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## BACKGROUND

- Non-alcoholic fatty liver disease (NAFLD) is the most common liver disease seen in the pediatric population
- It occurs in the setting of: insulin resistance and increased adiposity
- NAFLD can be:
  - Non-alcoholic fatty liver (NAFL): bland steatosis
  - Non-alcoholic steatohepatitis (NASH): steatosis and lobular inflammation and hepatocellular injury
- Fibrosis: indicate a more severe phenotype even in the absence of NASH
- Liver biopsy should be considered in children who have increased risk of NASH and/or advanced fibrosis (1B)
  - ↑ liver enzymes (ALT>80 U/L or AST/ALT>1)
  - splenomegaly
  - T2D
  - panhypopituitarism

## OBJECTIVE

- To investigate NAFLD in youth with overweight and obesity

## METHODS

- Retrospective analyses
    - Clinical
    - Laboratory
    - Imaging
    - Histological data
  - Underwent liver biopsy:
    - during bariatric surgery (n=22)
    - percutaneously (n=15)
  - Exclusion criteria: other causes of chronic liver diseases
  - Results: NASPGHAN criteria
  - Approved by the Institutional Ethic Committee and patient/parental consent was obtained
- Co-morbidities evaluated:
    - ↑ Liver enzymes
    - Splenomegaly
    - Hypertension: BP ≥ 130x80mmHg or use of anti-hypertensive drugs
    - Dysglycemia:
      - T2D: 2h-OGTT > 200 mg/dL
      - IGT: 140 < 2h OGTT < 200 mg/dL
      - IR: HOMA-IR ≥ 2.5
    - Dyslipidemia:
      - TC > 200 mg/dL
      - non-LDL-C > 135 mg/dL
      - HDL- C < 40 ♂
      - HDL- C < 45 ♀
      - TG > 130 mg/dL

## RESULTS

37 children and adolescents with overweight/obesity (2006-2017)

mean age: 15.8 years (7-21)

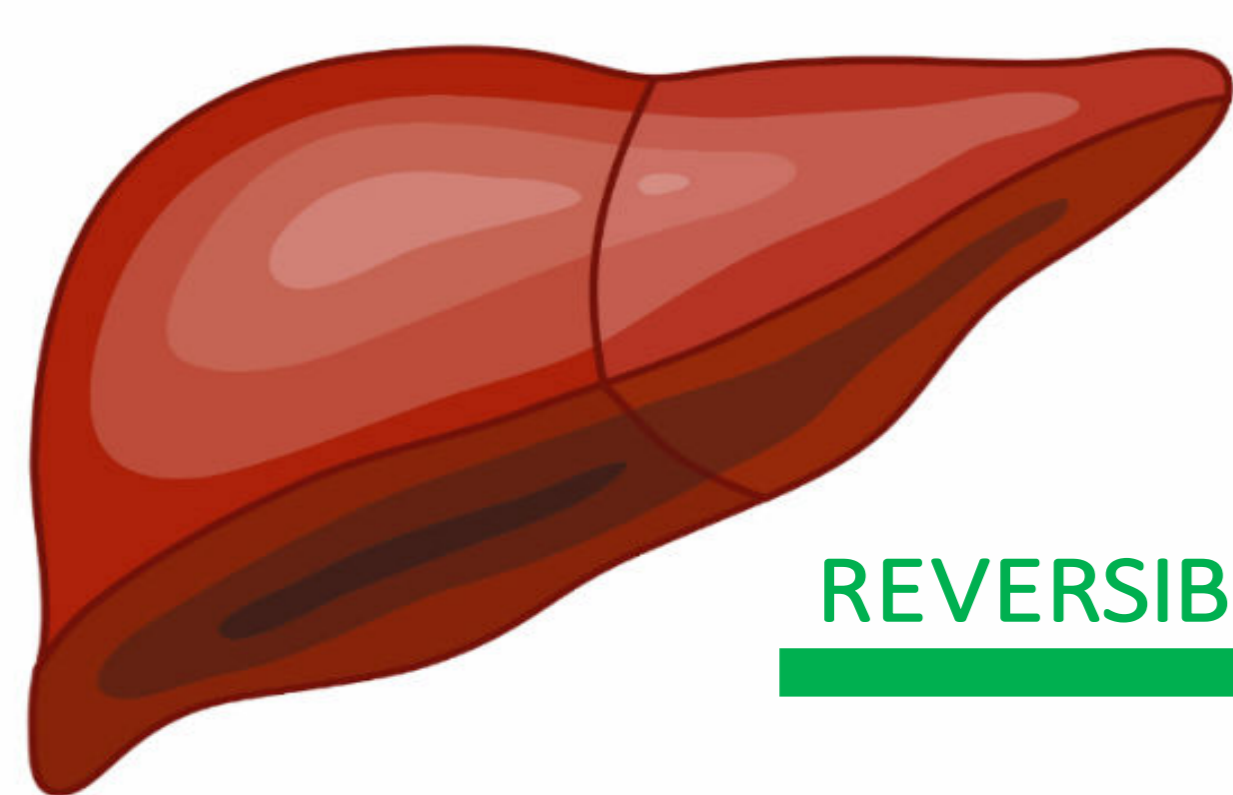
mean BMI: 39.3 kg/m<sup>2</sup>

0% splenomegaly

65% ♂

73% ultrasound with steatosis

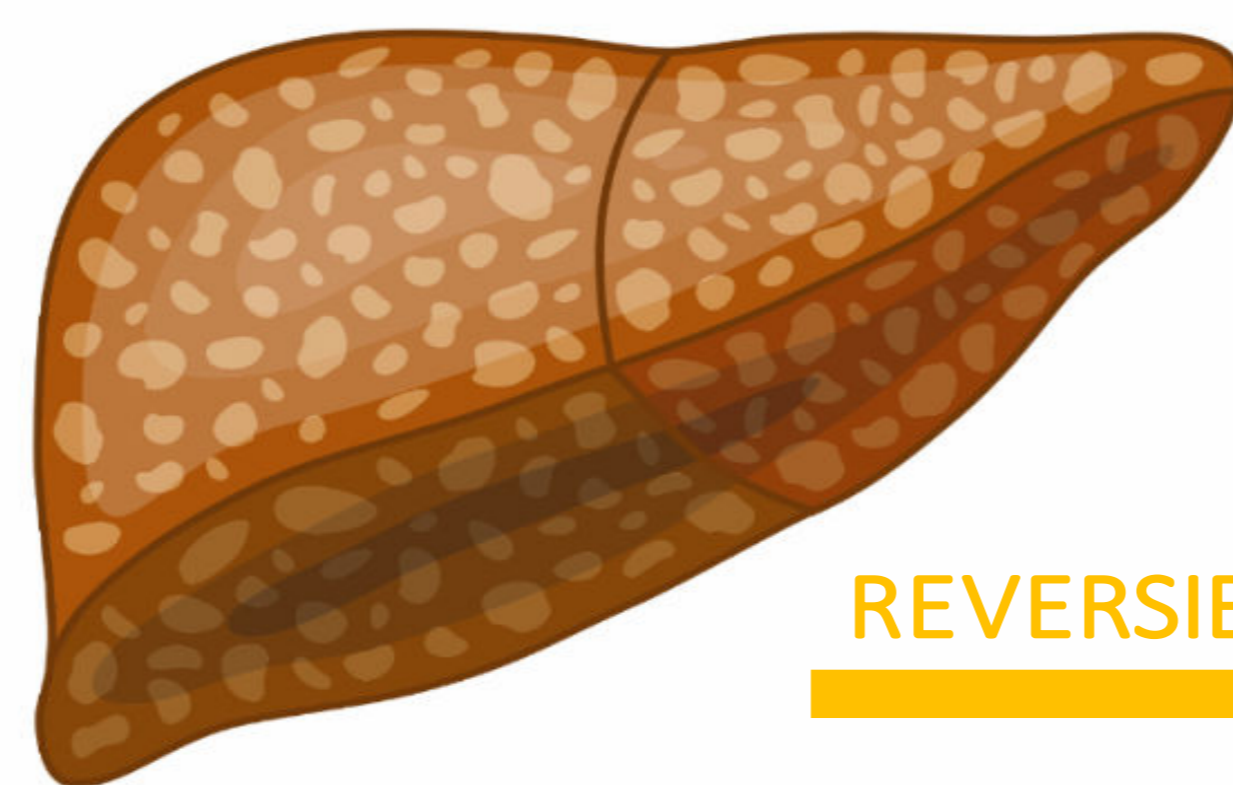
100% Waist Circumference > p90



HEALTHY LIVER

11% (4/37)

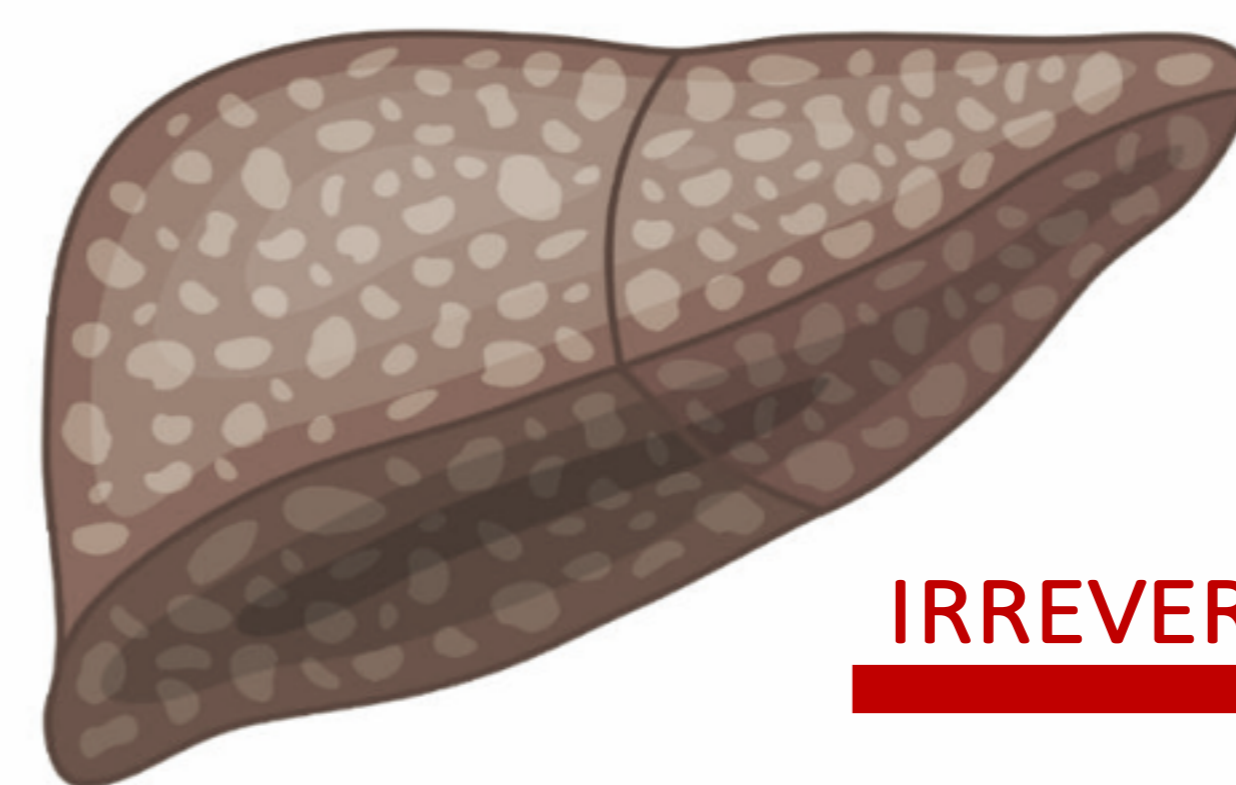
REVERSIBLE



Non-Alcoholic Fat Liver (NAFL)

89% (33/37)

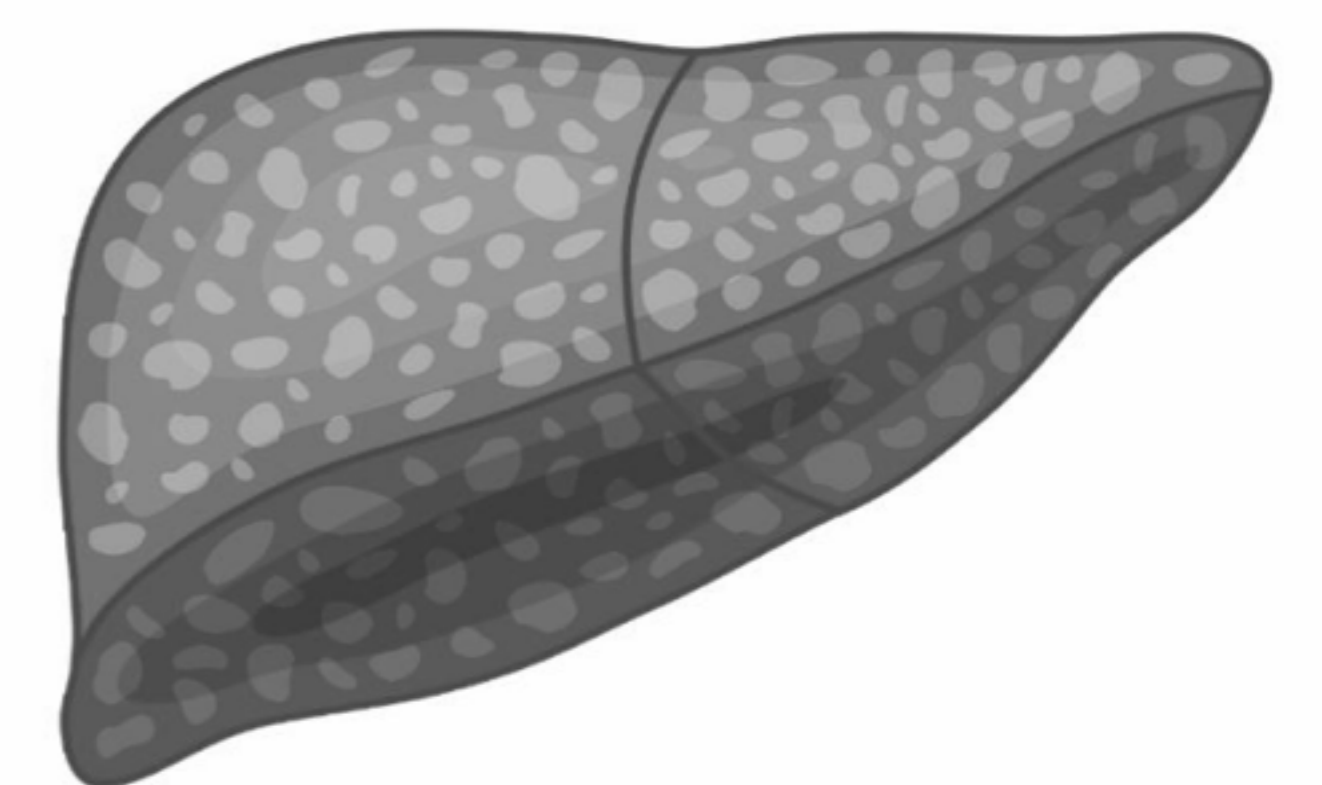
REVERSIBLE



Non-Alcoholic Steatohepatitis (NASH)

65% (24/37)

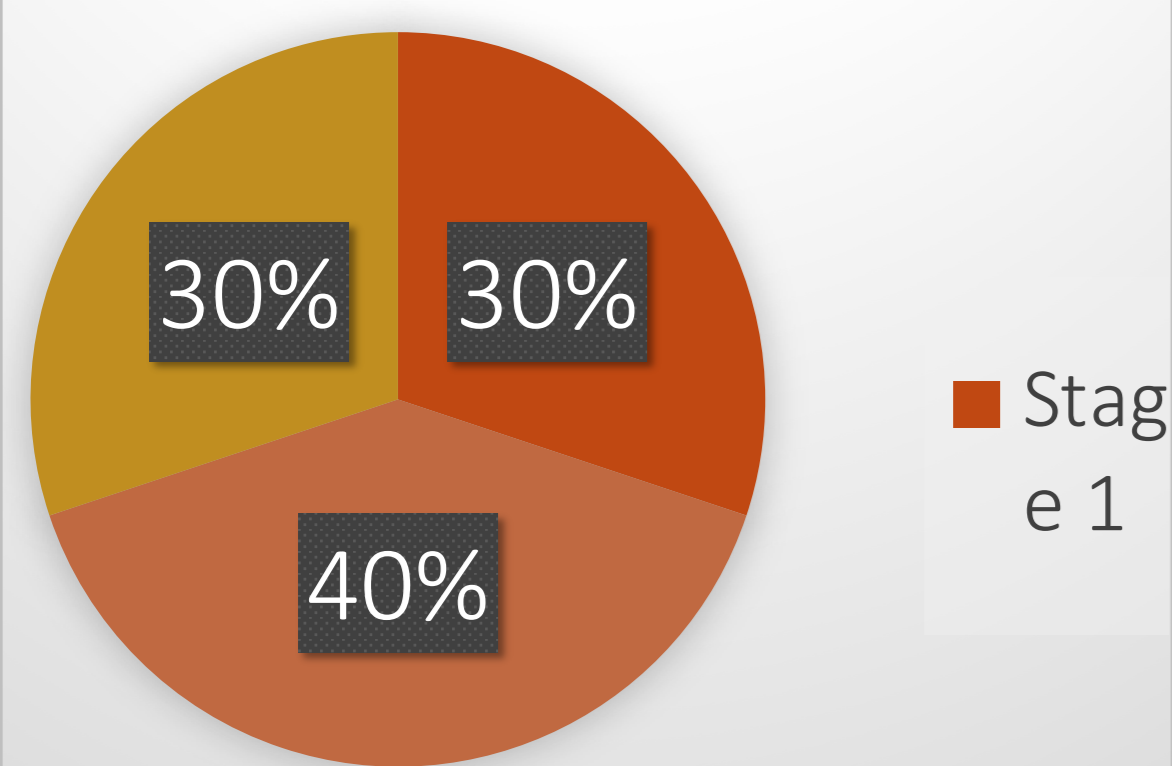
IRREVERSIBLE



CIRRHOSIS

0% (0/37)

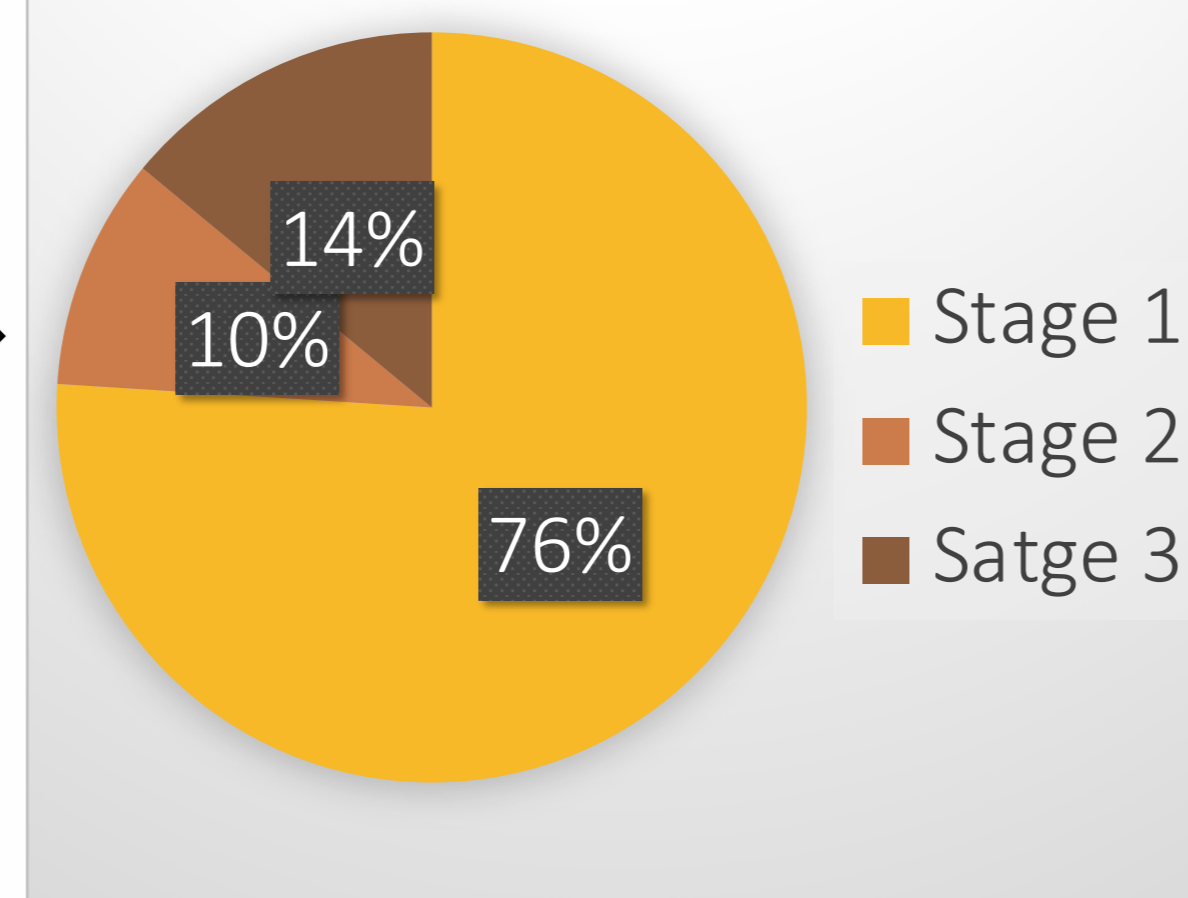
### NAFL (STEATOSIS)



Stage 1

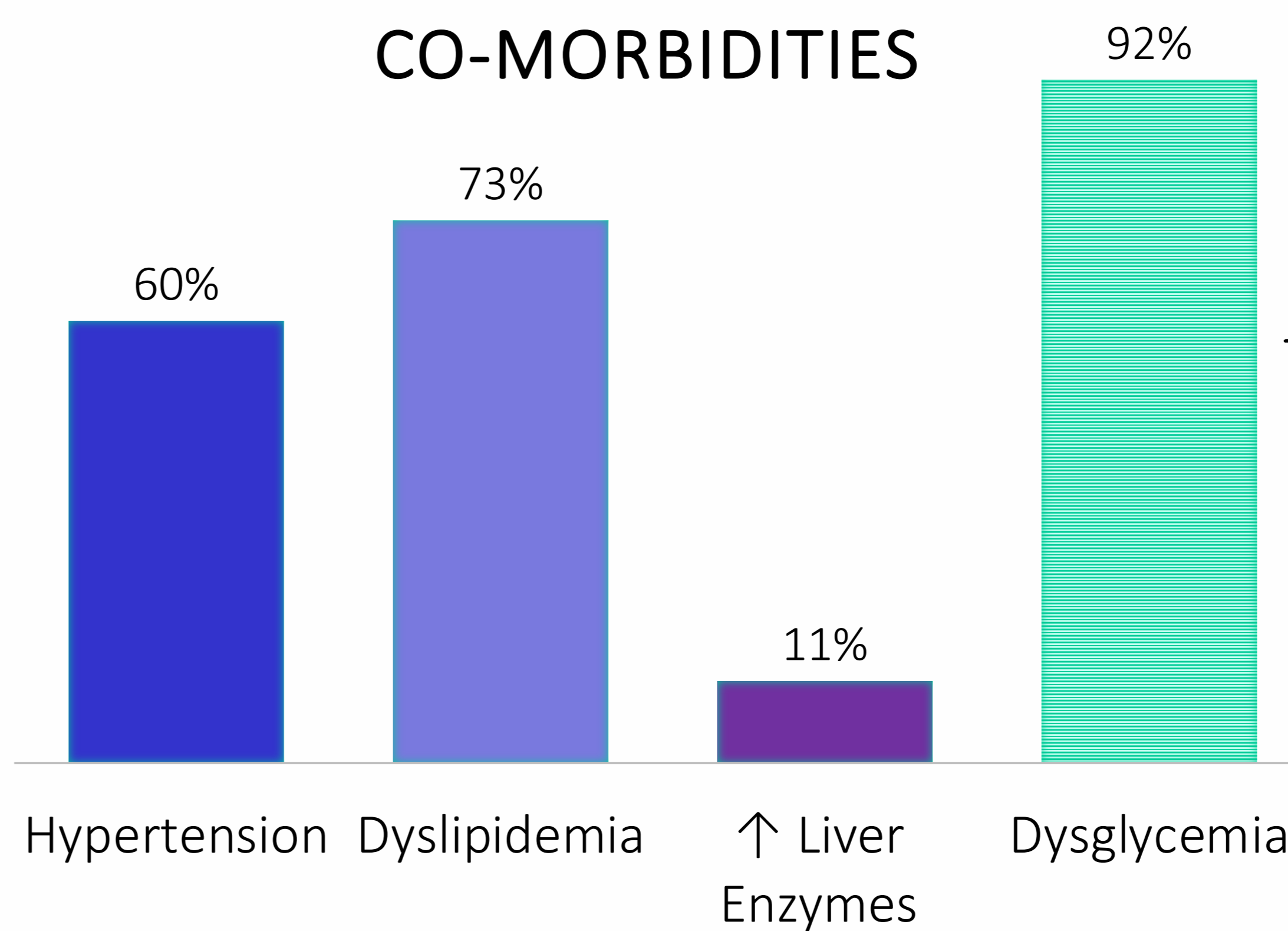
63.6% (21/33)

### STEATOHEPATITIS

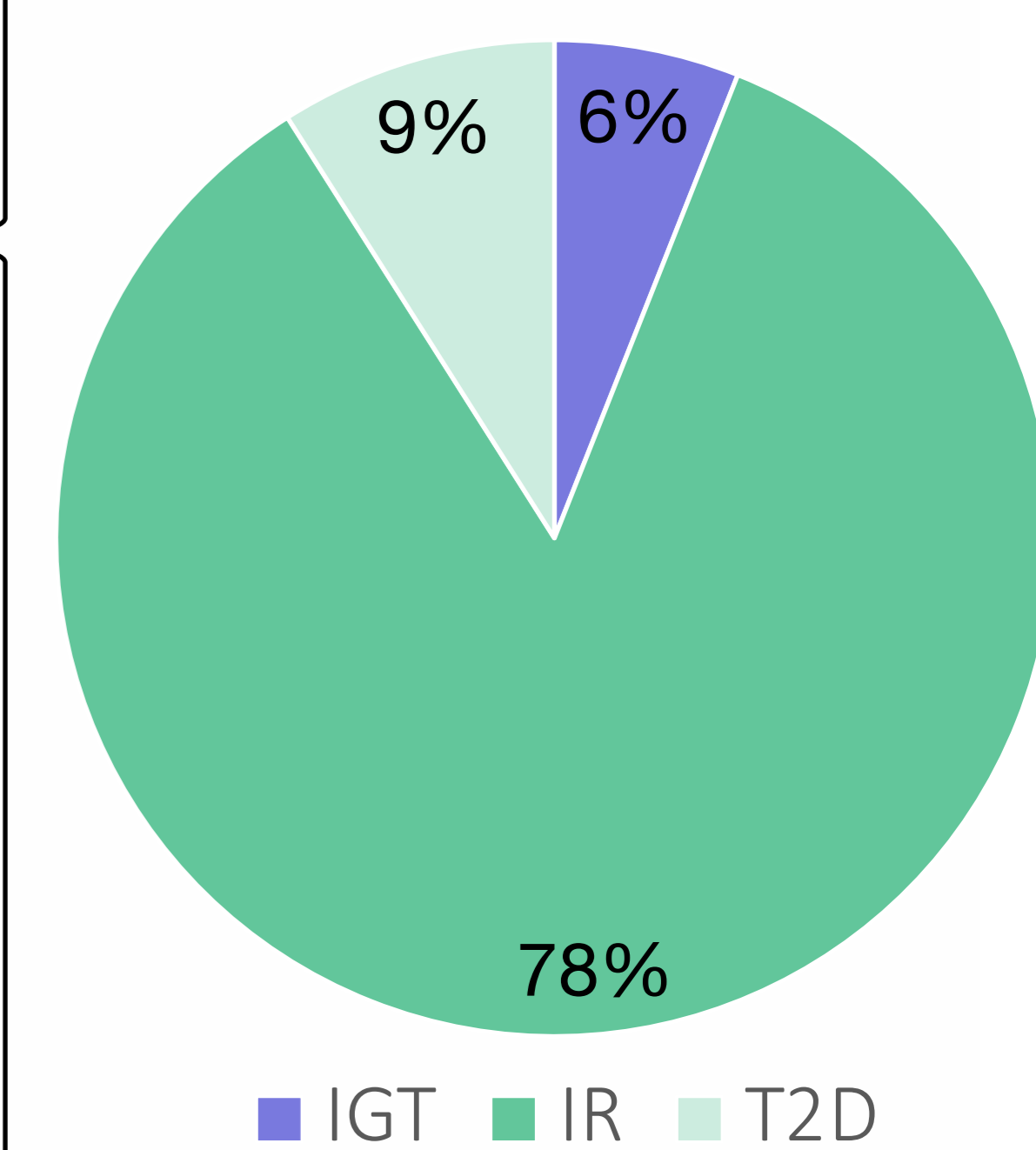


Stage 1  
Stage 2  
Stage 3

### CO-MORBIDITIES



### DYSGLYCEMIA



FIBROSIS  
63.6% (21/33)

## CONCLUSION

- NAFLD was highly prevalent among youth with overweight/obesity
- Although NASH was diagnosed in 65%, if we were to use NASPGHAN criteria only 20% would have been recommended liver biopsy
- Since NAFLD can result in progressive fibrosis and lead to end-stage liver disease, other criteria should be considered for the early diagnosis in this population