"Food safety knowledge, attitude, and hygiene practices (KAP) and microbial quality of meat in slaughterhouses: a study in Gopalganj, Bangladesh"

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BACKGROUND

"The Hidden Public Health Crisis"

Approximately
30 million cases of foodborne illness
occur annually in
Bangladesh
(Al Banna et al.,2022)

Diarrheal diseases, enteric fever, and viral hepatitis are the most common culprits
(Al Banna et al.,2022)

Each year **worldwide,** unsafe food causes
600 million cases of foodborne diseases and
420,000 deaths.
30% of foodborne deaths occur among children under 5 years of age (WHO, 2025).

BACKGROUND

"From Contamination to Foodborne Illness"

Step 1: Contamination Source

(Contaminated Water, Unsafe Human Handling, Chemical Residues, etc.)

Step 2: Entry into Food

(During Farming, During Processing, Cross-contamination, undercooking, etc.)

Step 3: Ingestion of Pathogens or Toxins

through handling, washing, consumption of contaminated food, undercooked meat/fish, etc.

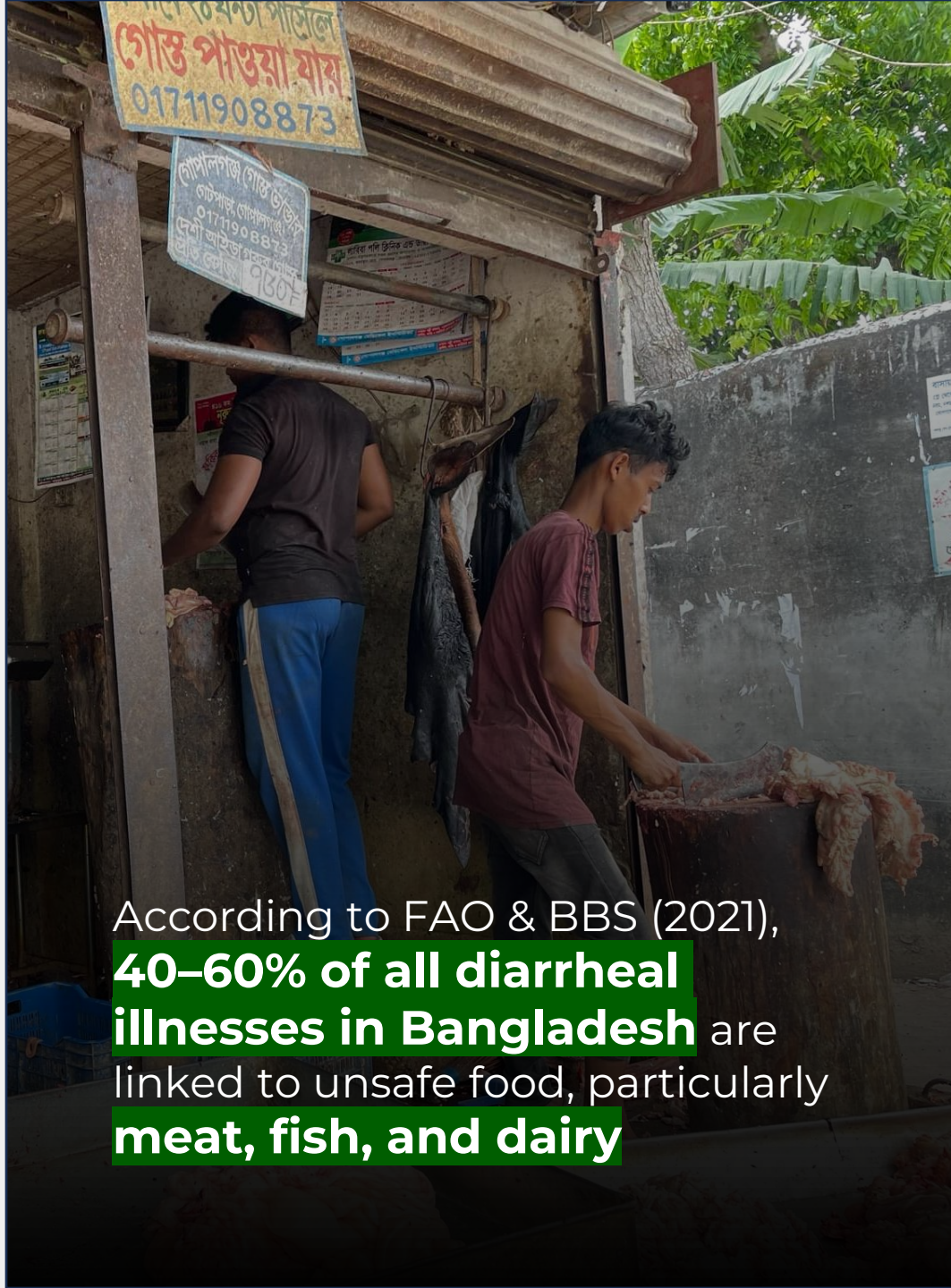
Step 4: Infection and Illness

Diarrhea, Vomiting, Abdominal Cramps, and Fever. In severe cases: dehydration, organ damage, and even death

BACKGROUND

"Meat- A High-Risk, High-Impact Food in Public Health"

- **High Risk of Contamination**
- **Major Cause of Foodborne Illness**
- **Unsafe Hygiene Practices in the Meat Chain**
- **Meat is Widely Consumed**
- **Antibiotic Resistance Risk**
- **Nutritional Importance**



According to FAO & BBS (2021), **40–60% of all diarrheal illnesses in Bangladesh** are linked to unsafe food, particularly **meat, fish, and dairy**

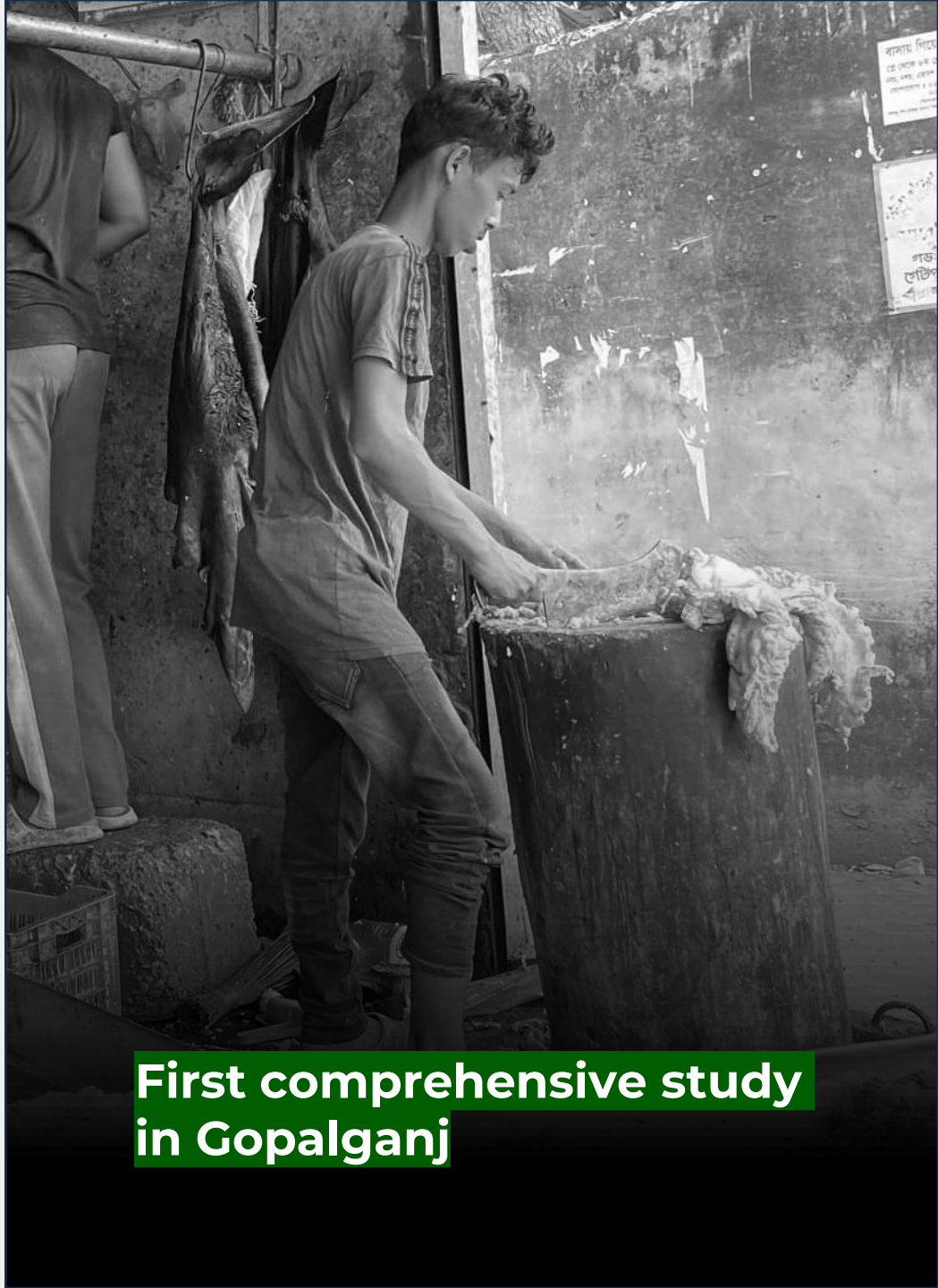
RESEARCH GOAL

"What We Set Out to Do"

01 **Study meat handlers' knowledge, attitudes, and practices (KAP)**

02 **Explore the condition of slaughterhouses**

03 **Assess microbial contamination of raw beef meat**



THE GOPALGANJ GROUND

"Where It All Happens"

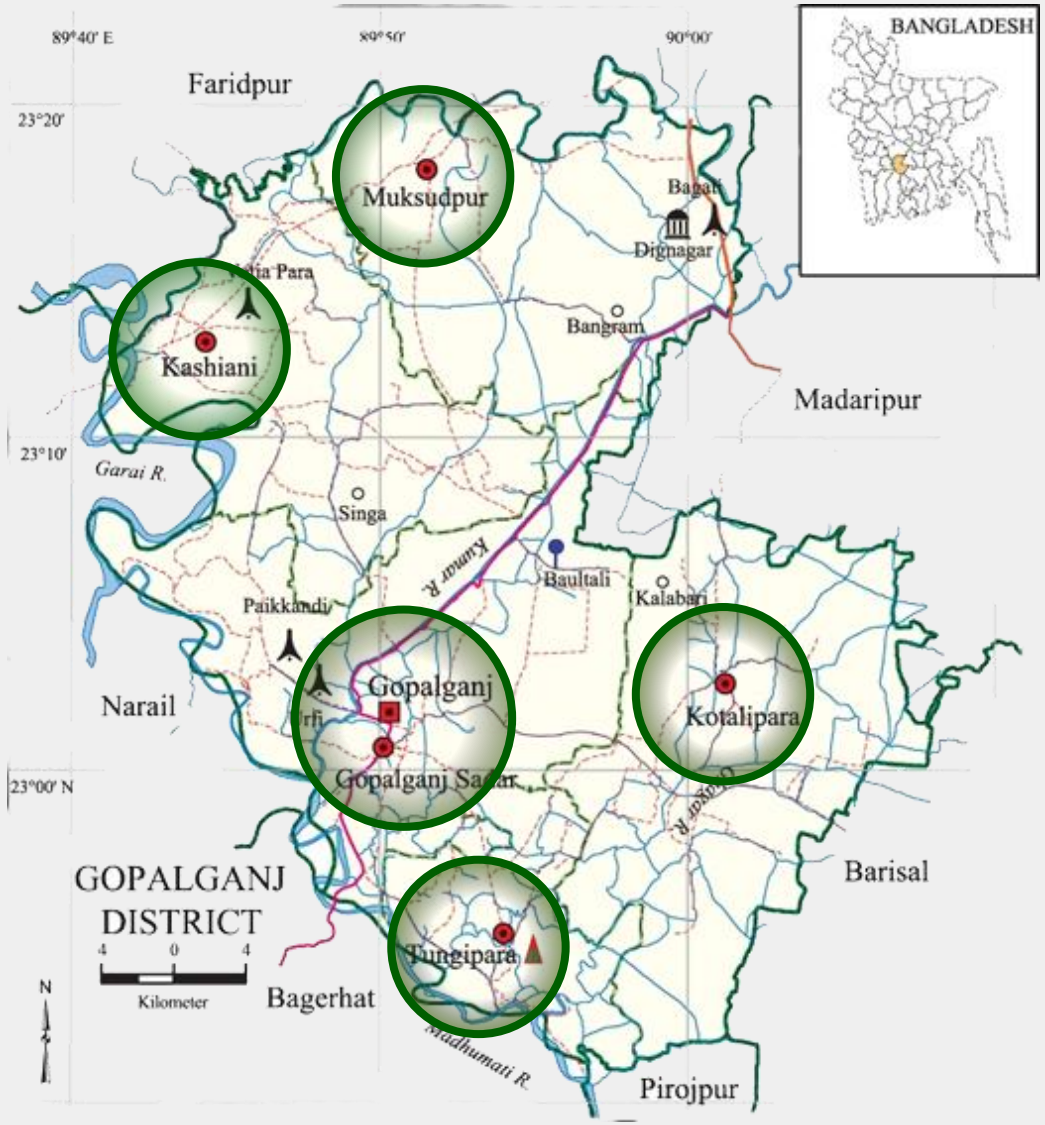
Gopalganj District

Area (sq km)	Upazila	Village	Population		Density (per sq km)	Literacy rate (%)
			Urban	Rural		
1468.74	5	889	128705	1043710	798	58.1

Upazila

1. **Kotalipara Upazila**
2. **Muksudpur Upazila**
3. **Tungipara Upazila**
4. **Gopalganj Sadar**
5. **Kashiani Upazila**

20 slaughterhouses, **60** handlers, **100** meat samples



METHODOLOGY

"Study Design"

- **Design:**

Cross-sectional study (Feb–Oct 2024)

- **Participants:**

60 meat handlers from 20 slaughterhouses

- **Data Tools:**

Structured KAP questionnaire (78 items)

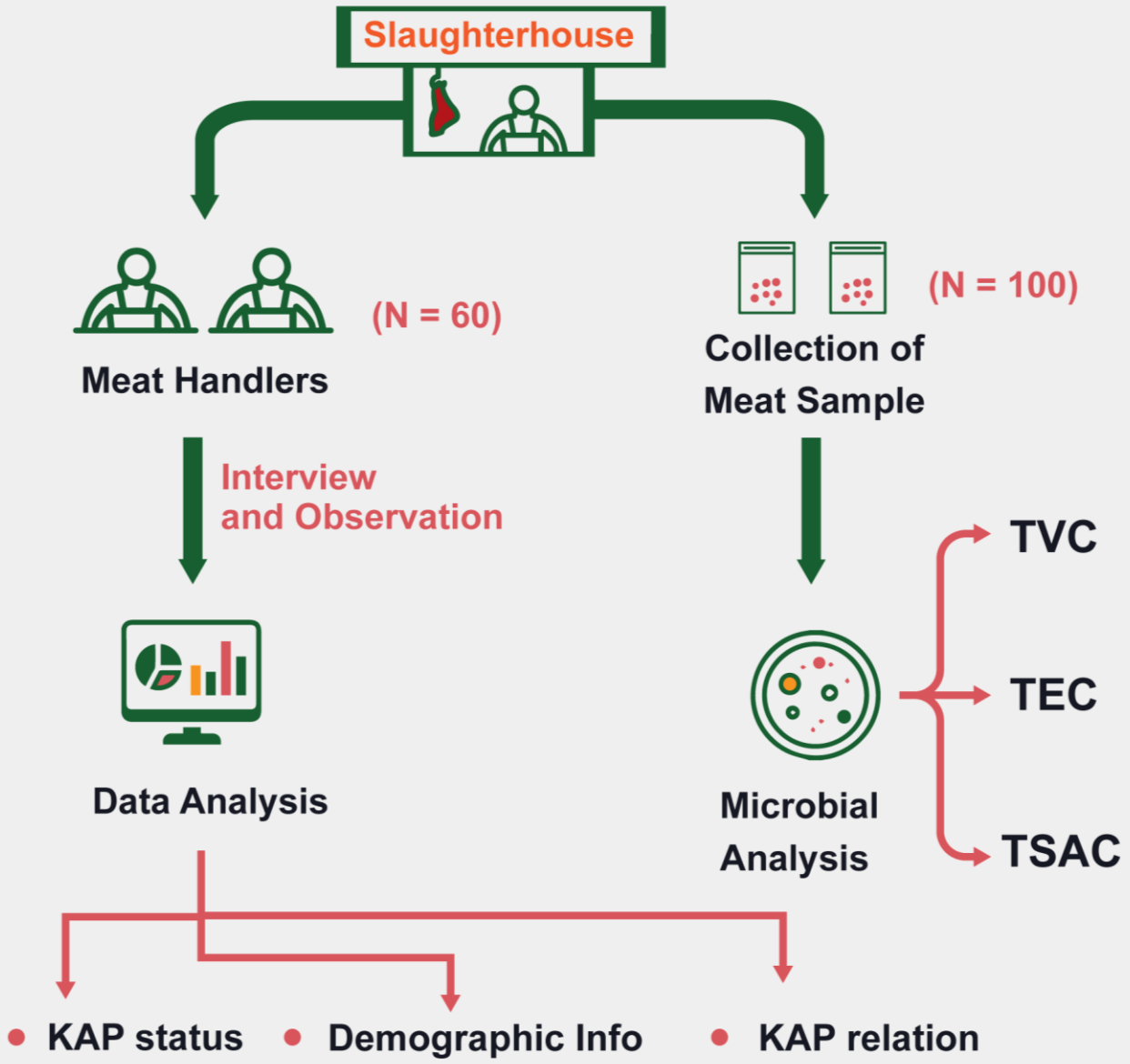
100 raw beef samples tested

- **Microbial Tests:**

E. coli (TEC), *Staphylococcus aureus* (TSAC), and TVC

- **Analysis:**

SPSS (Chi-square, ANOVA, Correlation)



METHODOLOGY

“Interview Questionnaire”

Interview Questionnaire

- **Consent Form**
- **Sociodemographic Information**
- **Food Safety Knowledge Statements (20)**
- **Food Safety Attitude Statements (13)**
- **Food Safety Practice Statements (12)**
- **Facilities of Slaughterhouse (16)**

METHODOLOGY

“Microbial Lab Test”

Staphylococcus aureus forms *yellow colony* on Mannitol Salt Agar

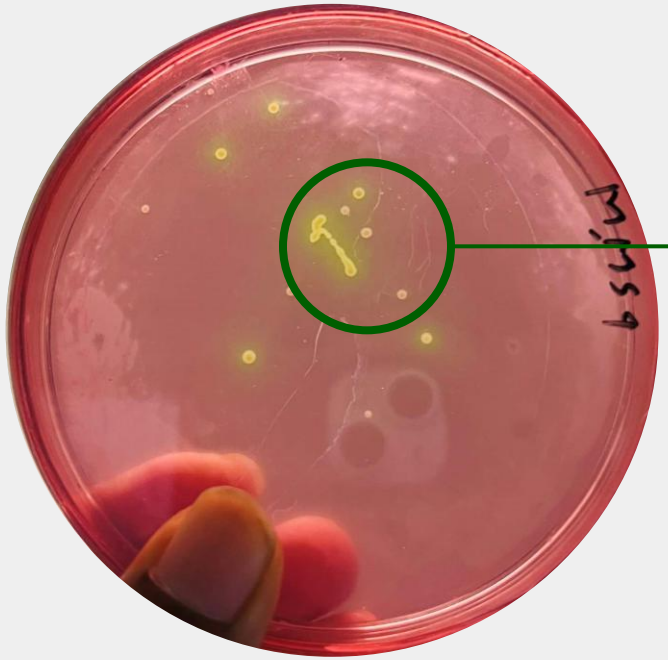


Figure: Sample on MSA

Meat Sample

↓

Peptone Water → Serial Dilution

↓

PCA (TVC)	**MSA (S.a.)**	**Mac + Brill (E. coli)**
↓	↓	↓
CFU/g Result	**CFU/g** Result	**CFU/g** Result

RESULTS

"Demographics"

100%

Most meat handlers were male

33%

Middle-aged

63.3%

Had no formal schooling

No formal food safety training

100%

Education level was significantly associated with **food safety practices** (p = 0.021)

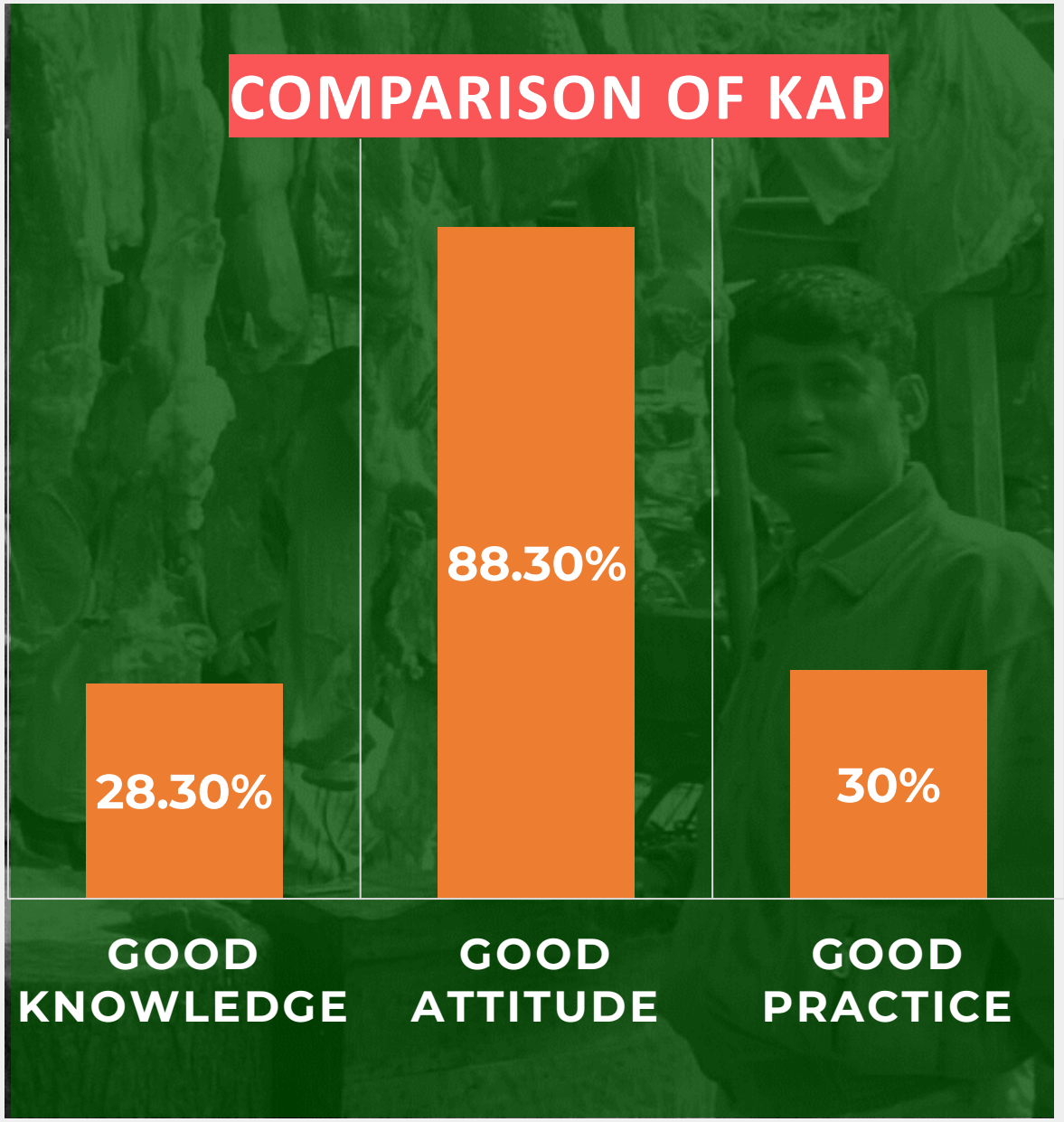
RESULTS

“Meat Handlers Food Safety knowledge, attitude and practice”

CORRELATION

Variable Pair	Correlation Coefficient (r)
Knowledge ↔ Attitude	0.895
Knowledge ↔ Practice	0.745
Attitude ↔ Practice	0.609

Correlation is highly significant at the $p < 0.001$ level



RESULTS

"Poor Infrastructure - Where the Problem Starts"

100% absent
Hygiene & sanitation facilities for visitors

Boundary around slaughterhouse
85% present

95% absent
Proper drainage system

85% absent
Toilets

Presence of ceiling
85% present

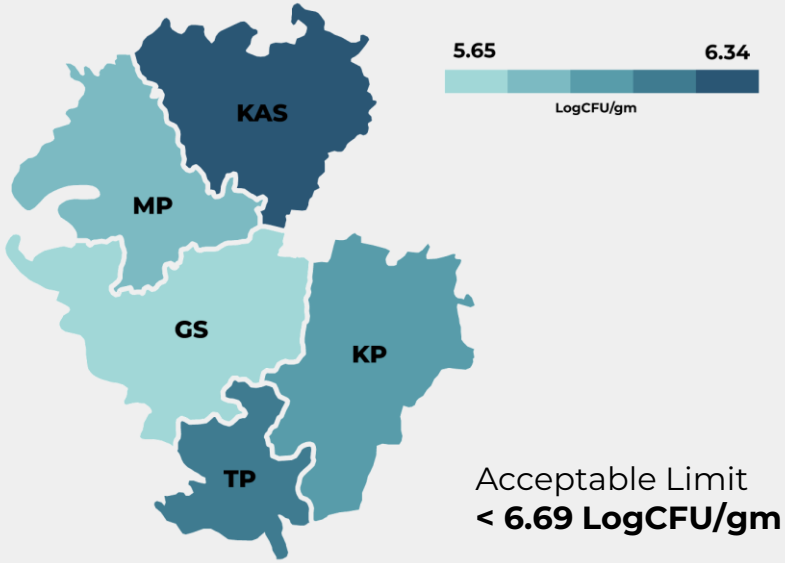
Safe disposal of waste
75% absent

Availability of clean water
90% present

RESULTS

Meat Contamination Levels

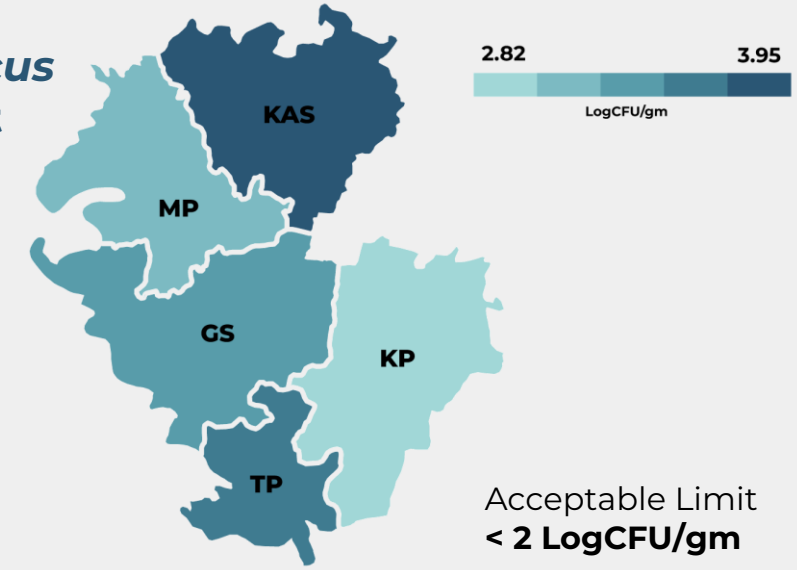
Total Viable Count (TVC)



GS = Gopalganj Sadar
TP = Tongipara
KP = Kotalipara
MP = Muksudpur
KAS = Kashiani

Acceptable Limit
< 6.69 LogCFU/gm

Total *Staphylococcus aureus* Count (TSC)



GS = Gopalganj Sadar
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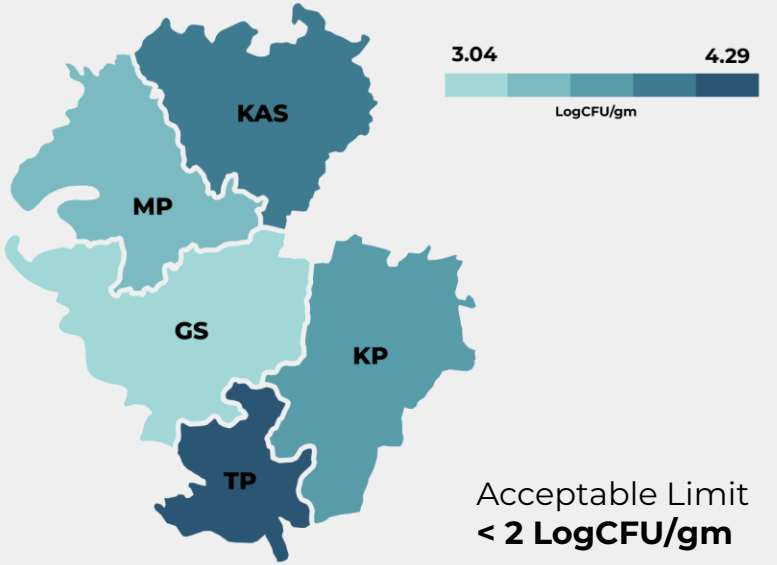
Acceptable Limit
< 2 LogCFU/gm

Total *E.coli* Count (TEC)



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Acceptable Limit
< 2 LogCFU/gm

OVERALL INSIGHTS OF THE STUDY

01 | **Knowledge–Practice Gap Among Meat Handlers**

04 | **Widespread Microbial Contamination**

03 | **Education Matters**

02 | **Inadequate Slaughterhouse Infrastructure**

05 | **Strong Interconnection of KAP**

OUR RECOMMENDATIONS

- **Implement Mandatory Food Safety Training**
- **Improve Slaughterhouse Infrastructure**
- **Enforce Microbiological Standards**
- **Promote Use of Personal Protective Equipment (PPE)**
- **Awareness Campaigns for Behavioral Change**
- **Policy & Institutional Strengthening**

THANK YOU / Q&A