

Mobile Based Ecological Momentary Assessment and Machine Learning for Predicting Suicidal Ideation Among Gay, Bisexual, and Other Men who Have Sex with Men

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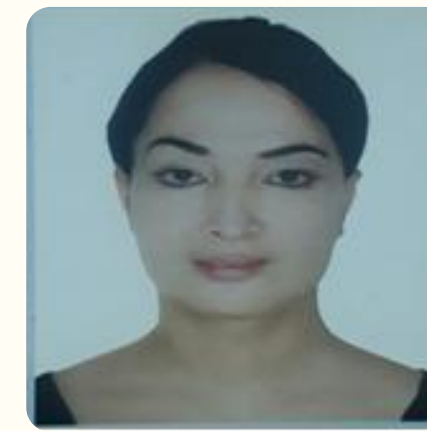
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Affiliations





Background: *Suicide as a Global Health Concern*

1. High Mortality

Over 700,000 deaths annually worldwide.

2. Disproportionate Impact

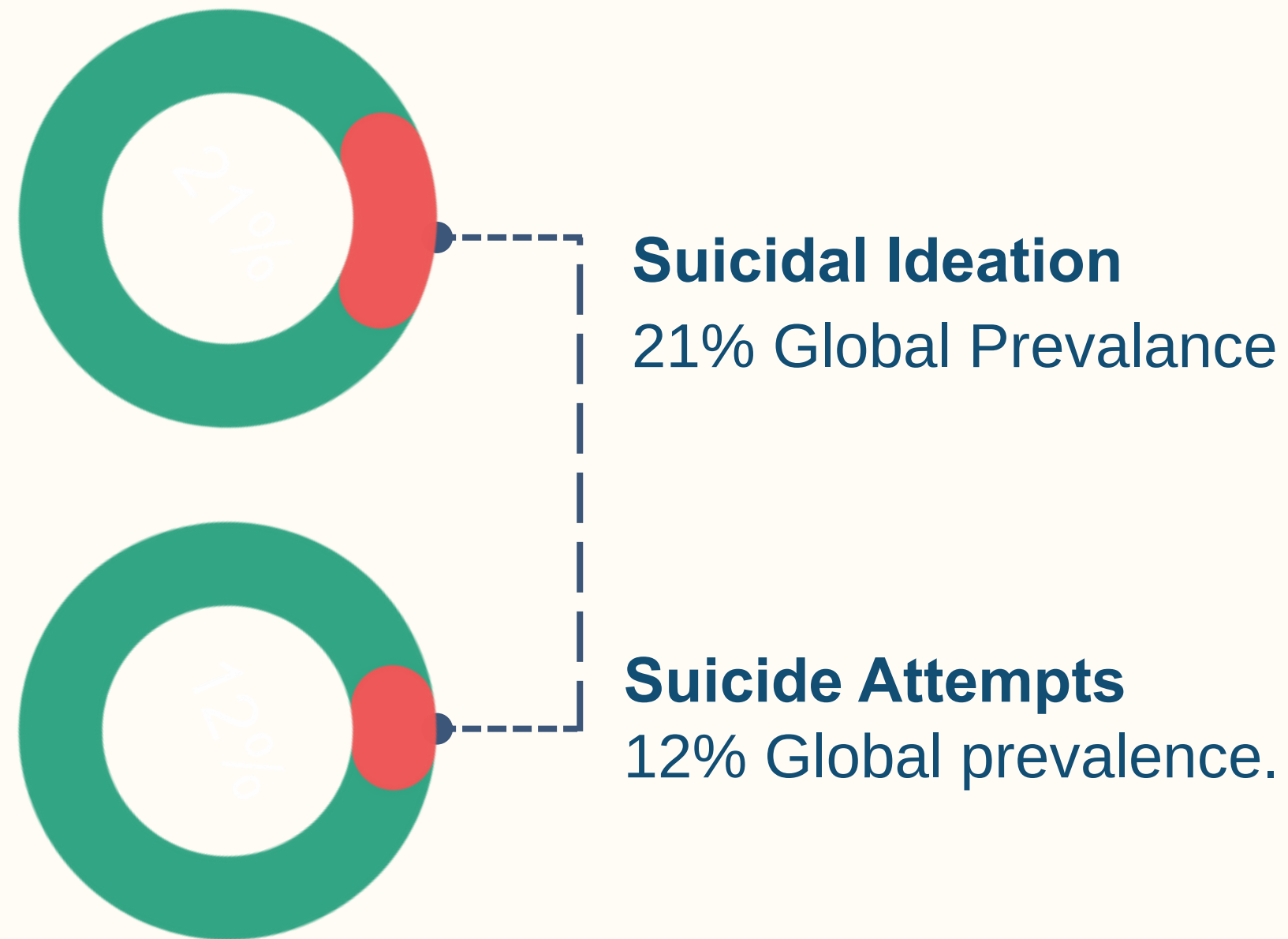
77% of deaths in low-middle-income countries.

3. South Asia

One of the highest estimates.

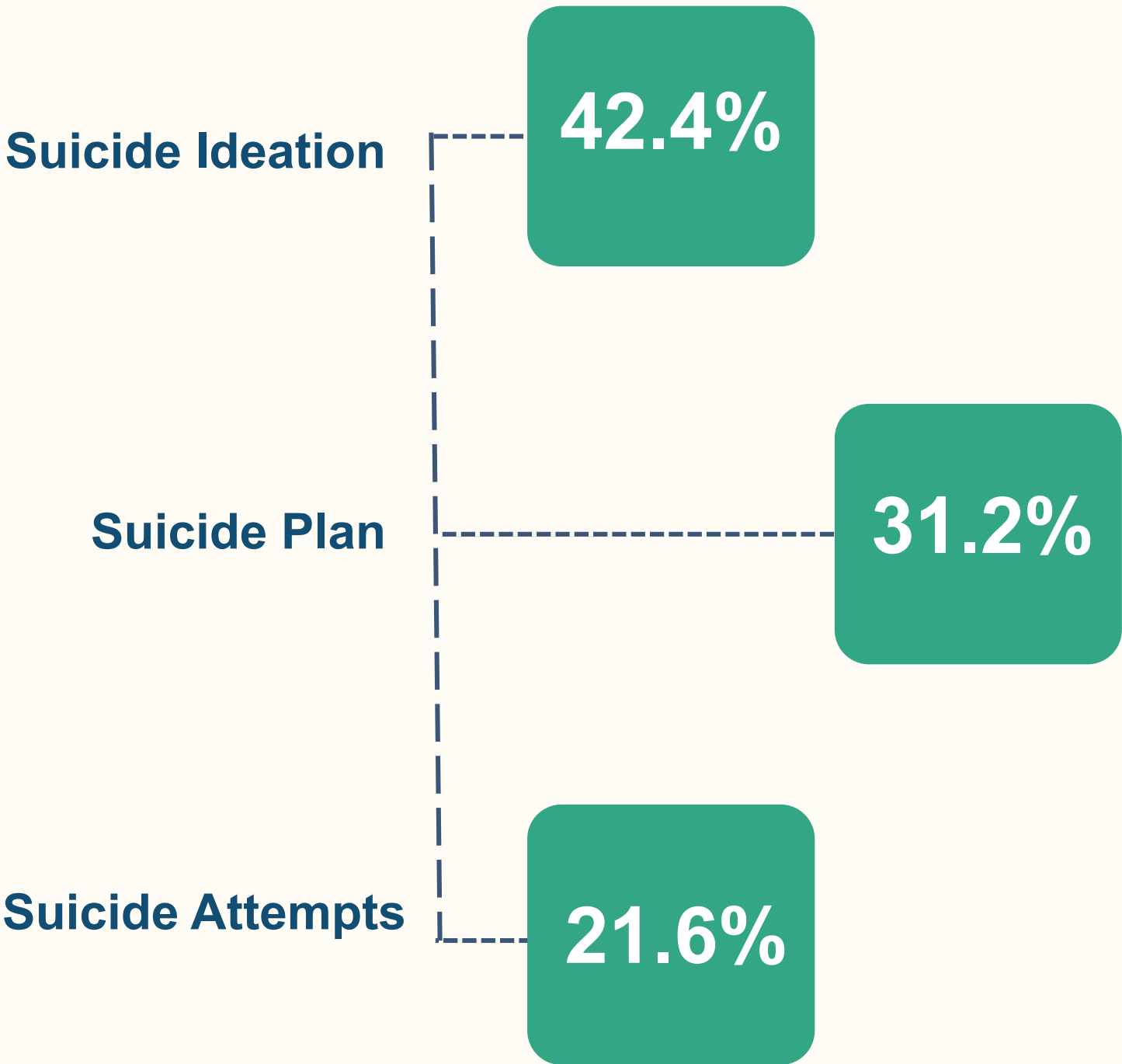
Background:

Increased Risk for GBMSM



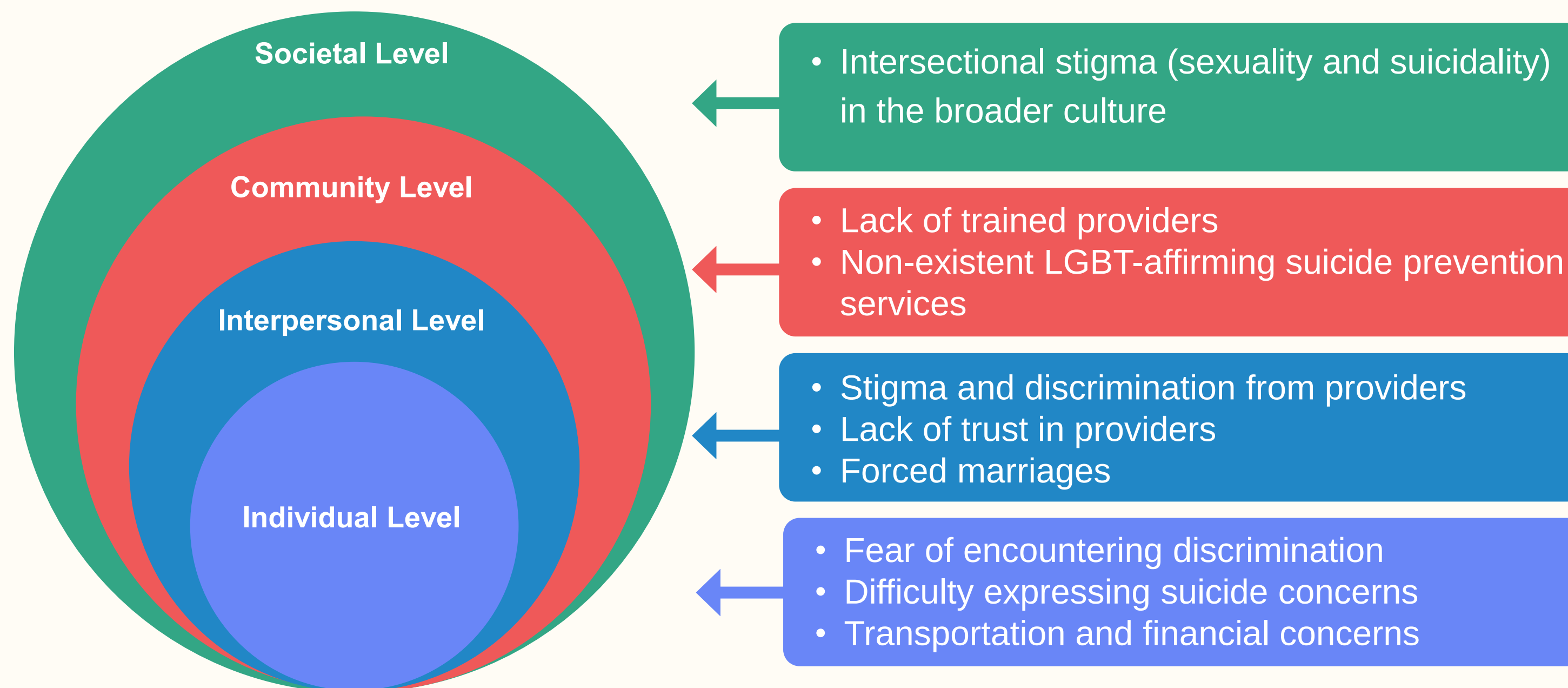


Background: *Severe Vulnerability in Nepal*



Background:

Multi-Level Barriers and Increased Suicide Risk Among GBMSM



Background:

Potential of mHealth

Journal of Community Health (2024) 49:575–587
<https://doi.org/10.1007/s10900-024-01324-x>

ORIGINAL PAPER

High Interest in the Use of mHealth Platform for HIV Prevention among Men Who Have Sex with Men in Nepal

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JMIR HUMAN FACTORS

Gautam et al

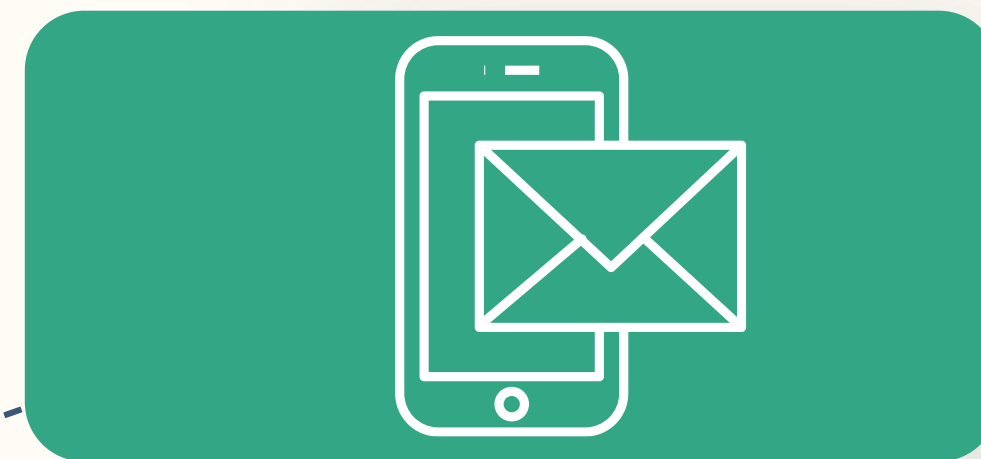
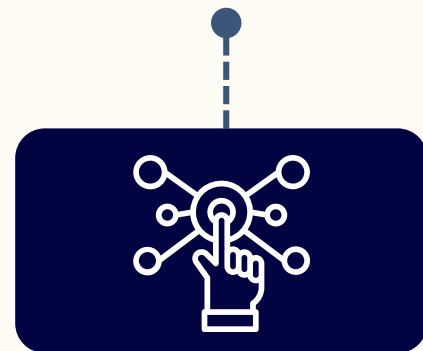
Original Paper

Preferences for mHealth Intervention to Address Mental Health Challenges Among Men Who Have Sex With Men in Nepal: Qualitative Study

Kamal Gautam^{1*}, MPH; Camille Aguilar^{2*}; Kiran Paudel^{1,3}, BPH; Manisha Dhakal⁴, MBS; Jeffrey A Wickersham⁵, PhD; Bibhav Acharya^{6,7}, MD, PhD; Sabitri Sapkota⁷, MPH, PhD; Keshab Deuba⁸, PhD; Roman Shrestha^{1,5}, MPH, PhD

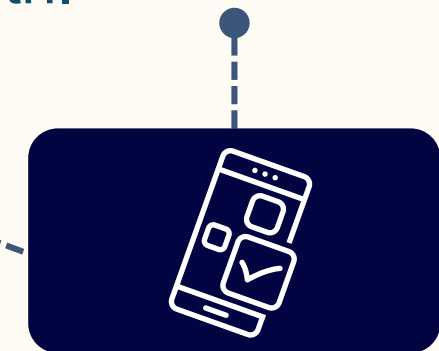
HIGH DIGITAL ACCESS

92% of GBMSM in Nepal own smartphones with internet access and 88% use the internet daily



HIGH WILLINGNESS

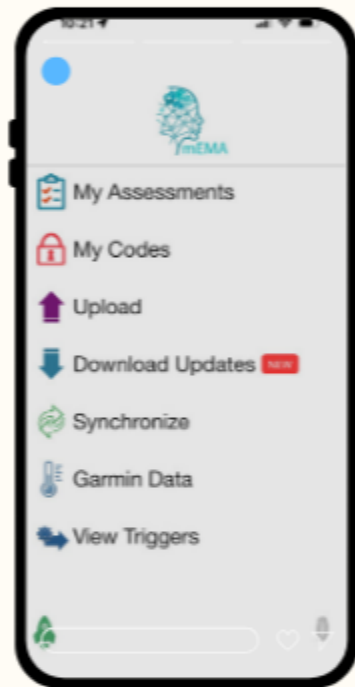
Over 60% willing to receive mental health information and engage in virtual support via mHealth.



STRONG INTEREST IN TAILORED APPS

89% use digital devices to search for health info; participants preferred confidential, LGBTIQ+ friendly mHealth platform.

Ecological Momentary Assessment (EMA)

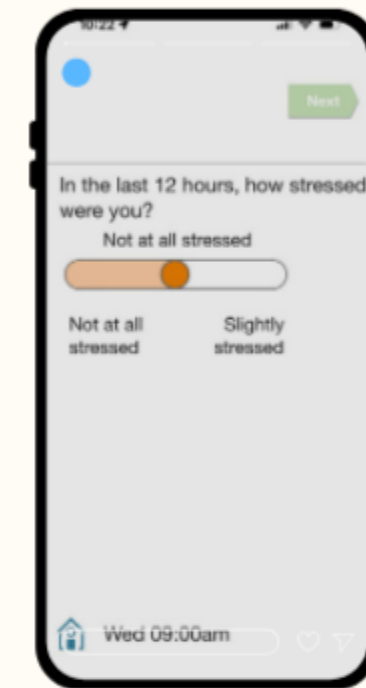


EMA

- Collection of real-time data on participants' behaviors, thoughts, and feelings in their natural environment.

Purpose

- Minimize recall bias.
- Capture dynamic behavior in real-time.
- Repeated assessments.



Method

- Assessments mainly via mobile devices.
- Completed at specific moments.

Methodology

01

Prospective Study

A 30-day study enrolled 50 GBMSM from Nepal between May and July 2024.

02

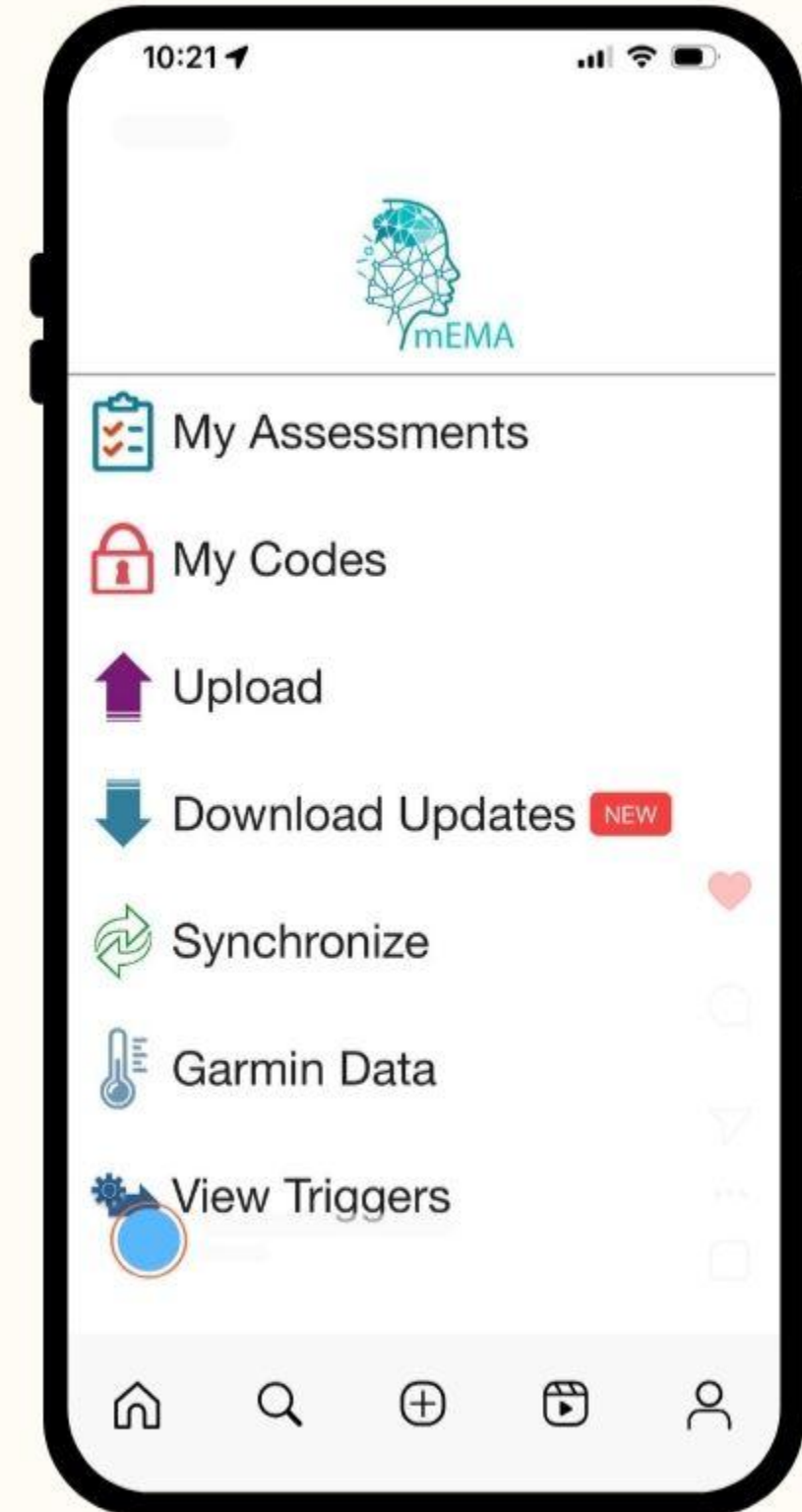
EMA Schedule

Three fixed-schedule daily EMAs were conducted via a smartphone app, "mEMA"

03

Reminders

Participants received up to three reminders to complete surveys.

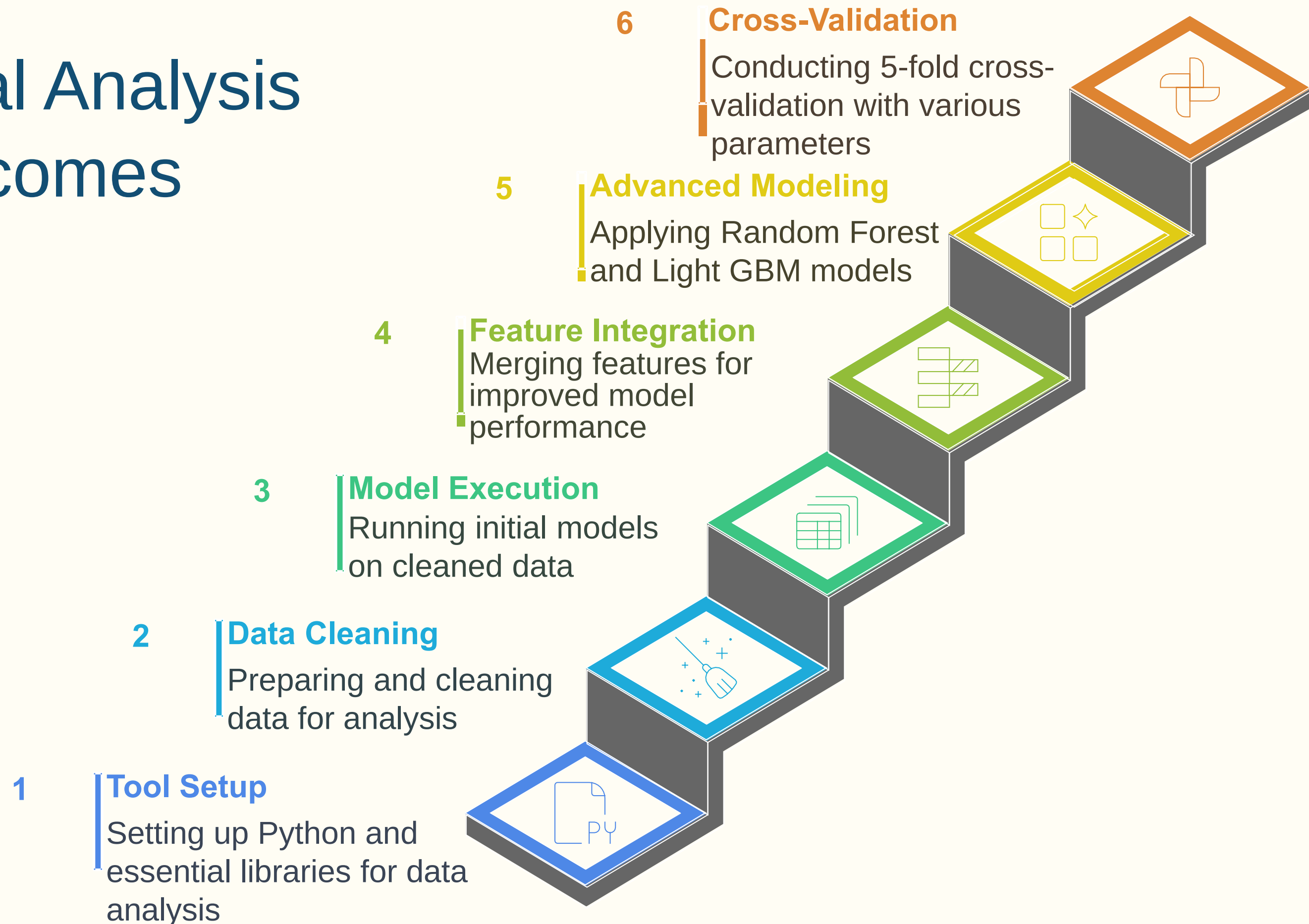


EMA Data Collection Measures



Measures were derived from EMA constructs assessed three times daily. These measures captured the temporality of the data.

Statistical Analysis and Outcomes



Results - Demographic Characteristics

27.8

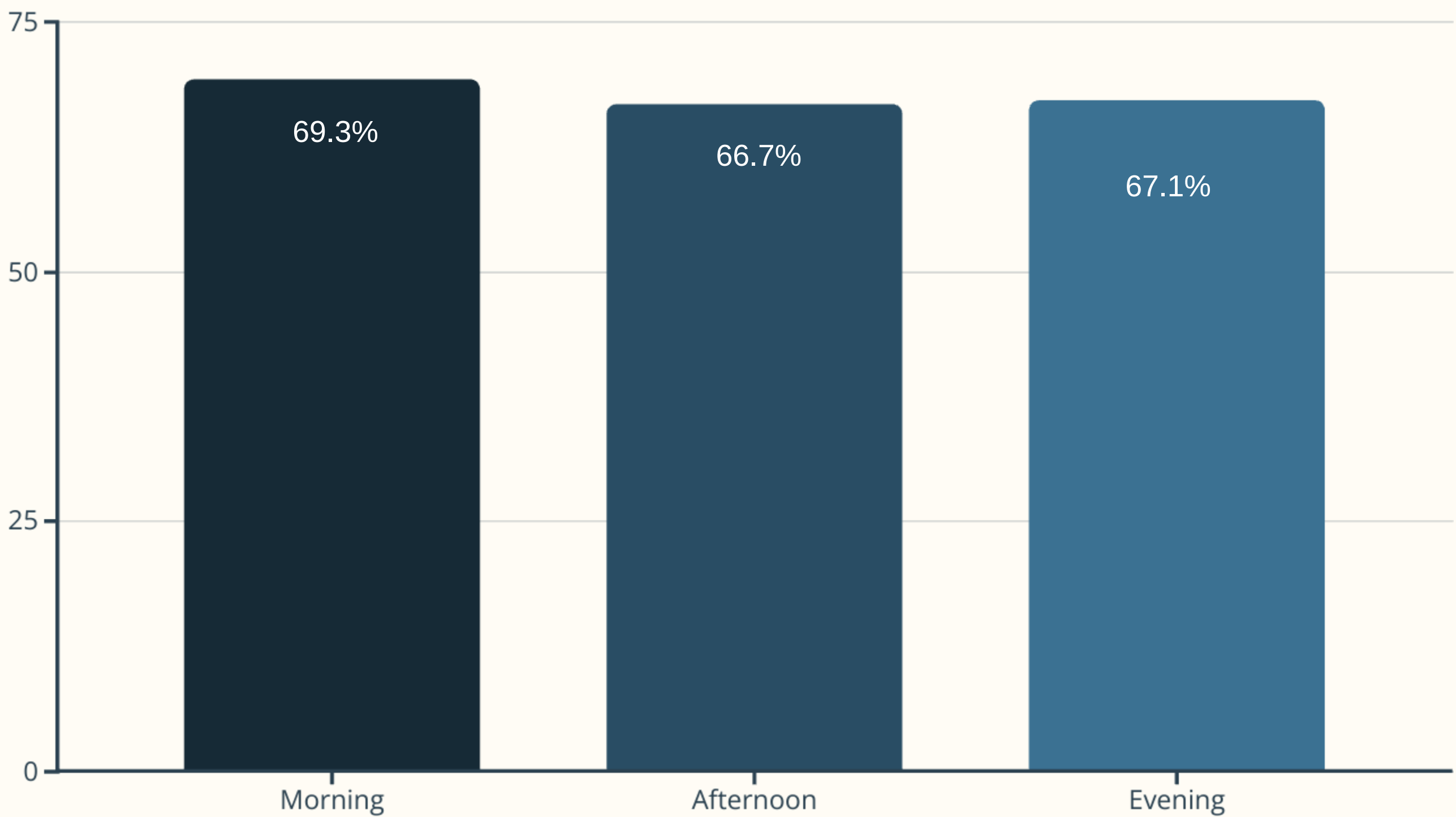
Mean Age

58%

Percentage identifying as gay



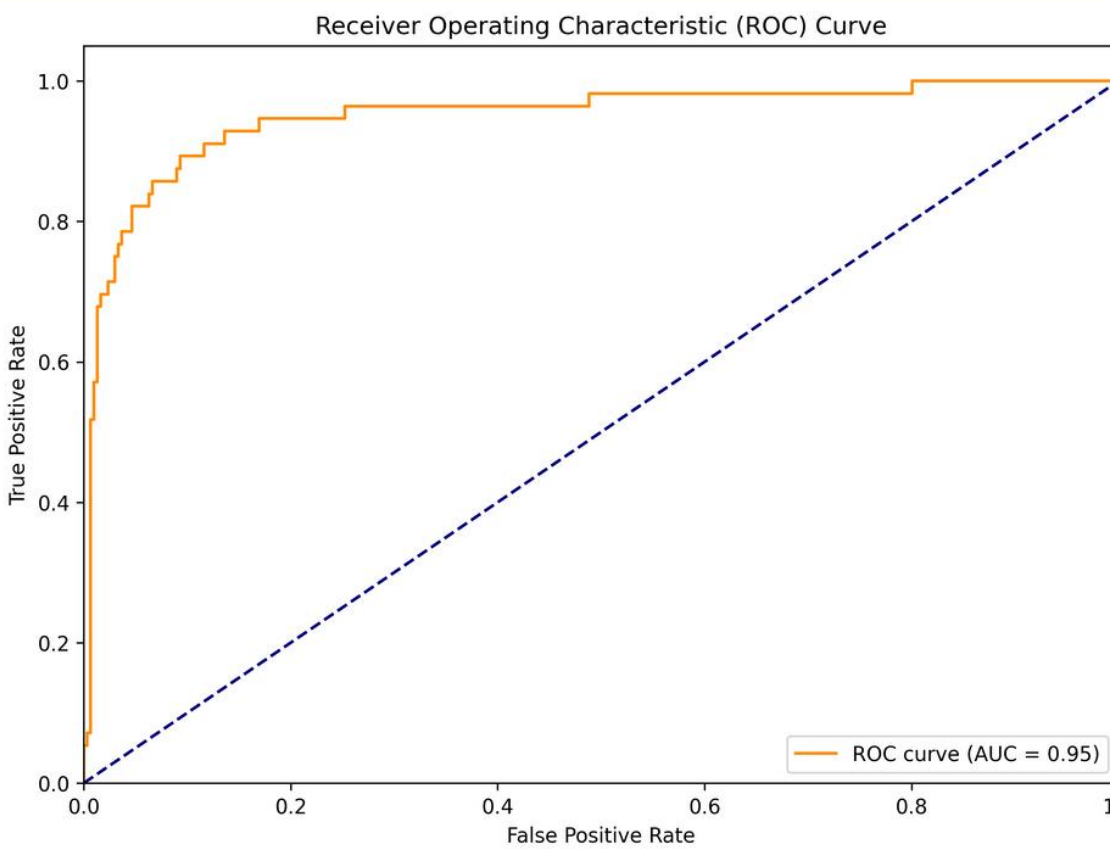
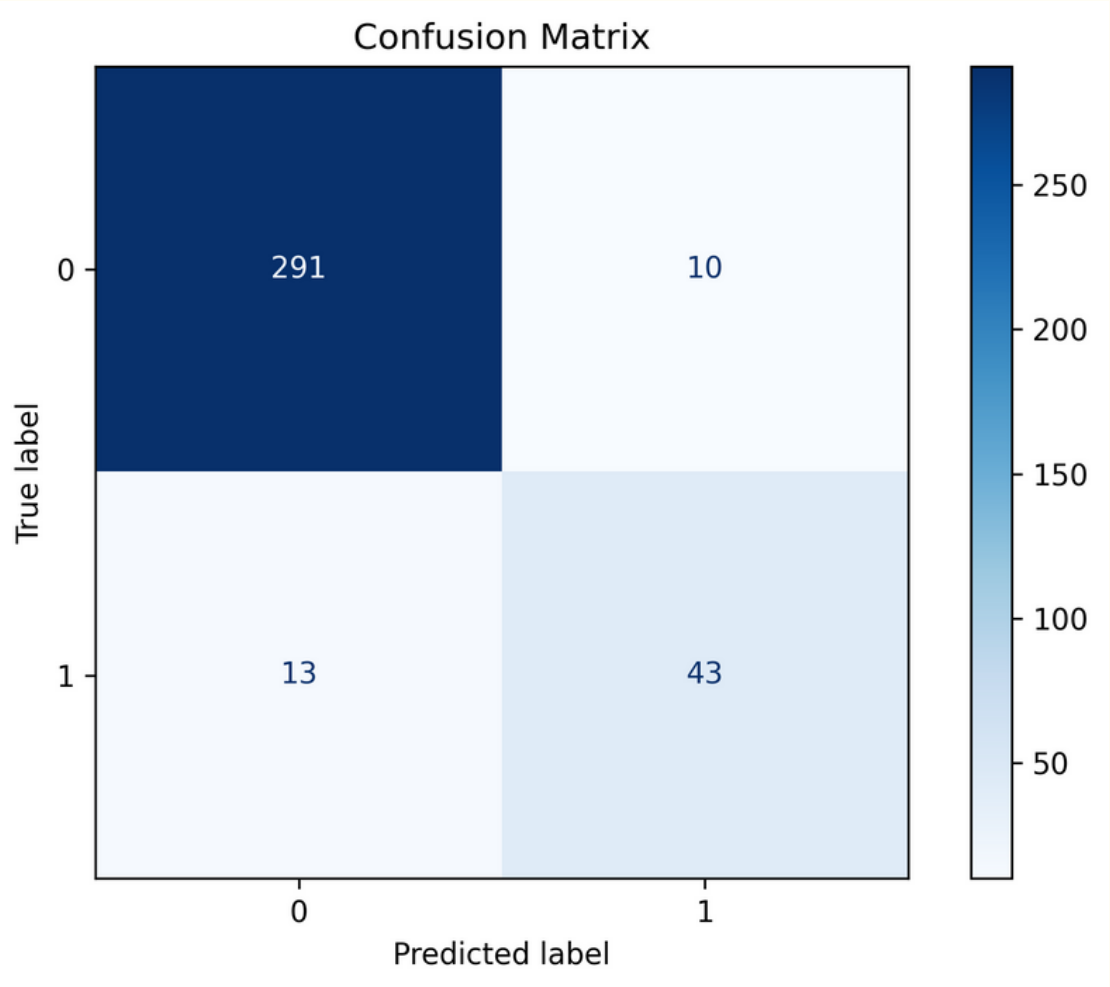
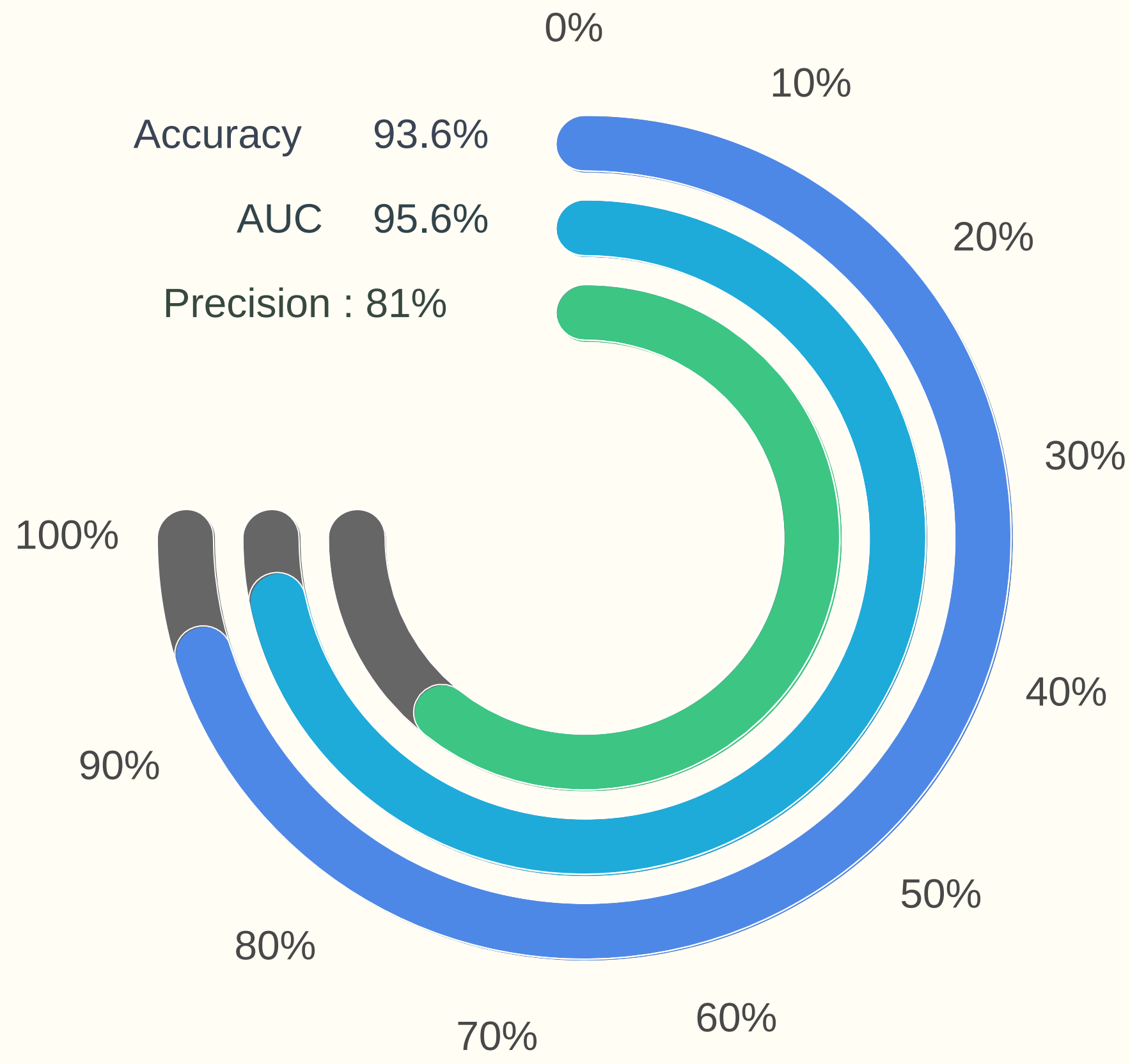
EMA Adherence Rates



Adherence rates were consistent across different times of day. These rates suggest good compliance with the EMA protocol.

ML Model Performance

The LightGBM model demonstrated strong performance in predicting next-day suicidal ideation.





Key Predictive Features

Emotional Stress

Cumulative emotional stress was a significant predictor.

Prior Suicidal Ideation

Prior-day suicidal ideation was highly indicative.

Sleep Quality

Prior-day sleep quality impacted predictions.

Implications and Utility

1

Real-Time Identification

Digital tools can identify at-risk individuals in real-time.

2

Resource-Limited Settings

Useful even in resource-limited settings.

3

Suicide Prevention

Optimize for suicide prevention strategies.

4

Intervention Development

Essential for future intervention development.



Conclusion and Future Directions

Demonstrated Potential

Mobile-based EMAs can predict suicidal ideation.

1

2

Optimize Tools

Future research should optimize these tools.

Broader Use

Expand use in suicide prevention strategies.

3

Presenter



Mohan Kumar Pudasaini is a WCO-accredited expert in two areas—Customs Risk Management and Data Analytics—with over a decade of public sector experience. Currently serving as a Risk/Data Analyst at Nepal Customs, he leverages tools such as SQL, R, Python, and Tableau to transform complex datasets into actionable insights, streamlining risk assessment and compliance processes. In addition to his work at Nepal Customs, he collaborated with the University of Connecticut to perform Ecological Momentary Assessment (EMA) data analysis for the current study.