Universiti Kebangsaan Malaysia
National University of Malaysia

STUDY ON PREVALENCE OF FUNCTIONAL CONSTIPATION AND ITS ASSOCIATION WITH DIETARY FIBRE, FLUID INTAKE AND TOILET TRAINING IN PATIENTS PRESENTED TO UKMMC PAEDIATRIC CLINICS

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INTRODUCTION

Definitions:

- **Functional Constipation**
  - Persistent symptoms of difficult, infrequent, or seemingly incomplete defecation, which has no other etiology. [1]
  - Functional constipation is an idiopathic constipation or fecal withholding , can usually be differentiated from constipation secondary to organic causes based on history and examination.[2]

Reference:
1. Turner, S.M (2001)
2. Kliegman et al (2020)

Definition of Functional Constipation (FC)

Table 2.1 ROME IV Pediatric Functional Constipation Diagnostic Criteria for children **up to 4 year old** [1]

Must include 1month of at least 2 of the following:
1) 2 or fewer defecation per week
2) History of excessive stool retention
3) History of painful or hard bowel movement
4) History of large diameter stool
5) Presence of large fecal mass in rectum
In toilet trained children, the following additional criteria may be used:
6) At least 1 episode/week of incontinence after acquisition of toileting skills
7) History of large diameter stool that may obstruct the toilet.

Table 2.2 ROME IV Pediatric Functional Constipation Diagnostic Criteria for children **more than 4 year old** [2]

Must include 1month of at least 2 of the following:
1)2 or fewer defecations in the toilet per week
2)At least 1 episode of fecal incontinence per week.
3)History of retentive posturing or excessive volitional stool retention.
4)History of painful or hard bowel movements.
5)Presence of a large fecal mass in the rectum
6)History of large diameter stools that can obstruct the toilet.

Reference:
1. Benninga, Nurko et al. (2016)
2. Hyams, J. S., et al. (2016).

Functional Constipation in Children

- Prevalence in literature 12% (0.7% to 29.6%) [1]
- Impact on patients & family members [2]
- Increasing presentation to A&E and clinic leading to increasing healthcare works and cost. [3,4]
- Prevention is better than cure: What are the modifiable risk factors?
  - Toilet training, Dietary factors

Reference:
1. Mugie, Benninga et al. 2011
2. Sommers, Corban et al. 2015
3. Walter, Hovenkamp et al. (2019)
4. Liem, Harman et al. 2009

Toilet Training (TT)

- Definition: Process of training a child to control bladder and bowel movements and to use the toilet.[1]
- Toilet training is not recommended before 24months as it may lead to constipation. [2,3]
- Contradicting literature suggesting that starting TT before 27 months does not increase risk of constipation.[4]

Reference:
1. Webster, M. (2014). Merriam Webster Online, Merriam-Webster Incorporated
2. Yachha, Srivastava et al. (2018)
3. Borowitz, Cox et al. (2003)
4. Blum, Taubman et al. (2003)

Dietary Factors

- Higher amount of dietary fibers intake can reduce risk of constipation. [1,2]
- Higher amount of fluid intake is associated with lesser risk of constipation, though not statistically significant.[3]
- Higher fat intake is significantly associated with constipation. [4]

Reference:

1. Lee, Ip et al. (2008)
2. Roma, Adamidis et al. (1999)
3. Jennings, Davies et al. (2009)
4. Fujitani, Sogo et al. (2018)

Problems:

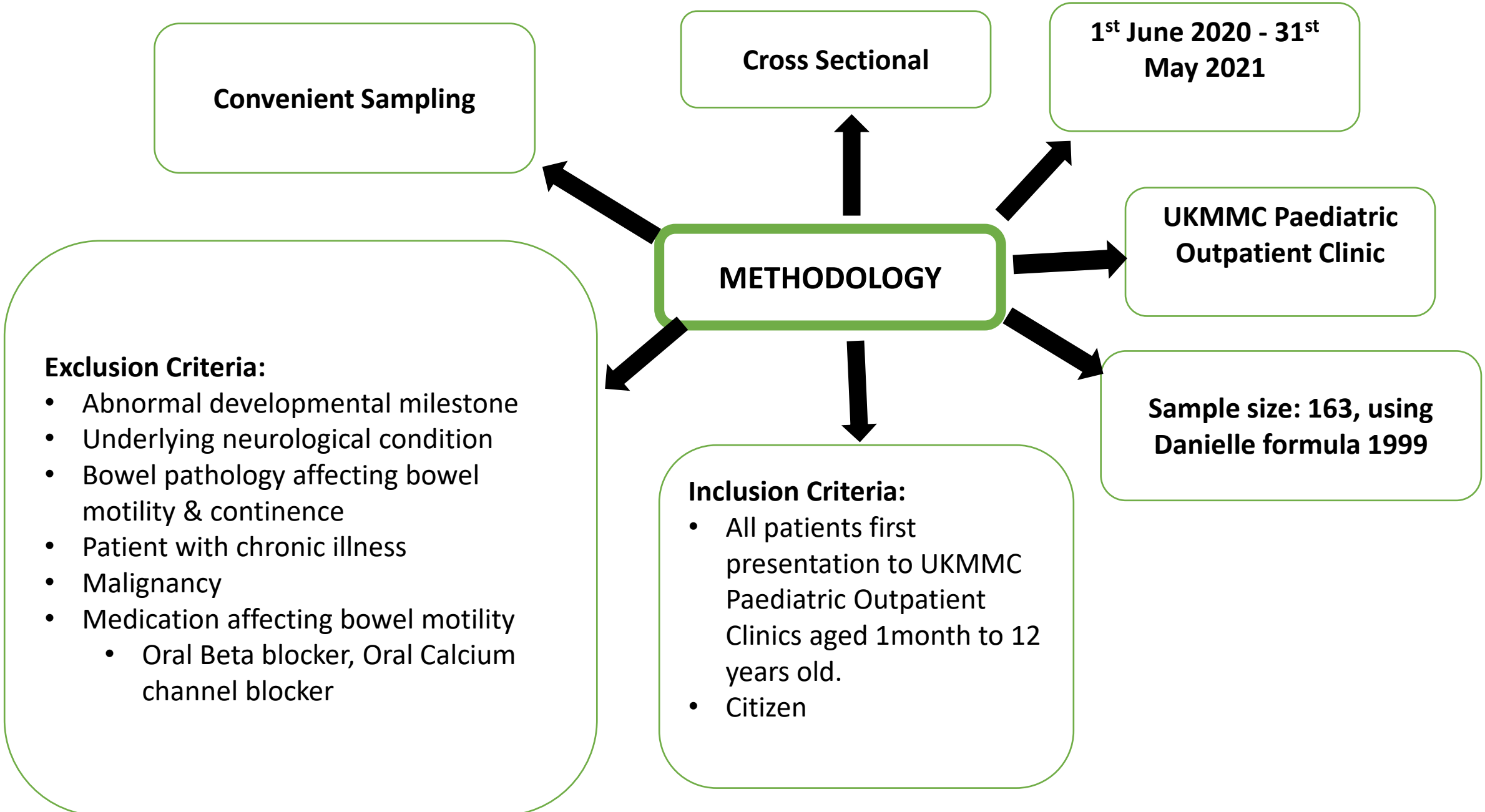
- Shortage of local data
- Preventive measures

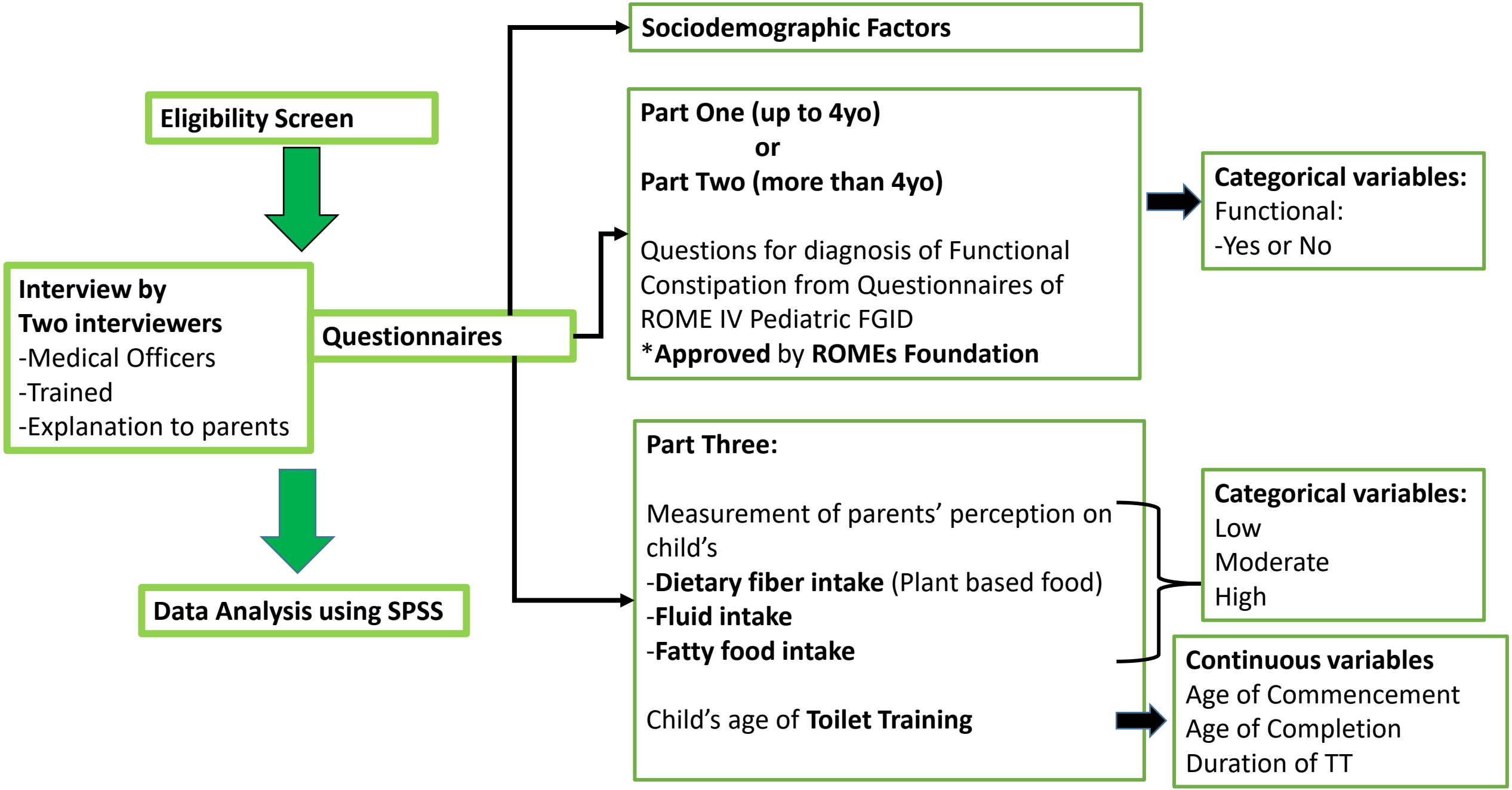
Strategize our management towards these modifiable risk factors

- Intervention on timing of toilet training
- Modification of pattern of dietary habit
- Reference for future studies

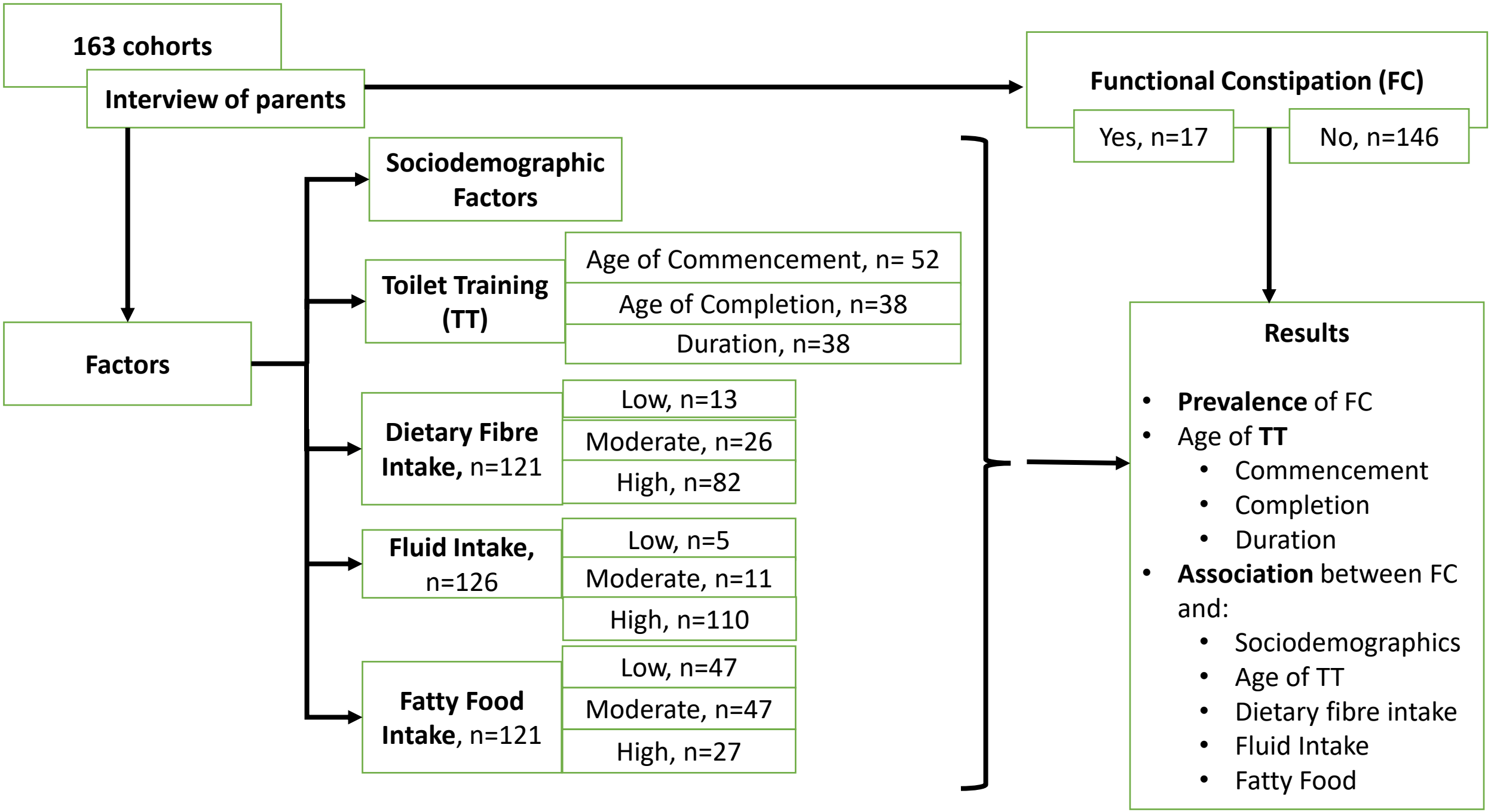
Objectives

- **Primary Objective**
  - To determine the **prevalence** of functional constipation in paediatric patients seen in UKMMC paediatric outpatient clinic.
- **Secondary Objective**
  - To determine the **age of toilet training** in paediatric patients seen in UKMMC paediatric outpatient clinic.
  - To determine if there is an association between **age and duration of toilet training** with the presence of functional constipation.
  - To determine if there is an association between **dietary fiber** with the presence of functional constipation.
  - To determine if there is an association between **high fat diet** with the presence of functional constipation.
  - To determine if there is an association between **total fluid intake** with the presence of functional constipation.

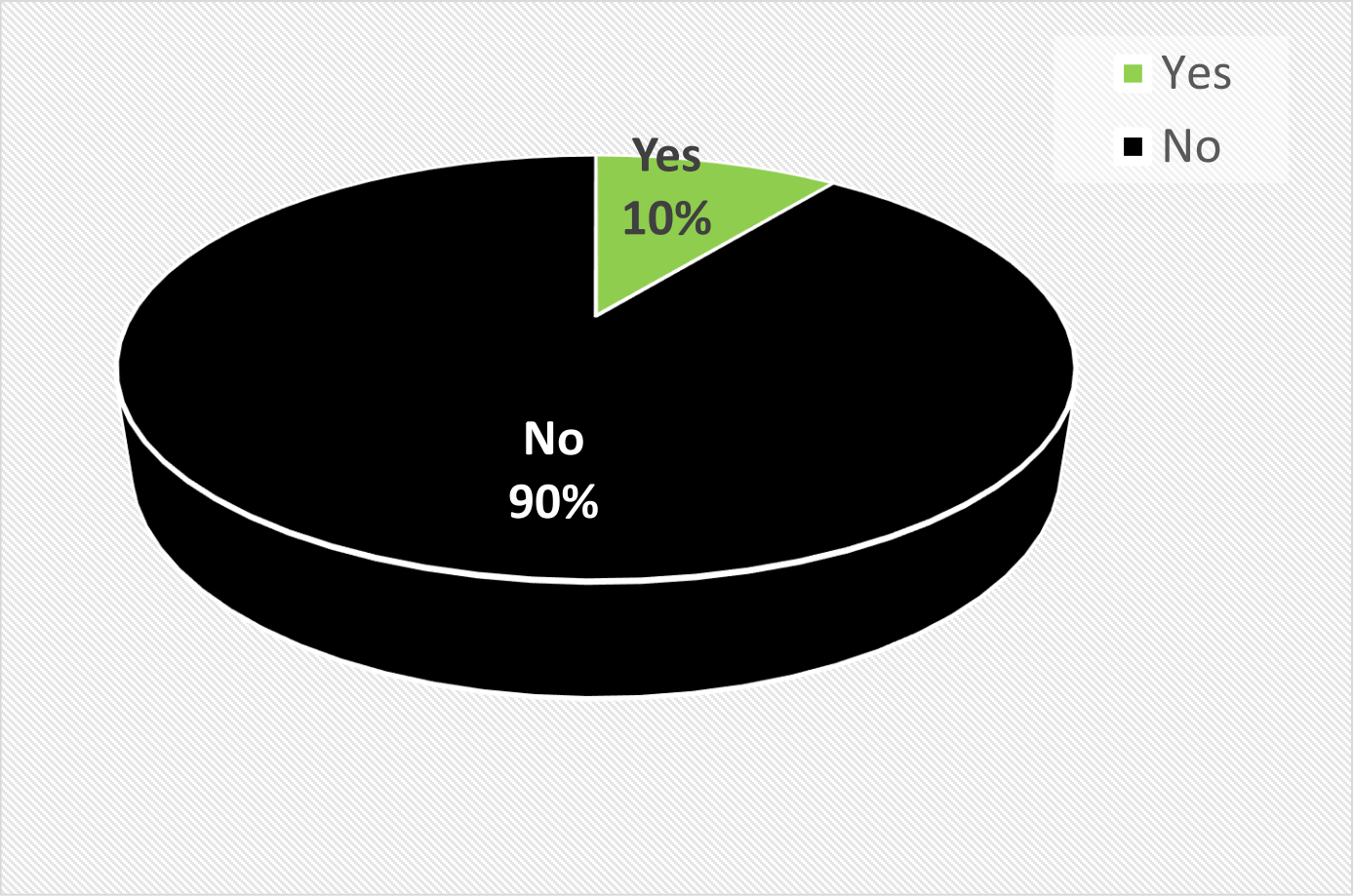

Convenient Sampling
Cross Sectional
1st June 2020 - 31st May 2021
METHODOLOGY
UKMMC Paediatric Outpatient Clinic
Sample size: 163, using Danielle formula 1999
Exclusion Criteria:
• Abnormal developmental milestone
• Underlying neurological condition
• Bowel pathology affecting bowel motility & continence
• Patient with chronic illness
• Malignancy
• Medication affecting bowel motility
• Oral Beta blocker, Oral Calcium channel blocker
Inclusion Criteria:
• All patients first presentation to UKMMC Paediatric Outpatient Clinics aged 1month to 12 years old.
• Citizen


Eligibility Screen
Interview by
Two interviewers
-Medical Officers
-Trained
-Explanation to parents
Questionnaires
Data Analysis using SPSS
Sociodemographic Factors
Part One (up to 4yo)
or
Part Two (more than 4yo)
Questions for diagnosis of Functional Constipation from Questionnaires of ROME IV Pediatric FGID
*Approved by ROMEs Foundation
Categorical variables:
Functional:
-Yes or No
Part Three:
Measurement of parents' perception on child's
-Dietary fiber intake (Plant based food)
-Fluid intake
-Fatty food intake
Child's age of Toilet Training
Categorical variables:
Low
Moderate
High
Continuous variables
Age of Commencement
Age of Completion
Duration of TT

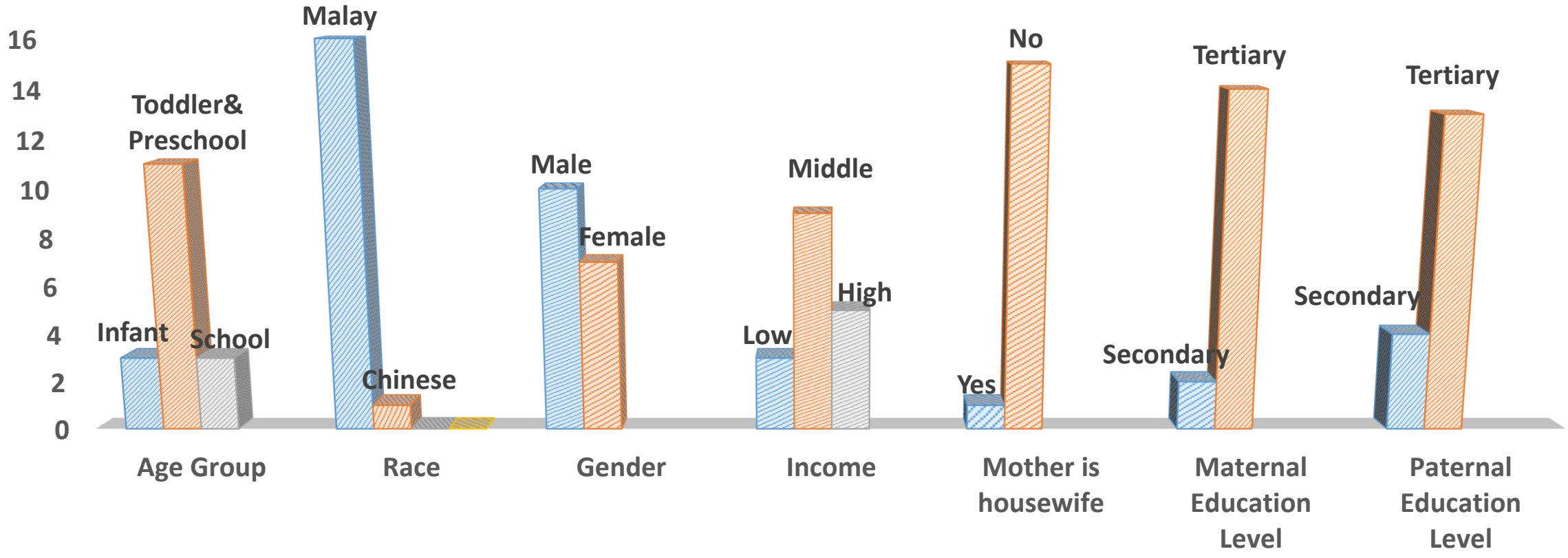
RESULTS


163 cohorts
Interview of parents
Functional Constipation (FC)
Yes, n=17
No, n=146
Factors
Sociodemographic Factors
Toilet Training (TT)
Age of Commencement, n= 52
Age of Completion, n=38
Duration, n=38
Dietary Fibre Intake, n=121
Low, n=13
Moderate, n=26
High, n=82
Fluid Intake, n=126
Low, n=5
Moderate, n=11
High, n=110
Fatty Food Intake, n=121
Low, n=47
Moderate, n=47
High, n=27
Results
Prevalence of FC
Age of TT
Commencement
Completion
Duration
Association between FC and:
Sociodemographics
Age of TT
Dietary fibre intake
Fluid Intake
Fatty Food

Prevalence of Constipation : 10.4%



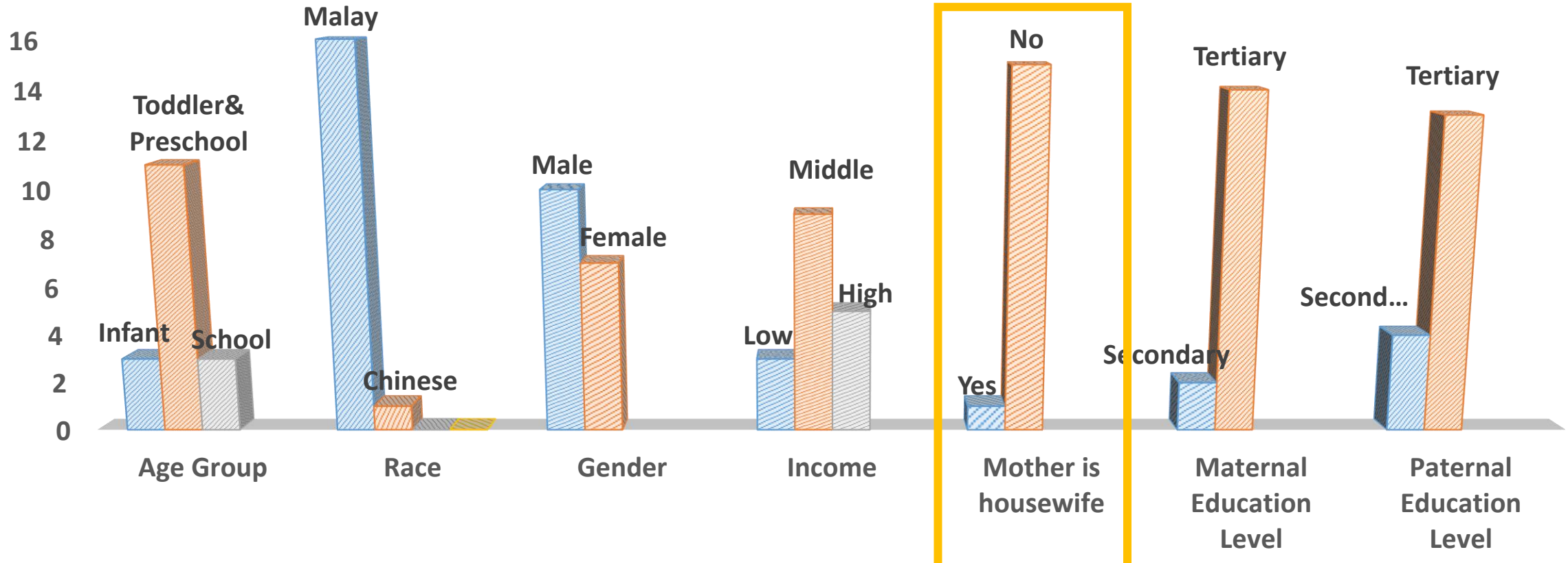
NUMBER OF FUNCTIONAL CONSTIPATION ACCORDING TO SOCIODEMOGRAPHICS



P-value:	0.122*	1.0ø	0.186*	0.423*	**0.049***	0.188*	0.456*

*Chi Square Test
øFisher Exact Test

NUMBER OF FUNCTIONAL CONSTIPATION ACCORDING TO SOCIODEMOGRAPHICS



	Age Group	Race	Gender	Income	Mother is housewife	Maternal Education Level	Paternal Education Level
P-value:	0.122*	1.0ø	0.186*	0.423*	**0.049***	0.188*	0.456*

*Chi Square Test
øFisher Exact Test

Multivariate Logistic Regression Analysis

Age of **Commencement** of TT		
N=52	Mean (months)	**34.7**
	Standard Deviation (months)	12.13

Constipated			Non Constipated		
N=11	Mean	**30.36**	N=41	Mean	**39.93**
	Standard Deviation	13.05		Standard Deviation	6.5

Independent t test

P value : 0.179⁕

⁕Independent t test

Age of **Completion** of Toilet Training (TT)		
N=38	Mean (months)	**49.74**
	Standard Deviation (months)	15.47

Constipated			Non Constipated		
N=4	Median	**38**	N=34	Median	**48**
	Range	35-66		Range	18-96

Mann Whitney U Test

P value : 0.304†

†Mann Whitney U test

Duration of Toilet Training (TT)		
N=38	Median (months)	**49.74**
	Range (months)	15.47

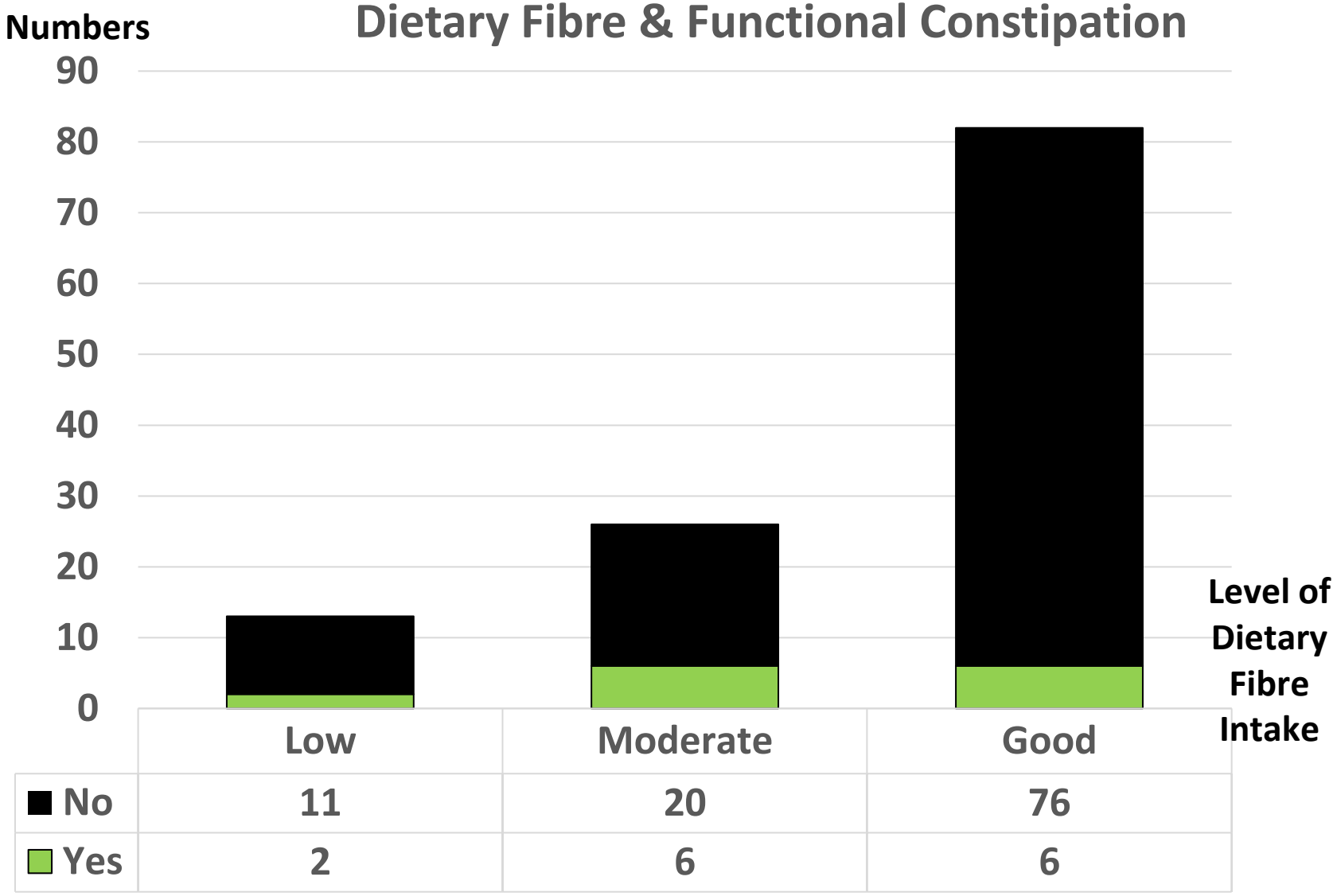
Constipated			Non Constipated		
N=4	Median	**5**	N=34	Median	**11**
	Range	1-30		Range	1-72

Mann Whitney U Test

P value : 0.503†

†Mann Whitney U test

Dietary Fibre & Functional Constipation

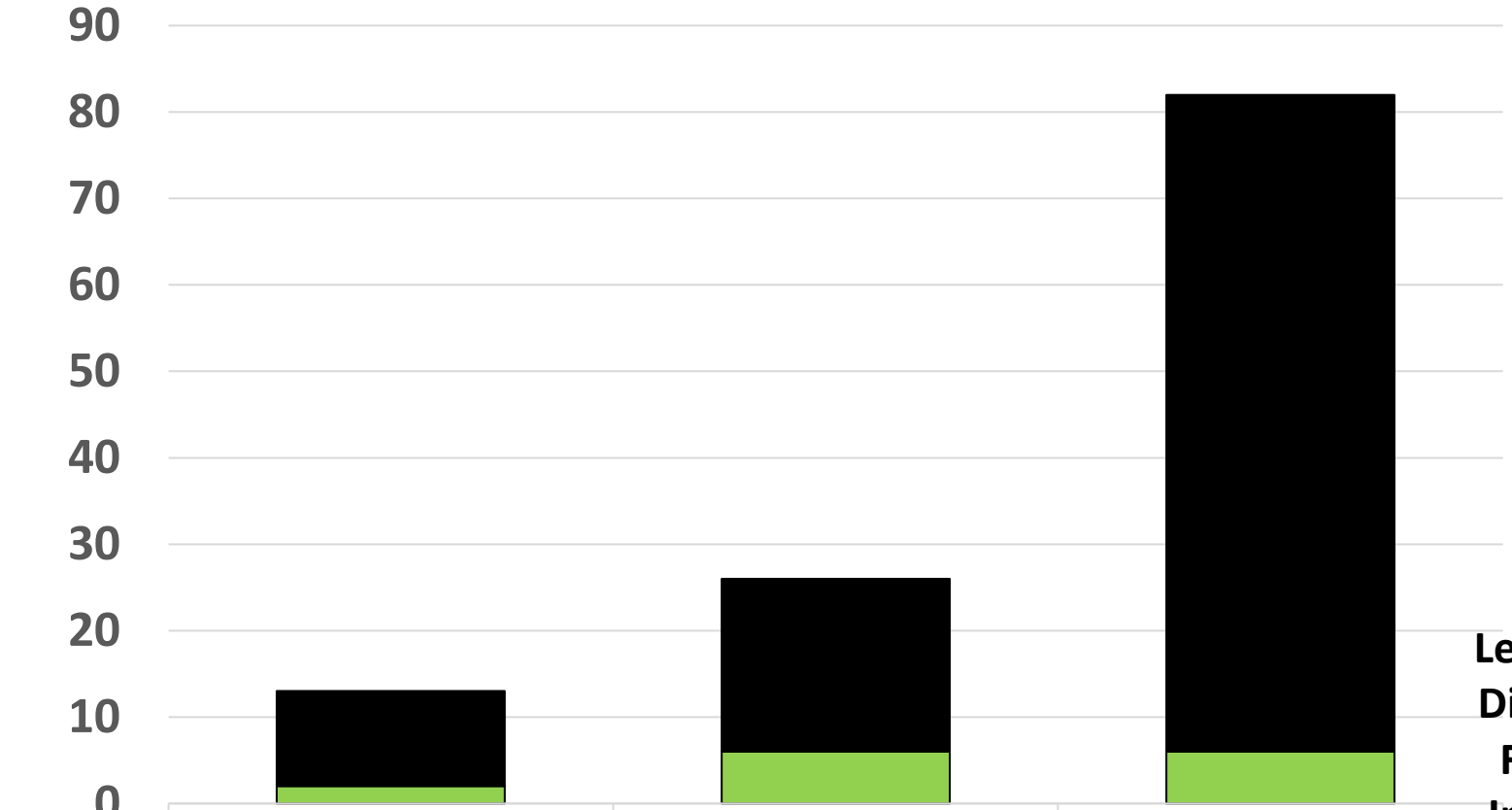


N= 121

	Low	Moderate	Good
No	11	20	76
Yes	2	6	6

Proportion of Constipation	**15.4%**	**23.1%**	**7.3%**

Dietary Fibre & Functional Constipation



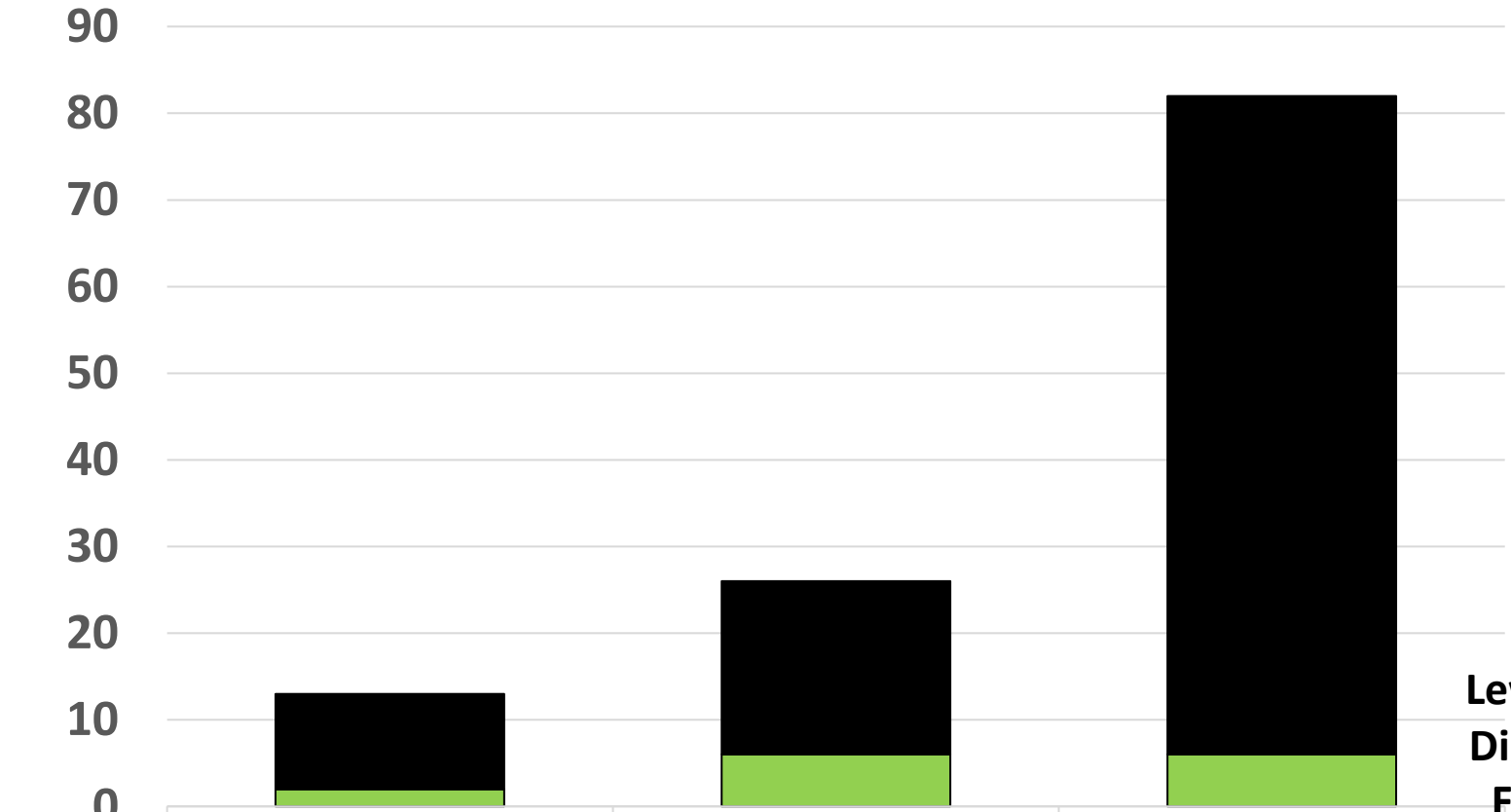
	Low	Moderate	Good
No	11	20	76
Yes	2	6	6

Proportion of Constipation	**15.4%**	**23.1%**	**7.3%**

N= 121

Majority Good Intake of Dietary Fibre-65%

Dietary Fibre & Functional Constipation



	Low	Moderate	Good
No	11	20	76
Yes	2	6	6

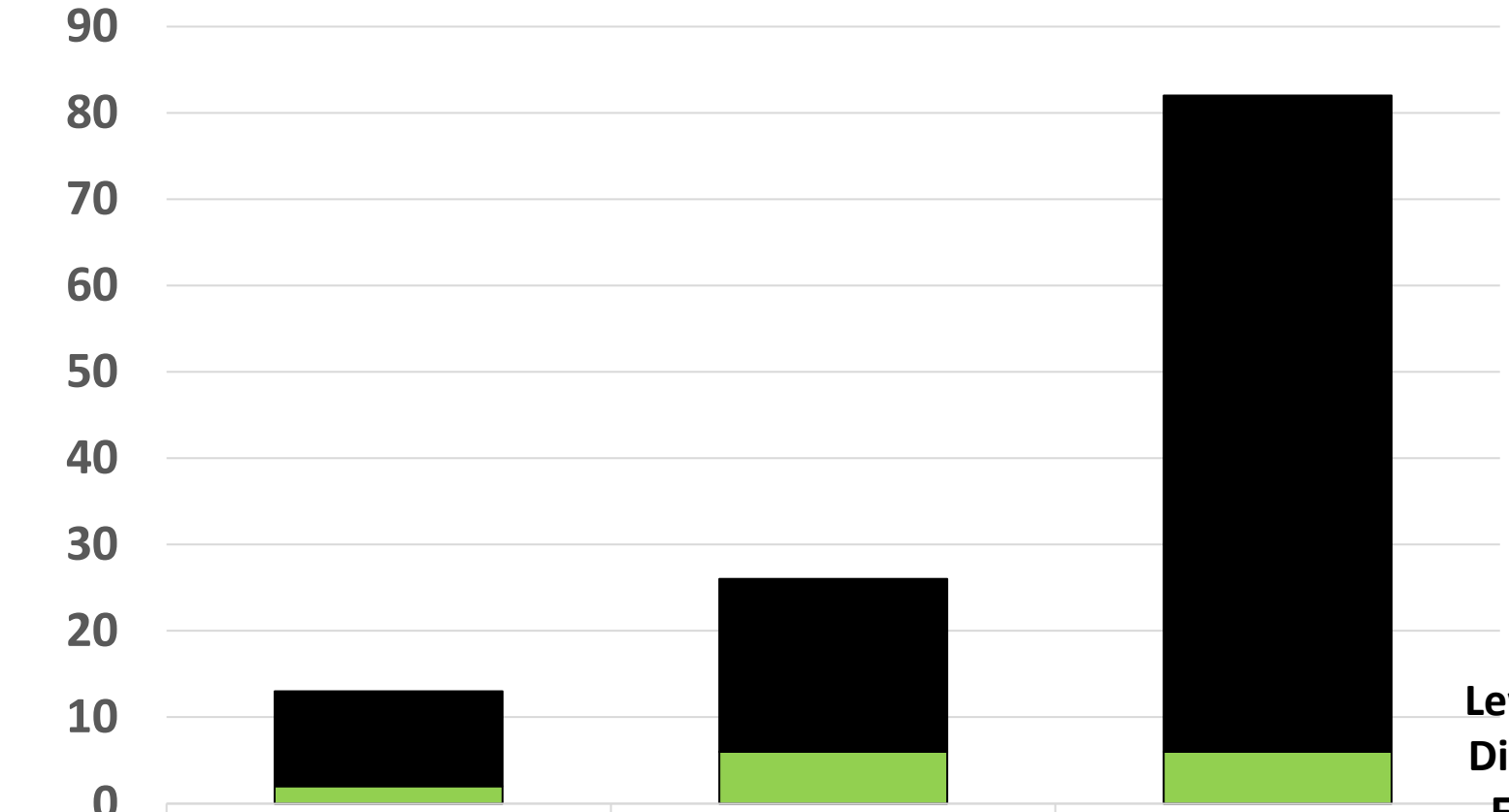
Proportion of Constipation	15.4%	23.1%	VS	7.3%

N= 121

Majority Good Intake of Dietary Fibre-65%

Lower proportion in high fibre intake group

Dietary Fibre & Functional Constipation



	Low	Moderate	Good
No	11	20	76
Yes	2	6	6

Proportion of Constipation	15.4%	23.1%	VS	7.3%

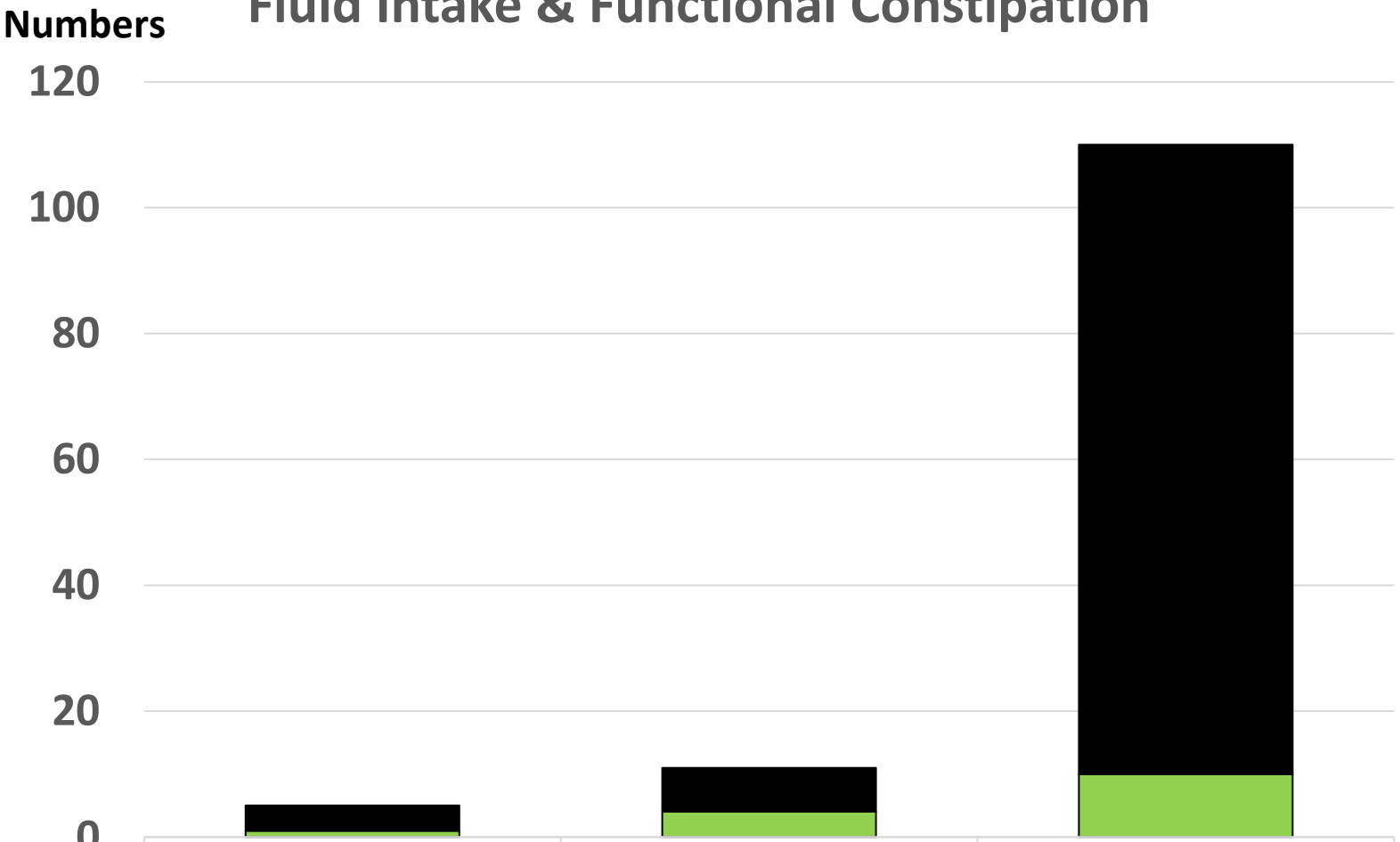
Fisher Exact Test → P-value: 0.062

N= 121

Majority Good Intake of Dietary Fibre-65%

Lower proportion in high fibre intake group – 7.3%

Fluid Intake & Functional Constipation

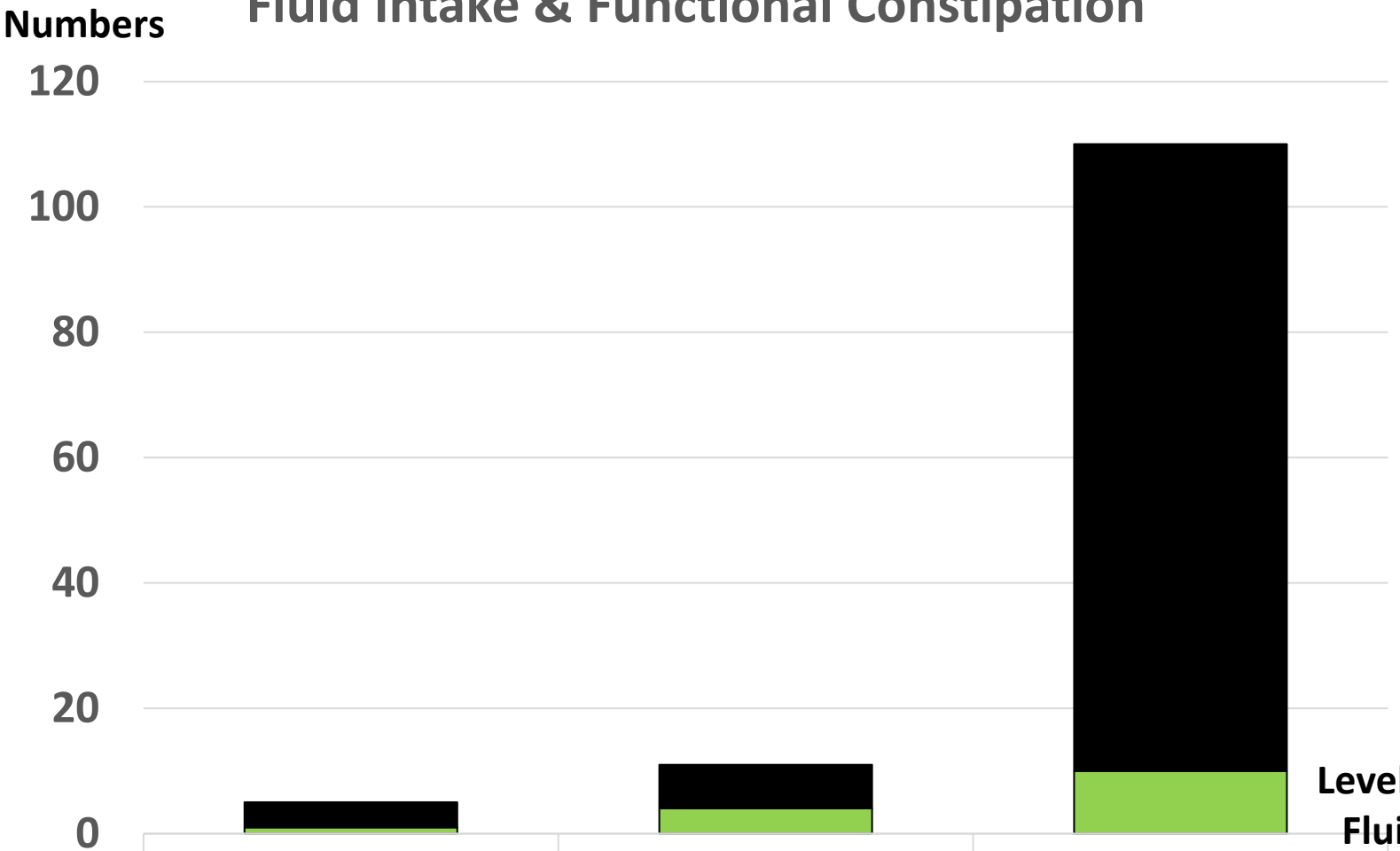


N= 126

	Low	Moderate	High
No	4	7	100
Yes	1	4	10
Proportion of Constipation	**20%**	**36.4%**	**9.1%**

Level of Fluid Intake

Fluid Intake & Functional Constipation

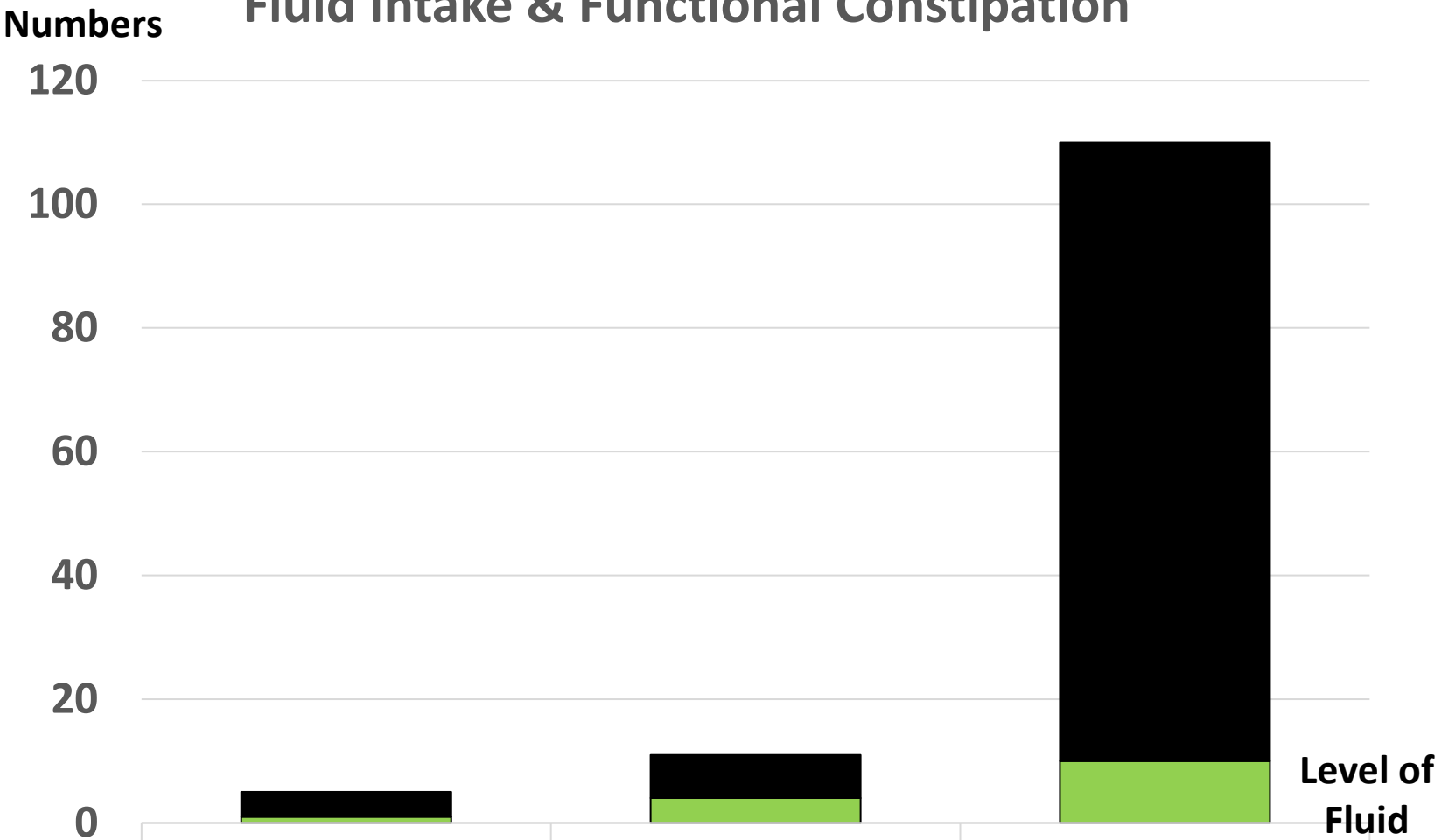


	Low	Moderate	High
No	4	7	100
Yes	1	4	10
Proportion of Constipation	20%	36.4%	9.1%

N= 126

Majority Good Intake of Dietary Fibre-87%

Fluid Intake & Functional Constipation



	Low	Moderate	High
No	4	7	100
Yes	1	4	10

Proportion of Constipation	20%	36.4%	VS	9.1%

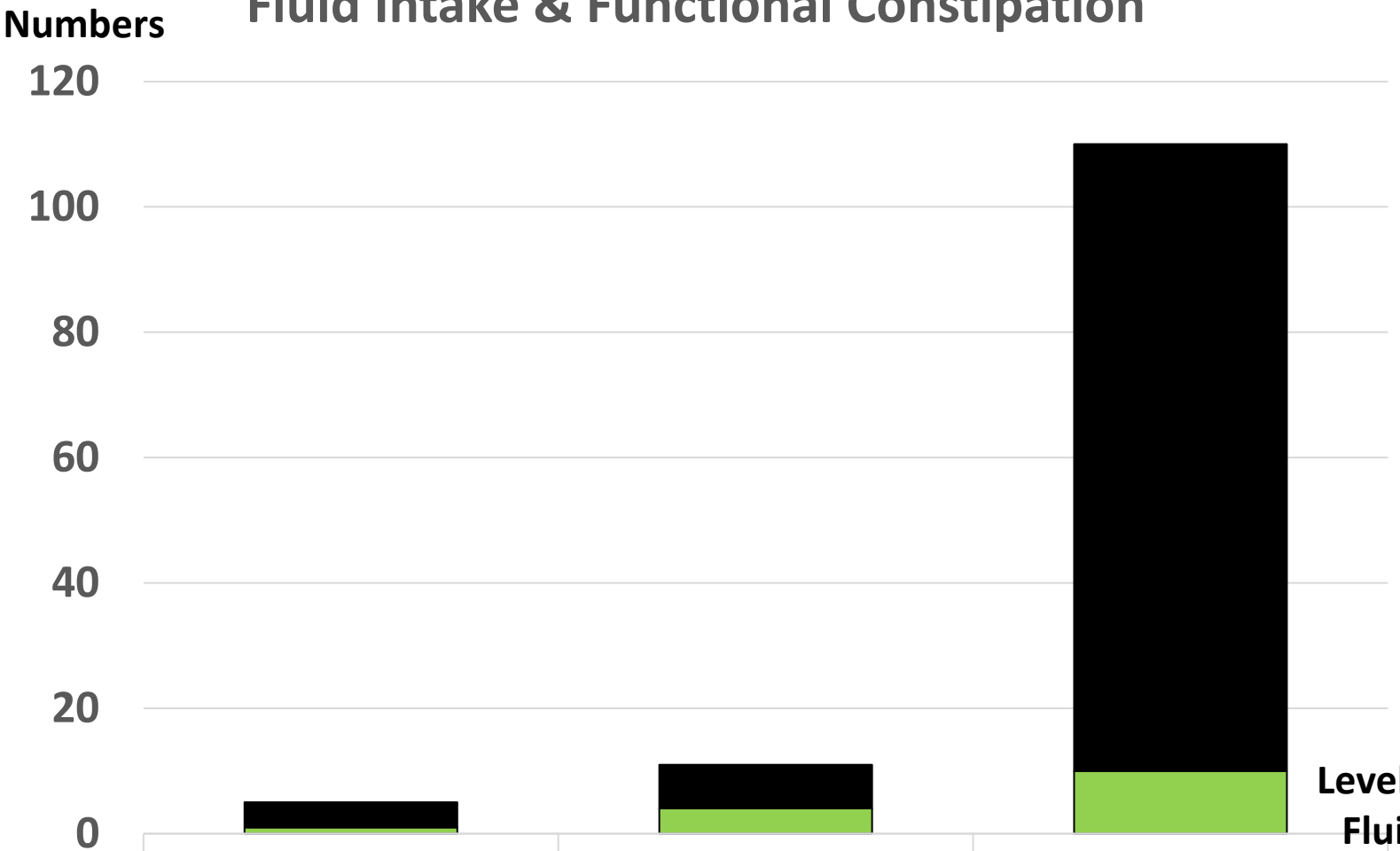
Fisher Exact Test → P-value: 0.032

N= 126

Majority Good Intake of Dietary Fibre-87%

Lower proportion in high fluid intake group – 9.1%

Fluid Intake & Functional Constipation



	Low	Moderate	High
No	4	7	100
Yes	1	4	10

Proportion of Constipation	20%	36.4%	VS	9.1%

N= 126

Majority Good Intake of Dietary Fibre-87%

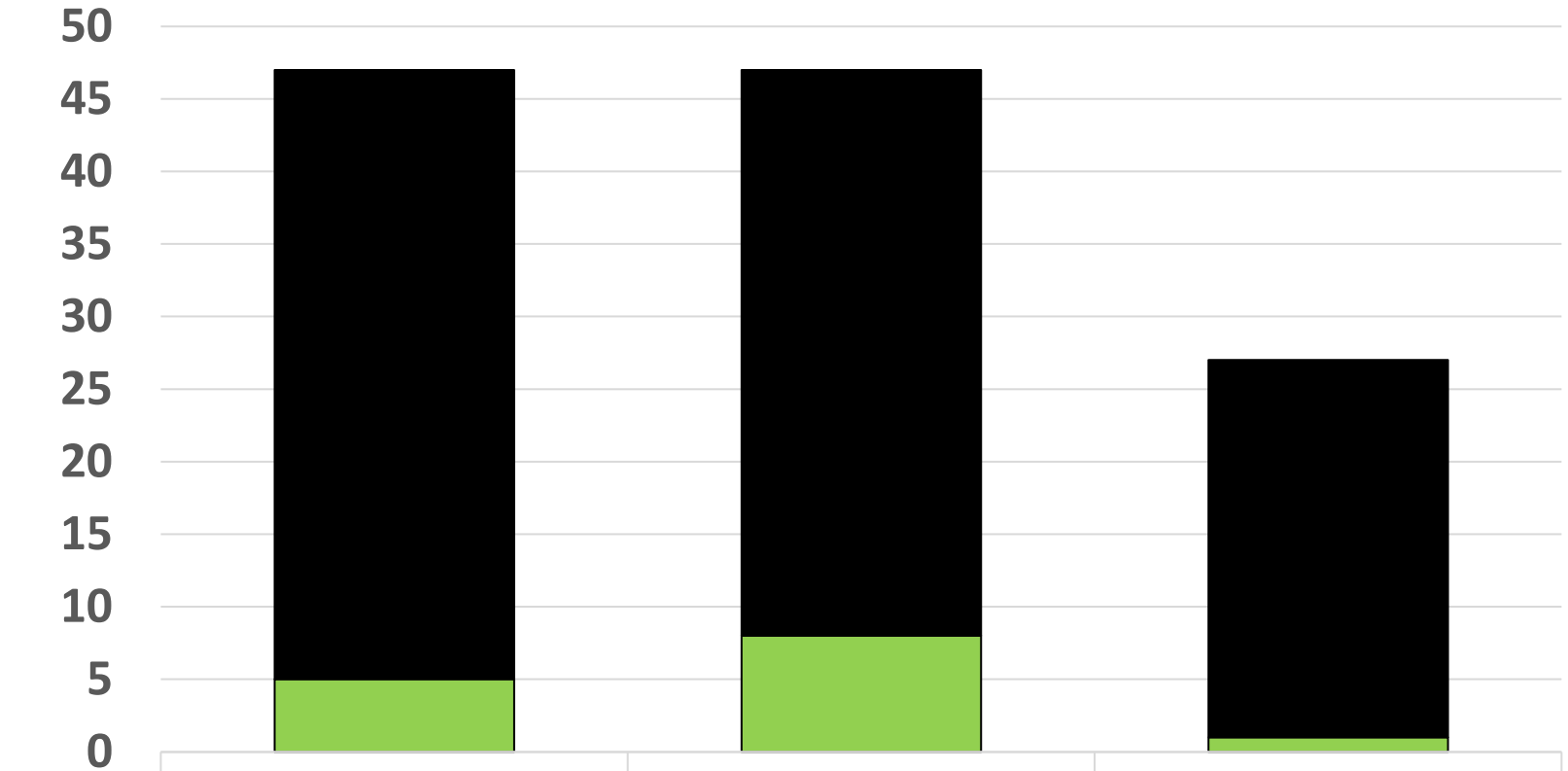
Lower proportion in high fluid intake group – 9.1%

Multivariate Logistic Regression

Fisher Exact Test

P-value: 0.032

Fatty Food Intake & Functional Constipation



	Low	Moderate	High
No	42	39	26
Yes	5	8	1

Level of Fatty Food Intake

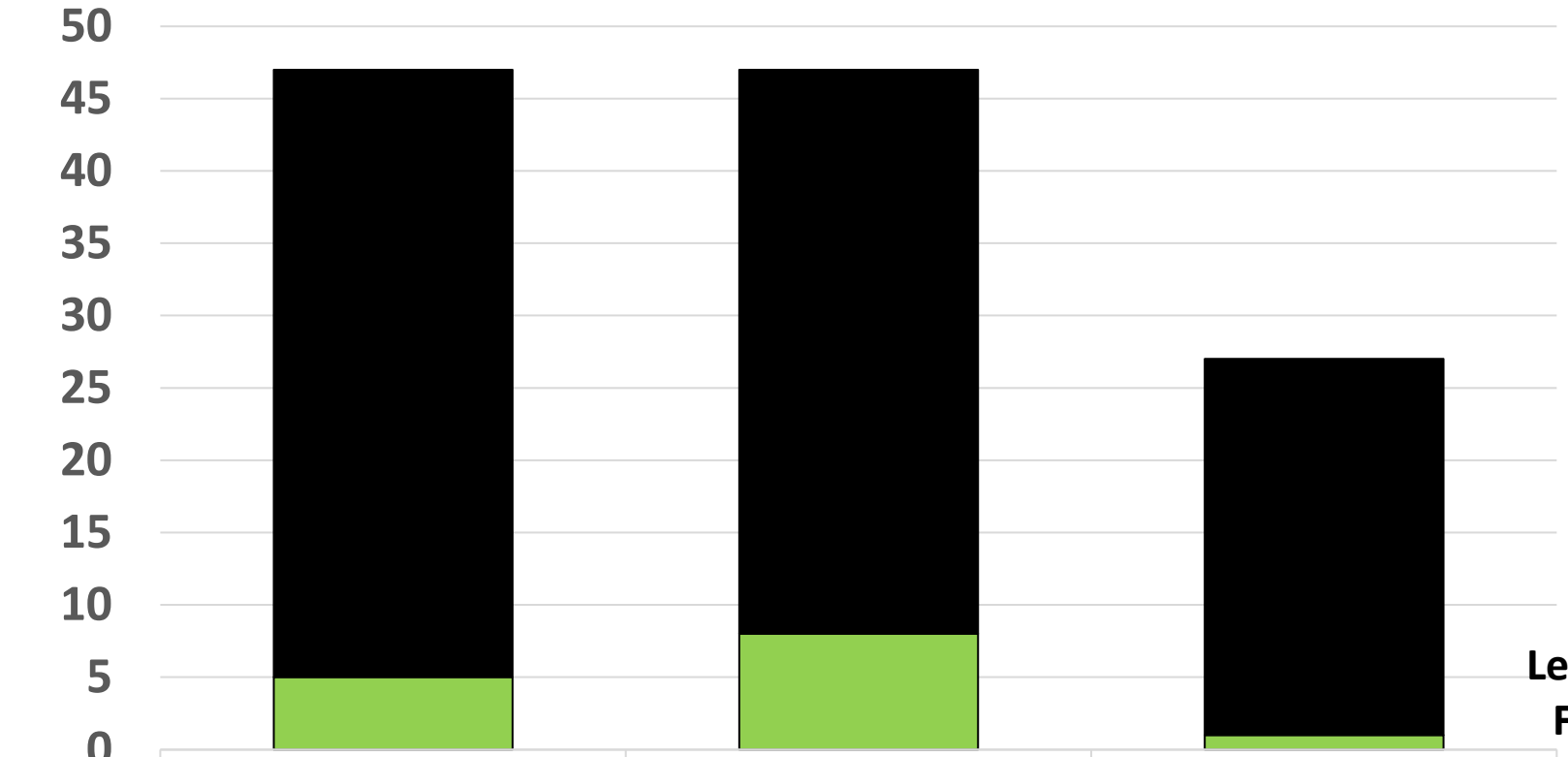
Proportion of Constipation	10.6%	17%	3.7%

N= 121

P-value: 0.219

Fatty Food Intake & Functional Constipation

N= 121



	Low	Moderate	High
No	42	39	26
Yes	5	8	1

Level of Fatty Food Intake

Proportion of Constipation	10.6%	17%	3.7%

Pearson Chi Square Test → P-value: 0.219

Multivariate Analysis

Table 3.5 Logistic Regression Model evaluating associated factors on odds of functional constipation.

	b	OR (95% CI)	P value
Mother is a housewife	1.763	5.83 (0.72 – 47.22)	0.099
Fluid intake level	-1.311	0.27 (0.069 – 1.046)	0.058

Hosmer-Lemeshow test, (p=0.281), Nagelkerke R^2 0.114

DISCUSSION

Prevalence of constipation in our study: 10.4%

- Comparable to others study

Toilet Training

Literature contradicting evidence.

Reducing trend in constipation seen in cohorts with later age of commencement, later age of completion of TT and longer duration TT but the difference is insignificant.

Reason: Reduced number of samples in this subgroup analysis as majority of the cohorts are not yet in the toilet trained group.

Dietary Factors

Our study did not show any significant association between dietary fiber, fluid and fatty food intake with constipation.

Reason:

- Designs of the Questions & Parents' perception
- Recall bias

Limitation

- Interviewer bias
- Recall bias
- Questions design:
  - Measurement of parents' perception
  - Retrospective data recall
- Single centre sampling

Recommendation

- Prospective Study with follow up
- Question Design:
  - To collect more objective data (Measurement of food and fluid intake) and can be done prospectively
- Study Design: More focus study on specific factors (TT), and follow up
- Broader population with multicentre sampling

CONCLUSIONS

- The prevalence of pediatric functional constipation in our study is not as prevalent as was first thought
- No significant association in the factors contributing to constipation identified
- These modifiable factors are important and require further study as tackling and identifying modifiable risk factors that contribute to FC can help improve outcomes for patients and families and improve their quality of life.

END

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