

Dec 09, 2025

Assessment of Helmet Usage Among Secondary School Students: Study Protocol

DOI

<https://dx.doi.org/10.17504/protocols.io.ewov11ey7vr2/v1>

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Protocol Citation: Mazhar Iqbal, Kashif Shafique, Mariam Ashraf 2025. Assessment of Helmet Usage Among Secondary School Students: Study Protocol. protocols.io <https://dx.doi.org/10.17504/protocols.io.ewov11ey7vr2/v1>

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Protocol status: Working

We use this protocol and it's working

Created: December 08, 2025

Last Modified: December 09, 2025

Protocol Integer ID: 234469

Keywords: practices of adolescent motorbike rider, helmet use in karachi, assessment of helmet usage, adolescent motorbike rider, regarding helmet use, helmet usage, using motorcycle, motorcycles for transport, using health belief model, health belief model, theory of planned behaviour, sector secondary schools in karachi, planned behaviour, study protocol objective, secondary school student, attitude, validated structured questionnaire

Abstract

Objective: Assess knowledge, attitudes, and practices of adolescent motorbike riders (ages 15-19) regarding helmet use in Karachi, Pakistan.

Design: Descriptive-analytical cross-sectional study using Health Belief Model (HBM) and Theory of Planned Behaviour (TPB).

Setting: Public-sector secondary schools in Karachi, Pakistan.

Participants: 502 male students aged 15-19 years using motorcycles for transport.

Data Collection: October-December 2022 using validated structured questionnaire.

Guidelines

Quality Control:

- Same-day submission to principal investigator
- Locked storage before and after data entry
- Restricted access to data files
- Daily verification of completeness



Materials

Required Materials

- Validated questionnaire (Urdu translation)
- Informed consent forms (Urdu)
- Parental consent forms for participants 3c18 years
- Secure storage files for data
- IBM SPSS version 27 for analysis

Equipment Specifications

- Computer-generated random number generator for sampling
- STATA software for cluster size calculation
- Locked storage facilities for questionnaires



Troubleshooting

Problem

Low consent rate

Solution

Conduct parent information sessions; provide detailed study benefits

Problem

Incomplete questionnaires

Solution

Implement on-site completion verification; train interviewers thoroughly

Problem

Language barriers

Solution

Use Urdu-validated questionnaire; employ bilingual interviewers

Problem

Access to schools

Solution

Obtain formal education department approval letters; coordinate with principals

Problem

Data quality concerns

Solution

Implement same-day PI review; conduct periodic inter-rater reliability checks

Before start

1. Guarantee anonymity and confidentiality.

1. ETHICAL APPROVAL

- 1 Duration: 2-4 weeks before study commencement
Obtain IRB approval (Reference: IRB-2510/DUHS/Approval/2022/856)
Request approval from Sindh Education Department
Obtain school enrollment lists from education department

2. SAMPLING STRATEGY

- 2 Duration: 1 week
Sample Size Calculation:
Formula: Two means comparison (Openepi.com)
Based on: Mean $\pm$ SD knowledge scores 7.16 $\pm$ 1.55 (intervention) vs 6.84 $\pm$ 1.68 (control)
Confidence interval: 95%
Study power: 80%
Initial calculated: 416 students
Final adjusted: 500 students (20% non-response buffer)
Actual enrolled: 502 students (100% response rate)
- 3 Cluster Sampling:
Software: STATA
Intra-cluster correlation: 0.05
Power: 80%, CI: 95%
Result: 10 schools total (5 per arm)
Students per school: 50
Selection method: Computer-generated random numbers
Sampling frame: Student identifiers from grades 8-10, ages 15-19, using motorcycles
- 4 Stratification:
Seven districts in Karachi
Public-sector secondary schools
Higher and lower socioeconomic communities

3. PARTICIPANT RECRUITMENT

- 5 Duration: 3 months (October-December 2022)
Inclusion Criteria:
Male students aged 15-19 years
Attending public secondary schools
Using motorbike for transportation (rider, pillion rider, or passenger)
Provided informed consent
Parental consent obtained (for age 3c18 years)



- 6 Exclusion Criteria:
Students not using motorcycles
Declined participation
Incomplete parental consent
- 7 Consent Process:
Distribute information sheets in Urdu
Obtain written parental consent (students 3c18 years)
Obtain written student assent/consent
Ensure voluntary participation
Guarantee anonymity and confidentiality

4. QUESTIONNAIRE DEVELOPMENT

- 8 Duration: 4-6 weeks (completed before data collection)
Phase 1 - Item Generation:
Adapted HBM scales from Champion 6 Skinner (2008)
Adapted TPB measures following Ajzen (2006)
Knowledge items from Pakistan's National Highway and Motorway Police curriculum
Initial items: 65
Expert review panel: 3 road safety researchers + 2 behavioral psychologists
- 9 Phase 2 - Content Validation:
Expert panel: 5 specialists (2 road safety, 2 health behavior, 1 adolescent psychologist)
Content validity index: 0.89
Forward-backward translation to Urdu
Discrepancy resolution through expert consensus
- 10 Phase 3 - Pilot Testing:
Sample: 50 students (non-study schools)
Factor analysis: KMO=0.83, Bartlett's test $p < 0.001$
Principal component analysis: 11 factors, 64% variance explained
Factor loadings: All ≥ 0.40
- 11 Reliability Assessment:
Knowledge scale: $\alpha = 0.76$
HBM subscales: $\alpha = 0.77-0.84$
TPB subscales: $\alpha = 0.80-0.88$
Test-retest (n=30, 2-week interval): ICC=0.76-0.89

5. DATA COLLECTION

- 12 Duration: 3 months (October-December 2022)
Procedure:
Schedule data collection sessions with schools

- Assemble trained data collection team
- Conduct interviews during school hours
- Use structured questionnaire (Urdu)
- Complete one session per school per day
- Submit questionnaires to PI same day
- Store in locked filing system

13 Quality Control:

- Same-day submission to principal investigator
- Locked storage before and after data entry
- Restricted access to data files
- Daily verification of completeness

14 Variables Assessed:

- Demographics (age, socioeconomic status)
- Transport characteristics (motorcycle type, riding frequency, user type)
- Accident history (past 12 months)
- Helmet usage patterns (as rider and passenger)
- Knowledge scores (range: 3-16)
- HBM scores (range: 12-33)
- TPB scores (range: 8-22)

6. OPERATIONAL DEFINITIONS

15 Socioeconomic Status:

- Tool: Modified Kuppaswamy scale (Pakistan adaptation)
- Components: Education (1-7), Occupation (1-10), Income (1-12)
- Total range: 3-29 points
- Categories: Middle class (16-25), Lower-middle (11-15), Lower (≤ 10)

16 Accident History:

- Timeframe: Past 12 months
- Definition: Collision/crash requiring medical attention or causing property damage
- Assessment: Self-reported via questionnaire

17 Helmet Use Frequency:

- Scale: 5-point (Always, Often, Sometimes, Rarely, Never)
- Assessed separately: As rider and as passenger
- Collapsed for analysis: Always / Often-Sometimes-Rarely / Never

18 Score Classifications (Median Split):

- Knowledge: Adequate (≥ 11) vs Inadequate (< 11)
- HBM: High (≥ 23) vs Low (< 23)
- TPB: High (≥ 11) vs Low (< 11)

7. DATA MANAGEMENT

- 19 Duration: 2-4 weeks post-collection
Data Entry:
Software: IBM SPSS version 27
Secure data entry workstation
Double-entry verification for accuracy
Data cleaning and validation
- 20 Data Storage:
Locked physical storage for questionnaires
Password-protected digital files
Restricted access (PI and designated staff only)
Backup copies maintained

8. STATISTICAL ANALYSIS

- 21 Duration: 2-3 weeks
Descriptive Statistics:
Frequencies and percentages (categorical variables)
Means and standard deviations (continuous variables)
Median and IQR (score distributions)
- 22 Inferential Statistics:
Pearson chi-square tests for categorical associations
Significance level: $p \leq 0.05$
Analysis of associations between:
Socioeconomic status and scores
Transport characteristics and scores
Helmet usage patterns and scores
Social influence patterns (peer and family effects)
Intention-behavior gaps
Risk perception patterns
- 23 Software:
IBM SPSS version 27

EXPECTED OUTCOMES

- 24 Primary Outcomes:
Knowledge, attitude, and practice scores regarding helmet use
Associations between socioeconomic factors and safety behaviors
Identification of barriers to helmet adoption

- 25 Secondary Outcomes:
Social influence patterns (peer and family effects)
Intention-behavior gaps
Risk perception patterns

SAFETY 6 QUALITY ASSURANCE

- 26 Ethical Safeguards:
IRB-approved protocol
Voluntary participation
Written informed consent
Parental consent for minors
Anonymity and confidentiality maintained
Right to withdraw anytime
- 27 Data Quality:
Validated questionnaire with high reliability
Trained data collectors
Same-day supervision and verification
Secure storage protocols
Systematic data management

TIMELINE SUMMARY

28

Phase	Duration	Activities
Ethics & Approvals	2-4 weeks	IRB, Education Dept approvals
Sampling	1 week	School selection, randomization
Recruitment	3 months	Oct-Dec 2022, consent process
Data Collection	3 months	Oct-Dec 2022, interviews
Data Management	2-4 weeks	Entry, cleaning, verification
Analysis	2-3 weeks	Statistical analysis
Total	~5-6 months	Complete study cycle

Protocol references

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Acknowledgements

Ethics approval: IRB-2510/DUHS/Approval/2022/856

Funding: No funding was used for this research

Conflicts of Interest: None declared

Troubleshooting:

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- **Incomplete questionnaires:** Implement on-site completion verification; train interviewers thoroughly
- **Language barriers:** Use Urdu-validated questionnaire; employ bilingual interviewers
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