene progresivno postaju teže od muškaraca. U društvima u razvoju, bogatiji imaju veću prevalencu gojaznosti sa prosečnim indeksom telesne mase stanovništva koji se progresivno povećava kako nacionalni prihodi rastu na bruto domaći proizvod od oko 5000 dolara, a zatim dostižu vrhunac kod žena na 15.000 dolara i kod muškaraca na 17.000 dolara (15).

Gojaznost značajno povećava rizik od razvoja nezaraznih bolesti (16). Postoje dokazi da je gojaznost, posebno u srednjim i kasnijim godinama života, glavni faktor rizika za kognitivni pad, direktno i indirektno, jer povezana hipertenzija i dijabetes tip 2 povećavaju brzinu vaskularnih promena u mozgu (17). Uticaj na respiratornu funkciju je važan jer deca i odrasli nisu u stanju da se bave napornom fizičkom aktivnosti. Gojazni odrasli koji hodaju polako već koriste do 60% svog maksimalnog kapaciteta za vežbanje. Tako gojazni odrasli često rade manje od normalnog jer njihovi fizički napor veoma troši energiju. Uticaj na respiratornu funkciju je važan jer deca i odrasli nisu u stanju da se bave napornom fizičkom aktivnosti. Gojazni odrasli koji hodaju polako već koriste do 60% svog maksimalnog kapaciteta za vežbanje. Tako gojazni odrasli često rade manje od normalnog jer njihovi fizički napor veoma troši energiju. Povećanje telesne težine je takođe značajan hendikep kod osoba sa bilo kojim stepenom respiratornog oštećenja. Pacijenti sa astmom i hroničnom opstruktivnom

respiratornom bolesti mogu značajno da poboljšaju svoju toleranciju na vežbanje i udobnost ako izgube težinu. Povećanje telesne težine takođe povećava rizik od apneje u snu koja je povezana sa debljinom vrata i tendencijom ometanja disanja. Apneja se obično javlja noću i naizgled je bezopasna, predstavlja veliki medicinski hendikep povezan sa hipertenzijom otpornom na lekove zbog uporne indukcije simpatičkog nervnog sistema ponovljenim epizodama anoksije. Kada je ozbiljna, takođe je povezana sa većom stopom smrtnosti i može izazvati saobraćajne nesreće, dok gojazne osobe voze svoje automobile (1).

Bolovi u leđima i zglobovima su još jedan veliki problem koji dovodi do većeg odsustva sa posla kod gojaznih pacijenata. Izražena je uticaj mehaničke sile na zglobove i opterećenje mišićno-skeletnog sistema što dovodi do čestih izostajanja sa posla i reaktivne depresije kod mnogih gojaznih osoba (1).

Gojaznost kod dece

Međunarodna radna grupa za gojaznost (The International Obesity Task Force) razvila je međunarodni sistem klasifikacije prekomerne težine i gojaznosti kod dece (18) zasnovanu na vrednostima indeksa telesne težine (19), i definisala odnos u detinjstvu i odrasloj dobi uzimajući, u dobi od 18 godina, one percentile koji su odgovarali BMI od 25 i 30 i koristeći te iste percentile u celom rasponu uzrasta u detinjstvu za određivanje prekomerne težine i gojaznosti u detinjstvu kod devojčica i dečaka odvojeno. SZO je razvila novi pristup za definisanje normalnog rasta dece (20) sa podacima iz velike multinacionalne studije koja uključuje decu u Kaliforniji, Norveškoj, Indiji, Omanu, Gani i Brazilu. SZO je zatim razvila referentni skup podataka o rastu dece od 5 do 20 godina koji se još uvek zasniva na američkim podacima (21), što pedijatri smatraju nerealnim i zbunjujućim u svakodnevnoj praksi (22). Deca sa prekomernom težinom prema klasifikaciji SZO pokazuju veću sklonost ka hipertenziji, viši nivo insulina i mokraćne kiseline i druge indekse insulinske rezistencije (23).

Deca se ne rađaju gojazna, ali svakako postaju gojazna. Većina studija pokazuje da se telesna težina povećava sa godinama (24). Porast telesne težine je takođe veći ukoliko već postoji problem sa prekomernom težinom i veća je verovatnoća za gojaznost kod devojčica nego kod dečaka. Kod dece starije od 5 godina, prisutna prekomerna težina donosi rizik od najmanje 40% da se ova prekomerna težina/gojaznost zadrži i u odraslom životu, a do sredine tinejdžerskih godina rizik se povećao na 60–75%. Barlow i Dietz (1998) su se u svom istraživanju fokusirali na decu stariju od 3 godine, ali sada postoji veoma zabrinjavajući porast prevalence i kod beba sa visokom porođajnom težinom i prisutnom gojaznosti kod dece od 1 do 5 godina (25). Većina dece uzrasta od 1 do 5 godina sa BMI većim od 2 standardne devijacije nalazi se u zemljama sa nižim prihodima sa značajnim porastom ove prevalence od 1990 godine (26). Povećanje telesne težine kod dece izaziva mnoge probleme u ranom detinjstvu,

uključujući, u težim stepenima prekomerne težine, razvojne abnormalnosti zglobova i udova koji nose težinu. Metabolički problemi kao što su insulinska rezistencija, viši krvni pritisak i dislipidemija takođe su evidentni kod gojazne i gojazne dece čak i kada su mladi i veći BMI čak i unutar normalnog, odnosno manje od 2 standardne devijacije kod dece od 7 do 13 godina predviđa ranu smrt i kardiovaskularne komplikacije (27).

Geni evidentno utiču na ljudsku fiziologiju i njenu adaptaciju, ali brzi rast gojaznosti mora biti posledica faktora sredine, a ne genetskih uticaja, jer je genetski fond relativno konstantan. Genetski faktori su važni u svom uticaju na sklonost ka povećanju telesne težine kroz interakcije gen-sredina. Istraživanja na genima koji uzrokuju osetljivost na dijabetes tip 2 identifikovala su zajedničku varijantu gena povezanog sa masnim naslagama i gojaznošću i MC4R gena koji predisponira dijabetes kroz uticaj na BMI. Ovo je očigledno od starosti od 7 godina i odražava specifično povećanje masne mase, možda izraženo kroz povećan apetit. Ovo je očigledno od starosti od 7 godina i odražava specifično povećanje masnih naslaga, možda izraženo kroz povećan apetit (1).

Oko 10% dečaka i 9% devojčica starosti od 5 do 17 godina širom sveta ima prekomernu težinu ili gojaznost, odnosno ukupno 118 miliona. Kod male dece, pojavljuju se dokazi o smanjenju uzlaznih trendova (1). Analiza u devet zemalja, uključujući Englesku, Sjedinjene Američke Države, Švedsku, Kinu, Australiju, Holandiju i Švajcarsku, takođe je prijavila smanjenje gojaznosti kod dece i tinejdžera od 2 do 19 godina (28). Ovi obećavajući trendovi možda neće potrajati i godišnje praćenje podataka zdravstvenih anketa je imperativ za evaluaciju napretka.

Iako je prevencija gojaznosti kod dece politički privlačna, nije verovatno da će doneti brze promene u zdravlju stanovništva i neće učiniti da smanje zdravstveni troškovi epidemije dijabetesa i hipertenzije izazvane gojaznošću, tako da ima zane-marljiv uticaj na teret bolesti u narednih 40 godina. Međutim, intervencija od 18 godina nadalje donosi veću korist, tako da je fokus na odrasle posebno koristan iz nekoliko razloga: incidenca gojaznosti je najveća u ranoj odrasloj dobi sa daljim progresivnim porastom i praćena je sve većim apsolutnim rizikom od bolesti. Roditelji kao odrasli takođe mogu da budu uzori svojoj deci (29).

Fizička neaktivnost

Postoje dokazi da procesi industrijalizacije mogu doprineti uočenim disparitetima u fizičkoj aktivnosti (30). Sa produženim periodom sedenja, manje kontrakcija skeletnih mišića može dovesti do smanjene aktivnosti lipoprotein lipaze i klirensa triglicerida, smanjenog klirensa oralnog opterećenja glukozom i manjeg lučenja insulina stimulisanog glukozom (31). Štaviše, vreme provedeno u sedentarnom položaju je povezano sa povećanom kardiovaskularnom smrtnosti i smrtnosti od svih uzroka (vreme provedeno u gledanju televizije, ukupno dnevno vreme sedenja i vreme provedeno sedeći u automobilima) (32).

Smanjena fizička aktivnost i nezdrave navike u ishrani dovele su do povećanja gojaznosti među mladim ljudima u mnogim zemljama koja, ako se nastavi u odrasloj dobi (kao što je često slučaj), predstavlja značajan rizik po zdravlje (33). Očigledni termodinamički principi energetskog balansa zahtevaju promene u ishrani i smanjenoj fizičkoj aktivnosti. Jeftiniji automobili za lični prevoz i mehanička i električna pomagala za otklanjanje fizičkih zahteva u kući i na poslu doveli su do značajnog smanjenja fizičkog napora. Pojava kompjutera i televizije znači da se u mnogim bogatim društvima može zaraditi odlična nadnica i uživati u slobodnom vremenu bez ikakvog fizičkog napora. Dečje navike se takođe transformišu izuzetnim sekularnim povećanjem vremena provedenog gledajući televiziju ili igrajući video igre (1).

Prevenција gojaznosti

Promene u populacijskom BMI-u u različitim starosnim dobima naglašavaju važnost borbe ne samo sa gojaznošću već i sa prekomernom težinom. Strategije se u početku mogu razmatrati na osnovu ispravljanja glavnih društvenih sila koje trenutno promovišu epidemiju, fizičku neaktivnost i unos energije. Postoje veoma moćne sile životne sredine koje promovišu debljanje koje pojedinac ne kontroliše. Dakle, gojaznost je opisana kao pasivan normalan odgovor ljudi na preovlađujuće neprikladno okruženje.

Lična odgovornost igra ključnu ulogu u povećanju telesne težine, ali ljudska biologija je preplavljena efektima današnjeg „gojaznog” okruženja, sa obiljem hrane bogate energijom, motorizovanim transportom i sedentarnim načinom života. Dakle, stanovništvo postaje teže samo živeći u svom okruženju. To znači da su oni koji uspešno ostanu vitki tokom života ili genetski srećni ili imaju prednost u obrazovnom, socijalnom ili finansijskom smislu da izdrže uticaj životne sredine i često za sebe stvaraju ono što je u stvari zdravo mikrookruženje.

Automobil, mehanička pomagala, kompjuterizacija brojnih procesa i pojava internet komunikacija su tokom decenija značajno doprineli smanjenju prosečne količine fizičke aktivnosti za 750–1000 kcal/dan. Ipak, preokretanje ovih novih navika kao koherentne strategije javnog zdravlja nije najbolja opcija. Kako najbolje kombinovati trenutna saznanja predstavlja izazov:

1. najefikasnije inicijative na osnovu koherentnih ispitivanja prevencije;
2. najisplativije inicijative;
3. najizvodljivije inicijative na osnovu karakteristika društvene organizacije zemlje, kulturnih percepcija i političkog sistema;
4. da li postoje druge političke inicijative u oblastima koje utiču na hranu i fizičku aktivnost koje treba integrisati ili, ako su u suprotnosti, rešiti.

Trenutno usvojene strategije u velikoj meri zavise od političke prirode zemlje u rasponu od utilitarnog regulatornog pristupa do uobičajenijeg neintervencijskog pristupa ličnoj odgovornosti (1). SZO je postavila kao cilj smanjenje prerane smrtnosti od nezaraznih bolesti za 25% do 2025. godine i smanjenje daljeg povećanja gojaznosti odraslih i adolescenata (13).

Trenutni fokus na prekomernoj težini/gojaznosti u detinjstvu je opravdan, uprkos ograničenim ranim ekonomskim doprinosima, po nekoliko osnova:

- Ni javnost ni većina kreatora politike ne okrivljuju pojedinačno decu za svoj problem sa prekomernom telesnom težinom, a samo nekolicina pokušava da krivicu pripiše njihovim roditeljima. Ovaj fokus na detinjstvo ima politički korisno mesto u ubeđivanju javnosti i političara da prepoznaju važnost faktora životne sredine, a ne individualnih, i da učine nešto drugo osim zagovaranja lečenja već nastalog problema.
- Prepoznato je da kod starije dece prekomerno dobijanje telesne težine uzrokuje daleko veće opterećenje bolešću tokom njihovog života i mnogo veću verovatnoću prerane smrti.
- Fokus na deci takođe je u skladu sa rutinskom praksom da je ključ za problem gojaznosti obrazovanje i postoji zasluga u obrazovanju deteta tako da se ne ponaša kao njihovi roditelji.
- Ako se kreatori politika žele fokusirati na određenu socijalnu grupu, onda su deca školskog uzrasta koristan izbor, jer je zagarantovano da se može dopreti do njih u većini društava putem inicijative koju posreduje škola (1).

Zaključak

Praćenje promena u prevalenci gojaznosti i njene budućeg uticaja na hronične bolesti i očekivani životni vek je od suštinskog značaja za razumevanje izazova i potencijalnih koristi od intervencija. Ovo se posebno odnosi na decu kod kojih se zdravstveni uticaj gojaznosti i prekomerne težine generalno neće manifestovati sve dok ne dostignu zrele godine života. Prevencija gojaznosti zahteva rigorozne integrisane politike vlada koje su pod velikim uticajem velikih globalne industrija koje se trenutno opiru promeni svoje prakse.

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OBESITY – THE MODERN AGE PANDEMIC OF SPECIAL SIGNIFICANCE

Abstract: The prevalence of obesity is growing rapidly in all regions of the world. This is of great importance for public health because morbidity associated with obesity and its complications reduces life expectancy and imposes unsustainable economic burdens on both society and health services. Reduced physical activity and unhealthy eating habits have led to an increase in obesity among young people in many countries which poses a significant health risk. Obesity significantly increases the risk of developing non-communicable diseases. Type 2 diabetes is increasingly being diagnosed in obese children and adolescents, and being overweight in childhood is associated with poor cardiovascular outcomes and increased adult mortality. Monitoring changes in the prevalence of obesity and its future impact on chronic diseases and life expectancy is essential to understanding the challenges and potential benefits of interventions.

Keywords: Obesity, epidemic, prevention, chronic non-communicable diseases

Introduction

The prevalence of obesity and overweight is rapidly increasing in all regions of the world. This is of great importance to public health because projections suggest that as obesity rates significantly rise, the morbidity associated with obesity and its complications will threaten the increase in life expectancy and impose unsustainable economic burdens on both society and healthcare services. Therefore, there is an urgent need for intervention to halt the growing epidemic (1). Obesity was initially defined by an analysis relating to mortality rather than morbidity, conducted by the US Metropolitan Life Insurance Company before

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World War II. The value of body mass index (BMI) (kg/m^2), adjusted for the person's clothing and footwear, set at approximately 25, defined the threshold above which mortality rates increased (2). A BMI value of 30 was 20% above this upper normal BMI limit. In 1995, the World Health Organization (WHO) accepted BMI as a method for assessing the degree of malnutrition and overweight, adopting a lower BMI limit of 18.5 to differentiate between normal and underweight (3). This BMI value became the threshold indicating malnutrition (4). Following a series of expert consultations on obesity, in 1997, overweight and obesity were recognized as global problems (5).

The Impact of Obesity on Health

Identifying the effects of being overweight on increased mortality requires many years of follow-up with a significant number of subjects and caution to eliminate other biases (6). Large studies with long-term follow-up periods show that mortality rates from all causes, including ischemic heart disease, are increased in the group of individuals with overweight (7), and integrated analyses of 33 cohort studies have shown that the risk of non-fatal and fatal cardiovascular diseases progressively increases with higher BMI, while the impact on hemorrhagic stroke is not evident until BMI exceeds 30 (8). Collaborative analyses of 57 prospective studies involving approximately 900,000 adults revealed that mortality was lowest at around 22.5-25 kg/m^2 for both sexes (9) and that every 5 kg/m^2 increase in BMI was associated with about a 30% higher overall mortality.

Comorbidities such as hypertension and diabetes in combination with higher body weight indicate the degree of cellular and organ damage and are far stronger predictors of premature death than BMI alone (10). Disability resulting from weight gain represents a significant social burden and affects younger individuals, disabling them physically, mentally, psychologically, socially, and economically. Type 2 diabetes is increasingly diagnosed in obese children and adolescents (11), and childhood overweight is associated with poor cardiovascular outcomes and increased adult mortality (12). Comorbidities that are intrinsically linked to higher BMI, such as diabetes, hypertension, gallstones, and coronary heart disease, are linearly associated with increasing BMI values (1).

There is a strong genetic influence on fat distribution, but smoking and alcohol consumption also increases the predisposition to abdominal obesity. Early nutritional and other disadvantages, partly manifested by low birth weight, are also associated with later abdominal obesity. The Indian, Chinese, and Latino populations with a history of early childhood malnutrition are particularly prone to abdominal obesity, with high waist circumference values even when BMI is below 25 (1). The WHO has developed statistical criteria for determining underweight and overweight children (3).

A child who has lower body weight for their age, height, or weight-for-height is classified as abnormal if it deviates more than -2 standard deviations for their age and sex. Thus, more than 2 standard deviations for weight-for-height is considered an indicator of overweight, based on reference data from complex, precise research data in the US but predominantly based on well-nourished infants considered to be healthy. Although obesity, measured by BMI, is an index of excess body fat, there are several ways to measure excess body fat, such as bioimpedance, densitometry, and plethysmography, but the latter two are costly and are not used for population studies. Evidence from various countries shows that weight tends to increase progressively as individuals age until it reaches its peak and then begins to decline, usually after the sixth decade of life. Most BMI data are based on height and weight self-reported by individuals, which underestimates the prevalence and complicates comparison with measured data in studies. Overweight and obesity have now become a global problem, and the threat of excess weight is starting to match the burden of cardiovascular diseases, where developing countries now bear about 80% of the global burden of non-communicable diseases (1).

The WHO report recommends global monitoring of the prevalence of overweight and obesity in adolescents (defined according to WHO growth criteria) and BMI measurements in adults (13). The economic development of a country, particularly population urbanization, is associated with a significant increase in the prevalence of obesity (14). In poorer communities, middle-aged women are the first to gain excess weight, and as the economy develops, women progressively become heavier than men. In developing societies, wealthier individuals have a higher prevalence of obesity, with the average body mass index of the population progressively increasing as national income reaches a gross domestic product of around \$5000, peaking in women at \$15,000 and in men at \$17,000 (15).

Obesity significantly increases the risk of developing non-communicable diseases (16). There is evidence that obesity, particularly in the middle and later years of life, is a major risk factor for cognitive decline, both directly and indirectly, as obesity-related hypertension and type 2 diabetes increase the rate of vascular changes in the brain (17). The impact on respiratory function is important as both children and adults are unable to engage in vigorous physical activity. Obese adults who walk slowly already utilize up to 60% of their maximum exercise capacity. Therefore, obese adults often work less than normal because their physical exertion consumes a significant amount of energy. Weight gain is also a significant handicap for individuals with any degree of respiratory impairment. Patients with asthma and chronic obstructive pulmonary disease can significantly improve their exercise tolerance and comfort by losing weight. Weight gain also increases the risk of sleep apnea, which is associated with neck circumference and breathing disruption tendencies. Apnea typically occurs at night and may seem harmless, but it represents a significant medical handicap associated with drug-resistant hypertension due to the persistent activation of the sympathetic

nervous system from repeated episodes of oxygen deprivation. When severe, it is also associated with higher mortality rates and can lead to traffic accidents when obese individuals drive their cars (1).

Back and joint pain is another major problem that leads to increased work absenteeism among obese patients. The mechanical force exerted on the joints and the burden on the musculoskeletal system results in frequent work absences and reactive depression in many obese individuals (1).

Childhood Obesity

The International Obesity Task Force has developed an international classification system for overweight and obesity in children (18) based on body mass index (BMI) values (19). They defined the relationship between childhood and adulthood by using the BMI percentiles corresponding to 25 and 30 at the age of 18 and applying these percentiles across all age ranges in childhood to determine overweight and obesity separately for girls and boys. The WHO has developed a new approach for defining normal growth in children (20) using data from a large multinational study that includes children from California, Norway, India, Oman, Ghana, and Brazil. The WHO then developed a reference data set for the growth of children aged 5 to 20 years, still based on US data (21), which pediatricians consider unrealistic and confusing in everyday practice (22). Children classified as overweight according to the WHO classification show a higher tendency towards hypertension, higher levels of insulin and uric acid, and other indices of insulin resistance (23).

Children are not born obese, but they certainly become obese. Most studies show that body weight increases with age (24). Weight gain is also greater if there is already a problem with being overweight, and the likelihood of obesity is higher in girls than in boys. In children over 5 years old, having excess weight carries a risk of at least 40% that this excess weight/obesity will persist into adulthood, and by mid-adolescence, the risk increases to 60-75%. Barlow and Dietz (1998) focused their research on children over 3 years old, but there is now a very concerning increase in the prevalence of high birth weight and obesity in children aged 1 to 5 years (25). Most children aged 1 to 5 years with a BMI greater than 2 standard deviations are found in low-income countries with a significant increase in prevalence since 1990 (26). Weight gain in children causes many problems in early childhood, including, in severe cases of overweight, developmental abnormalities in weight-bearing joints and limbs. Metabolic problems such as insulin resistance, higher blood pressure, and dyslipidemia are also evident in overweight and obese children, even when they are young, and have higher BMI even within the normal range. Having a BMI of less than 2 standard deviations in children aged 7 to 13 years predicts early death and cardiovascular complications (27).

Genes influence human physiology and adaptation, but the rapid rise in obesity must be attributed to environmental factors rather than genetic influences, as the genetic pool remains relatively constant. Genetic factors are important in their influence on the predisposition to weight gain through gene-environment interactions. Studies on genes causing susceptibility to type 2 diabetes have identified a common variant of a gene associated with fat accumulation and obesity, as well as the MC4R gene that predisposes to diabetes through its influence on BMI. This becomes apparent from the age of 7 and reflects a specific increase in fat mass, possibly manifested through increased appetite (1).

Approximately 10% of boys and 9% of girls aged 5 to 17 worldwide are overweight or obese, totaling 118 million individuals. Among young children, evidence of decreasing trends is emerging (1). Analyses in nine countries, including England, the United States, Sweden, China, Australia, the Netherlands, and Switzerland, have also reported a decline in obesity among children and adolescents aged 2 to 19 years (28). These promising trends may not be sustained, and annual monitoring of health survey data is imperative to assess progress.

Although childhood obesity prevention is politically appealing, it is unlikely to bring about rapid changes in population health and will not significantly impact the healthcare costs of obesity-related epidemics such as diabetes and hypertension, thus having a negligible impact on disease burden over the next 40 years. However, interventions from the age of 18 onwards yield greater benefits, making a focus on adults particularly beneficial for several reasons: the incidence of obesity is highest in early adulthood with further progressive increase and is accompanied by an increased absolute risk of disease. Parents as adults can also serve as role models for their children (29).

Physical Inactivity

There is evidence that the processes of industrialization can contribute to the observed disparities in physical activity (30). Prolonged sitting time, with fewer contractions of skeletal muscles, can lead to reduced activity of lipoprotein lipase and triglyceride clearance, decreased oral glucose tolerance clearance, and lower insulin secretion stimulated by glucose (31). Moreover, time spent in a sedentary position is associated with increased cardiovascular and all-cause mortality (time spent watching television, total daily sitting time, and time spent sitting in cars) (32).

Reduced physical activity and unhealthy dietary habits have led to an increase in obesity among young people in many countries, which, if continued into adulthood (as is often the case), poses a significant health risk (33). The apparent thermodynamic principles of energy balance require changes in diet and reduced physical activity. Cheaper personal transportation options and mechanical and electrical aids to elim-

inate physical demands at home and work have resulted in a significant reduction in physical exertion. The advent of computers and television means that in many affluent societies, one can earn a good wage and enjoy leisure time without any physical effort. Children's habits are also being transformed by a significant secular increase in time spent watching television or playing video games (1).

Prevention of Obesity

Changes in population BMI at different ages emphasize the importance of addressing not only obesity but also overweight. Strategies can initially be considered based on correcting the major social forces currently promoting the epidemic, namely physical inactivity and energy intake. There are powerful environmental forces promoting weight gain that individuals do not control. Therefore, obesity is described as a passive normal response of people to the prevailing inappropriate environment.

Personal responsibility plays a crucial role in weight gain, but human biology is inundated with the effects of today's "obesogenic" environment, with abundant energy-dense food, motorized transportation, and sedentary lifestyles. Thus, the population becomes heavier simply by living in its environment. This means that those who successfully remain lean throughout their lives are either genetically fortunate or have advantages in education, social status, or financial means to withstand the influence of the environment and often create a healthy microenvironment for themselves.

The advent of automobiles, mechanical aids, computerization of various processes, and the emergence of internet communication has significantly contributed to a reduction in average physical activity levels by 750-1000 kcal/day over the decades. However, reversing these new habits as a coherent public health strategy is not the optimal choice. The challenge lies in combining current knowledge effectively, considering:

1. Most effective initiatives are based on coherent prevention research.
2. Most cost-effective initiatives.
3. Feasible initiatives based on the country's social organization characteristics, cultural perceptions, and political system.
4. Whether there are other political initiatives in areas impacting food and physical activity that need to be integrated or resolved if they contradict each other.

Currently adopted strategies largely depend on the political nature of the country, ranging from a utilitarian regulatory approach to a more common

non-interventionist approach emphasizing personal responsibility (1). The WHO has set a goal of reducing premature deaths from non-communicable diseases by 25% by 2025 and slowing down the further increase in adult and adolescent obesity (13).

The current focus on overweight/obesity in childhood is justified, despite limited early economic contributions, for several reasons:

- Neither the public nor the majority of policymakers blames individual children for their weight problems, and only a few try to attribute blame to their parents. This focus on childhood has a politically useful place in convincing the public and politicians to recognize the importance of environmental factors rather than individual factors and to do something other than advocating for treating an already established problem.
- It is recognized that excessive weight gain in older children leads to a far greater disease burden throughout their lives and a much higher likelihood of premature death.
- Focusing on children is also consistent with the routine practice that education is the key to the obesity problem, and there is merit in educating the child so they do not behave like their parents.
- If policymakers want to focus on a specific social group, then school-age children are a useful choice because they can be reached through school-based initiatives in most societies (1).

Conclusion

Monitoring changes in the prevalence of obesity and its future impact on chronic diseases and life expectancy is crucial for understanding the challenges and potential benefits of interventions. This is particularly relevant for children, in whom the health effects of obesity and overweight generally do not manifest until they reach adulthood. Obesity prevention requires rigorous integrated government policies that are greatly influenced by major global industries that are currently resistant to changing their practices.

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