Obesity and gastrointestinal disorders in children

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Objectives

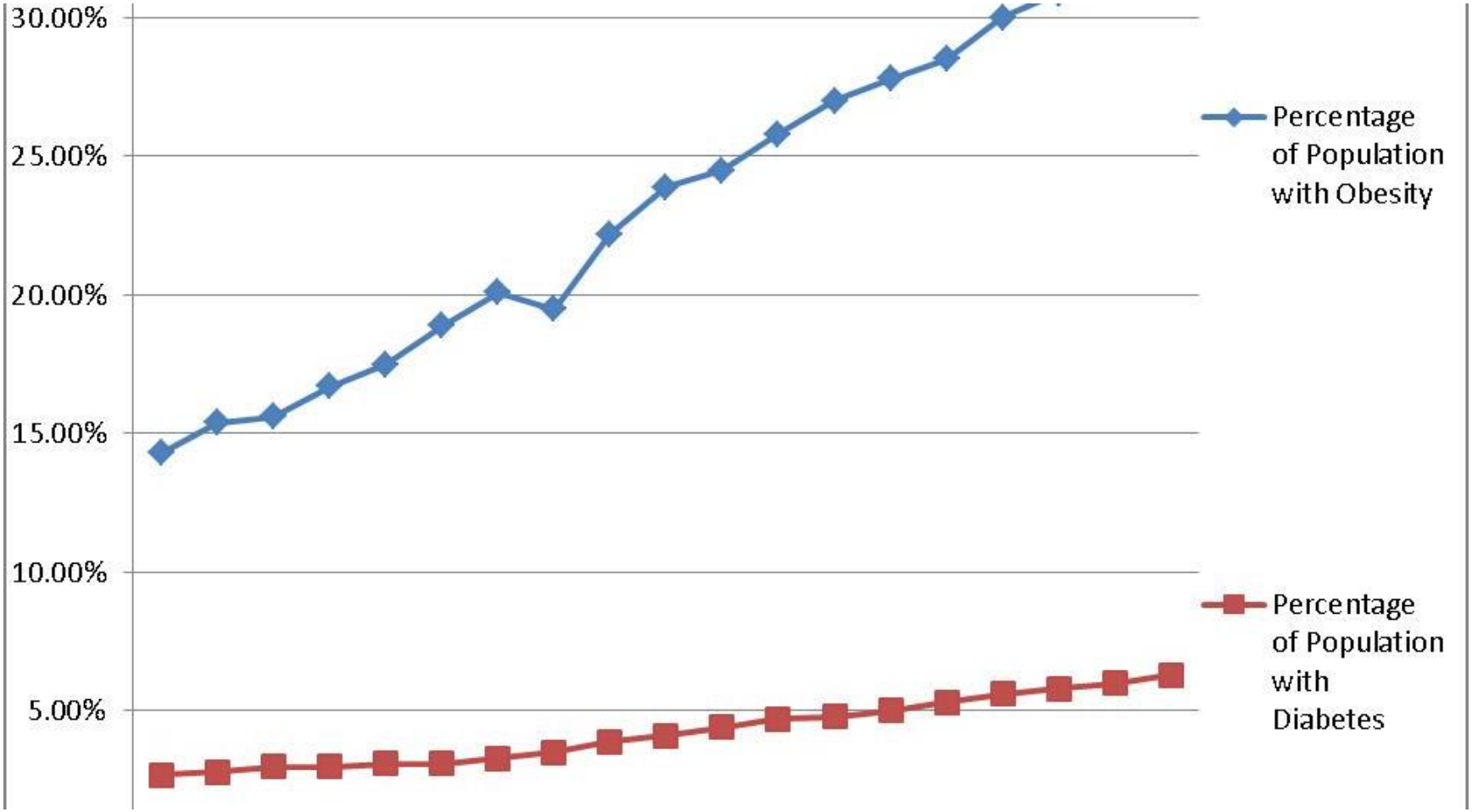
- Discuss GI disorders associated with obesity
  - Functional GI disorders
  - Organic GI disorders
- Discuss possible mechanisms of association
- Discuss the clinical significance/implications of the association between obesity and GI disorders

TIME

The Obesity Epidemic in America

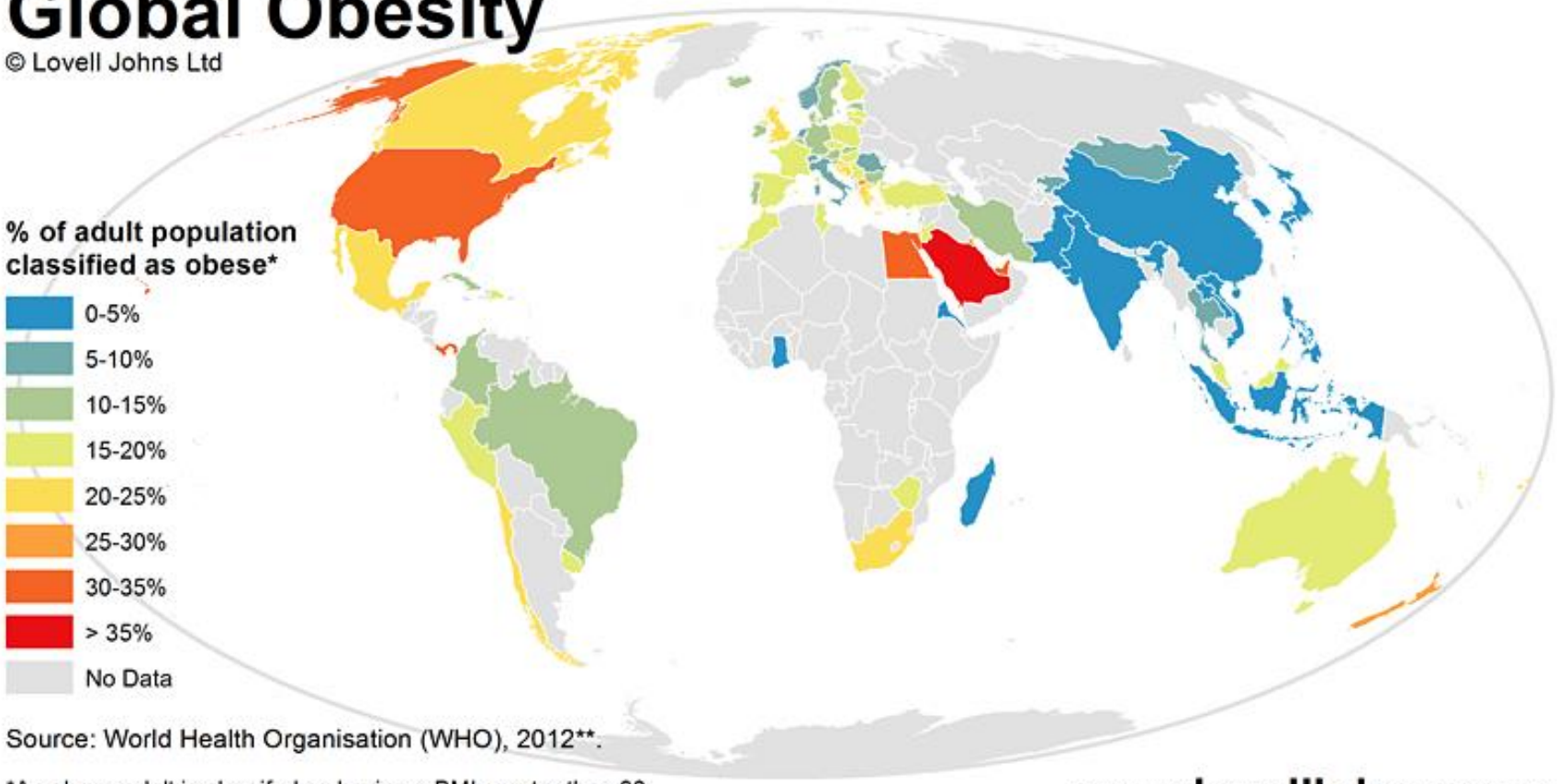


Obesity growth trend in the US



Global Obesity

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Source: World Health Organisation (WHO), 2012**.

*An obese adult is classifed as having a BMI greater than 30.
**The map uses the latest available data which varies in year of data collection.

www.lovelljohns.com

Global obesity pandemic

- Estimated 500 million obese adults
- Estimated 1.5 billion overweight or obese individuals worldwide



CDC GROWTH CHARTS

WEIGHT STATUS CATEGORY	PERCENTILE RANGE
Underweight	Less then 5th centile
Normal weight	5th to less than 85th centile
Overweight	85th to less than 95th centile
Obese	95th centile or greater



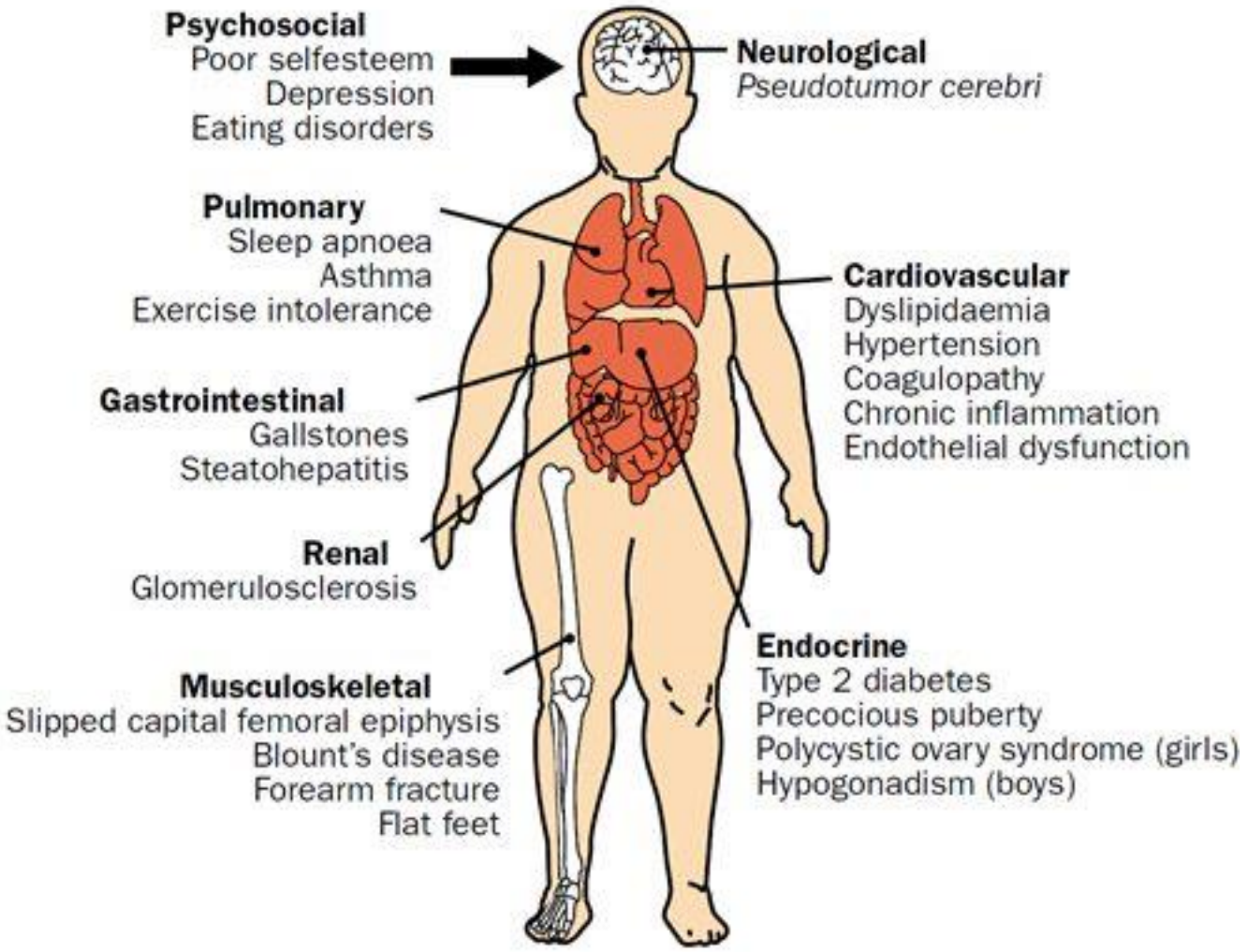
- Per center for disease control, almost 17% (12.7 million) children and adolescents in the US are ≥ 95th centile for weight

- About 16% adolescents are overweight.

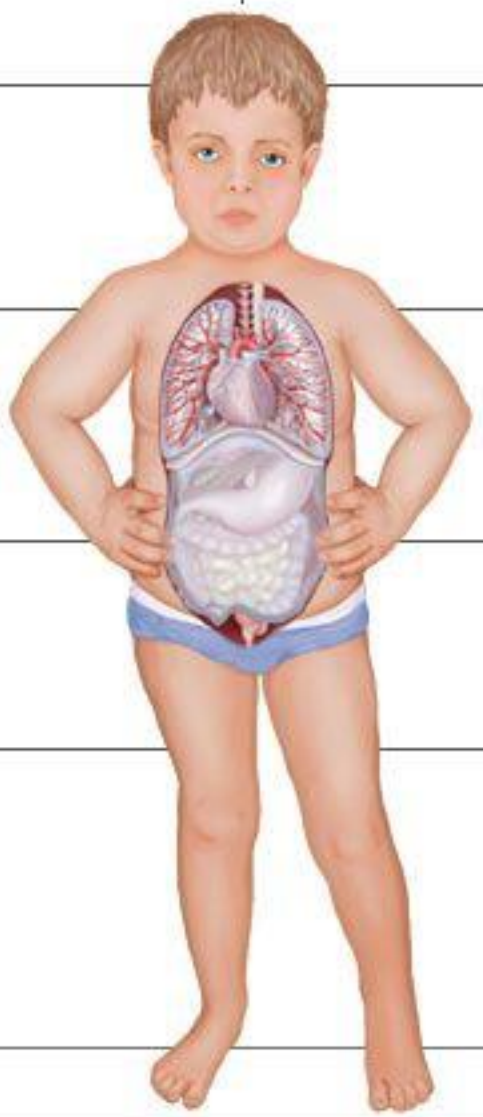
- Global issue, affecting developed and developing countries

Ogden et al. JAMA 2006
Rajindrajith S et al. J Neurogastroenterol Motil 2014

COMPLICATIONS OF CHILDHOOD OBESITY



Childhood Obesity Complications



Psychological
Stress and Anxiety
Eating Disorder Risk
Poor Self-esteem
Poor Social Skills
Social Isolation

Pulmonary
Asthma
Exercise Intolerance
Sleep Disorders
Sleep Apnea

Gastrointestinal
Fatty liver
Gallstone
Acid Reflux

Musculoskeletal
Bone and Joint Disorders
Flat Feet
Blout's Disease
Femoral Epiphysis

Central
Fatique
Skin Infections
Skin Rashes

Cardiovascular
Hypertension
Heart Disease
Blood Clots
High Cholesterol
Endothelial Dysfunction

Renal
Kidney Disease
Glomerulosclerosis
Kidney Failure

Endocrine
Diabetes
Early Puberty
Polycystic Ovary (Girls)
Hypogonadism (Boys)

Obesity and overweight are also associated with functional and organic gastrointestinal disorders

Phatak UP, Pashankar DS. JPGN 2015

Obesity and GER/GERD

- Adult and pediatric studies show positive association

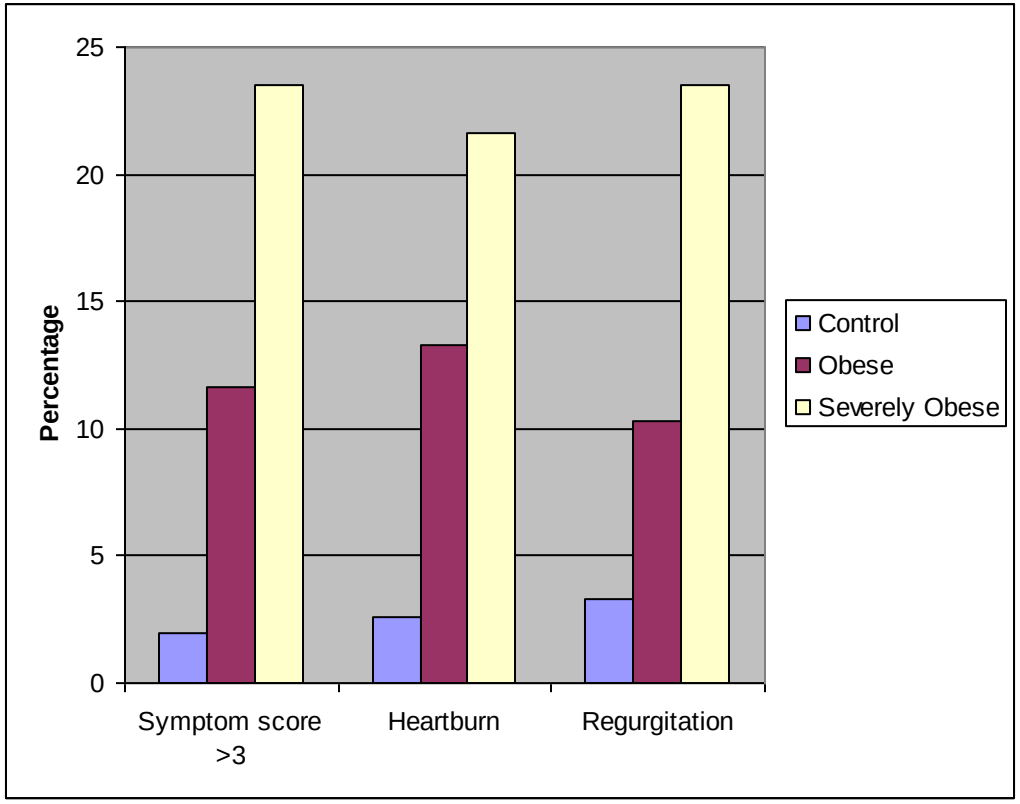
- Possible mechanism – extrinsic gastric compression leading to increase in intra-gastric pressure and subsequent relaxation of LES, increased esophageal acid exposure

Malaty H et al. Clin Exp Gastroenterol 2009
Pashankar DS et al. J Clin Gastroneterol 2009
Teitelbaum et al. J Pediatr 2009

Obese vs. controls

	Obese N= 283	Control N=153	P value
Positive score	13.8 %	1.9%	< 0.001
Heartburn	14.8%	2.6%	<0.001
Regurg	11.7%	3.3%	<0.01

Influence of BMI on symptoms



Obesity and GER/GERD

- Obese Adults: risk for complications of GER – Barretts esophagus, esophageal adenocarcinoma

- Obesity and Reflux esophagitis. 2 studies show no association.

Elitsur et al Metab Syndr Relat Disord 2009
Patel N et al. J Obes 2010

Obesity and constipation

- All pediatric studies in US show positive association between obesity and functional constipation

- Phatak UP, Pashankar DS:
  - 450 children
  - Primary care clinic + private practice
  - Rome III criteria for functional constipation
  - Prevalence of constipation – 18%
  - Obese/overweight children with higher prevalence as compared to healthy normal-weight counterparts (23% vs. 14%, p=0.01)

Fishman et al. J Pediatr 2004
Pashankar DS et al. Pediatrics 2005
Misra et al J Parental Enteral Nutr
Phatak UP et al. Int J Obes 2014

Obesity and abdominal pain-related functional GI disorders

Irritable Bowel Syndrome

Functional Abdominal Pain

Obesity and Irritable bowel syndrome

- Adult data is conflicting
- Pediatric data limited to 2 studies
- Both studies show significant relation between IBS and obesity

Phatak UP et al. Int J Obes 2014
Teitelbaum et al. J Pediatr 2009

Obesity and Functional abdominal pain

- Positive relation between obesity and recurrent abdominal pain

- Subsequent 2 studies have not shown this association
  - Validated ROME III criteria used

Malaty et al. Acta Paediatr 2007
Phatak UP et al. Int J Obes 2014
Teitelbaum et al. J Pediatr 2009

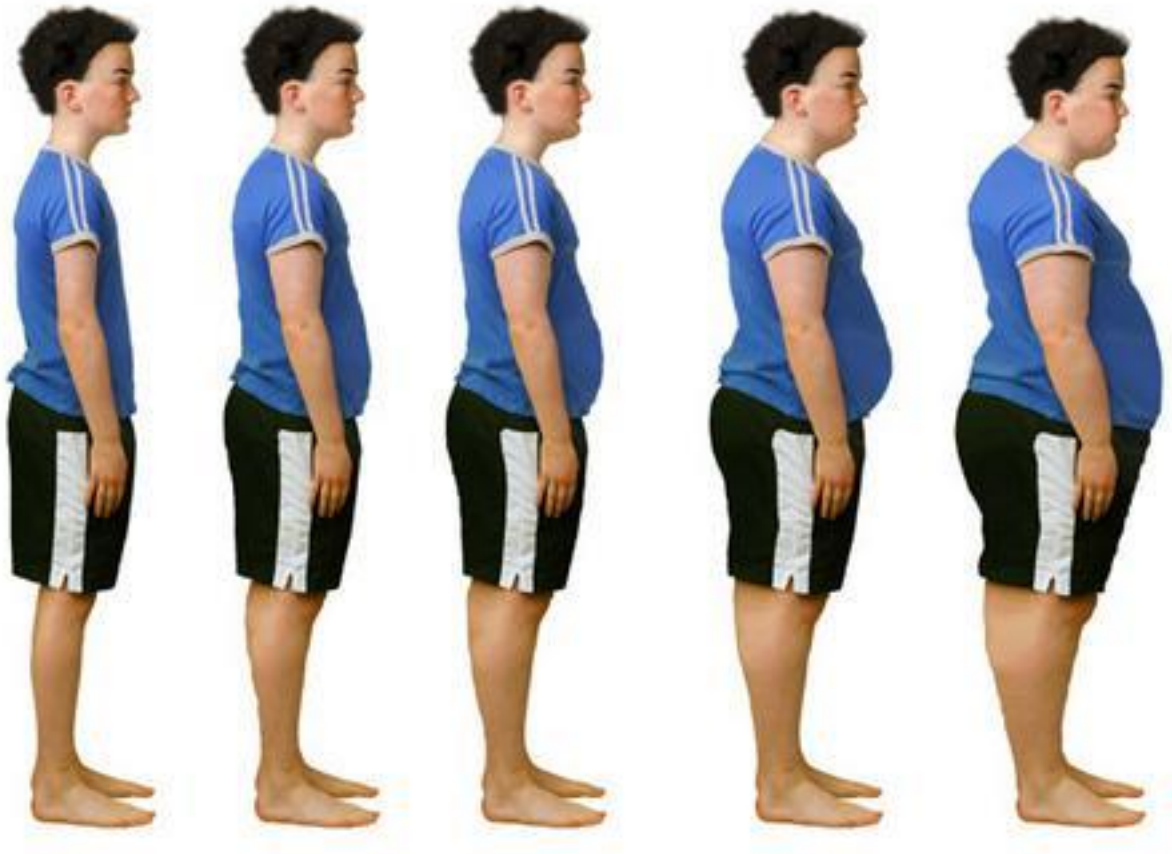
Obesity and Organic GI disorders

Celiac disease

Inflammatory bowel disease

Obesity and celiac disease

The changing look of celiac disease



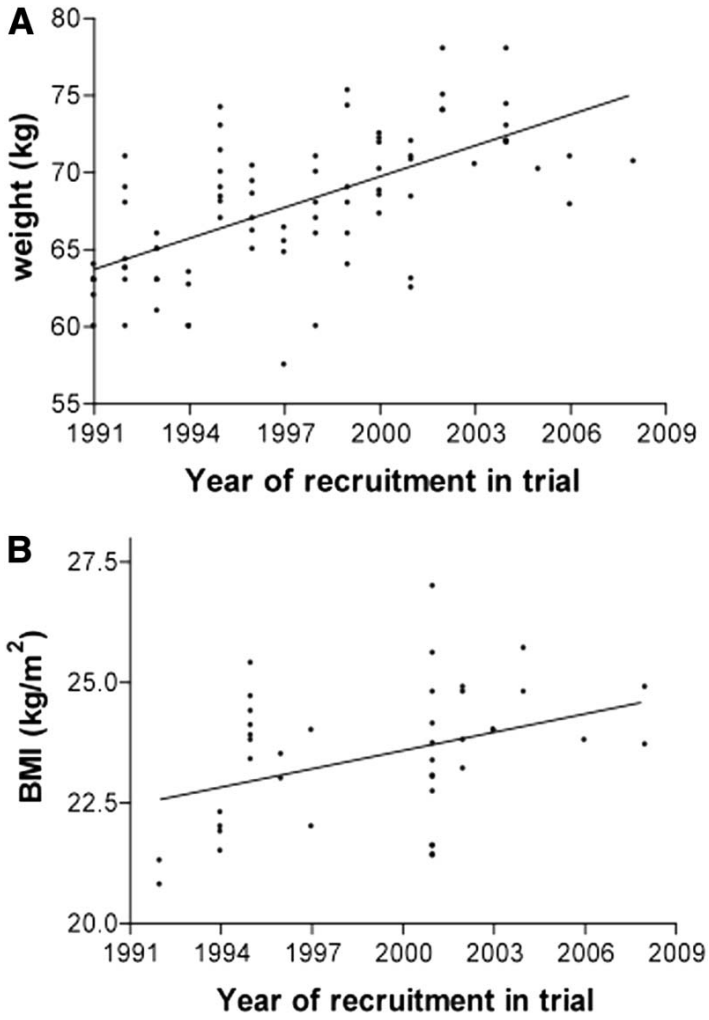
Obesity and celiac disease

Supplementary Table 4. Body mass index status and celiac disease

References	Sample size	Underweight at presentation	Overweight/obese at presentation	Effect of gluten-free diet
Norsa et al (28)	114	9.6%	14.1%	Increase in BMI. Increase in overweight/obesity to 19.4%
Reilly et al (29)	142	7%	19%	Decrease in BMI z-score in 75%
Valletta et al (30)	149	5%	14%	Increase in BMI z-score Increase in overweight/obese to 25%
Brambilla et al (31)	150	16%	12 %	Decrease in overweight/obese to 9.4%
Venkatasubramani et al (32)	143	Not known	5%	Decrease in overweight/obesity to 3%

Rates of obesity/overweight higher than that being underweight

Obesity and Inflammatory bowel disease – Time trend analysis showing increase in BMI over time



Obesity and Inflammatory bowel disease

- Kugathasan et al: 10% of CD patients and 30% patients with IBD were overweight

- African American race and Medicaid insurance positively associated with overweight/obese status.

Moran et al. Inflamm Bowel Dis 2013
Kugathasan et al. J Pediatr 2007
Long et al. Inflamm Bowel Dis 2011

Possible mechanisms of association

- Diet: Excess sugar, excess fat, low fiber
- Psychosocial factors: depression, anxiety, low self-esteem
- Neuropeptides: leptin, ghrelin
- Gut microbiome - dysbiosis

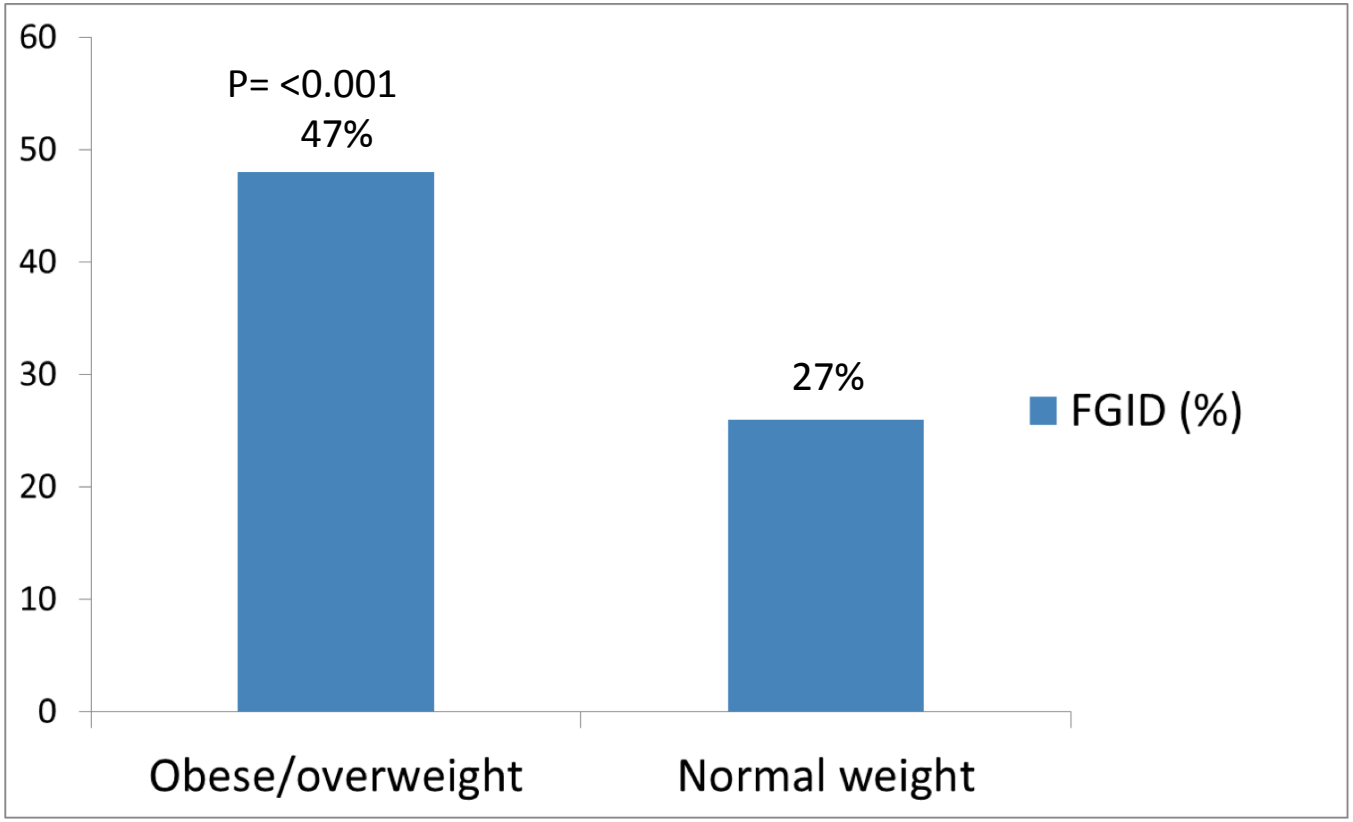
Possible mechanisms of association

- Not known for IBD, celiac disease
- Might mirror the general trend in obesity
- Celiac disease: more likely to be obese if diagnostic work-up was based on positive screening rather than clinical features

Diamanti et al. Nutrients 2014

Clinical Significance of association

Figure 1: Comparison of percentage of having at least one FGID in the obese/overweight versus normal weight children



Phatak UP et al. Int J of obes 2014

Clinical significance of association

- Adversely affects the outcome of GI disorders
  - Higher frequency and intensity of abdominal pain
  - School absenteeism
  - Disruption of daily activities

- Misra et al: obese children with constipation more likely to fail therapy

Bonilla et al. Int J Obes 2011
Misra et al. J Parental Enteral Nutr 2006

Clinical significance of association

-High BMI related to IBD related surgery

-No significant association between obesity and IBD disease severity and surgery

Krane et al. J Am Coll Surg 2013
Zwintscher et al. J Pediatr Surg 2014

Clinical significance of association

Almost 1 in 2 obese/overweight children has a functional GI disorder

Only 36% of patients with GI symptoms saw a physician for their complaints

Phatak UP et al. J Int Obes 2014

Conclusions

- Association between obesity and functional and GI disorders
- Consider a diagnosis of organic GI disorder even if a children is overweight or obese
- Awareness is needed for optimal management and overall well being and quality of life of obese children

Thank you!

- In summary, we report that obese and overweight children have a significantly higher prevalence of some FGIDs as compared with normal-weight children. An interesting finding in our study is that only a minority of the children with gastrointestinal symptoms sought medical attention for their complaints. Our study high- lights the need for better awareness amongst primary care providers to ask their obese and overweight patients about the presence of gastrointestinal symptoms. A recent study has shown that obesity is associated with poor outcome and disability at long-term follow-up for children with abdominal pain.21 Moreover, obesity and FGIDs are known to be associated with psychosocial issues and depression.22,23 Hence, an awareness of the association between obesity and FGIDs may not only be important for timely management but also the overall well-being and quality of life of obese and overweight children.

Possible mechanisms of association

- Ethnicity

- Location of practice….. Table 1 and 2 from our paper??

Introduction

- Obesity is associated with physical and psychosocial co-morbidities
- Hepatic steatosis, cirrhosis
- Obesity also associated with functional and organic GI disorders