Feasibility of a Mobile Health App for Air Quality Forecasting to Support Asthma Self-Management: A Pilot Randomised Controlled Trial in Malaysia

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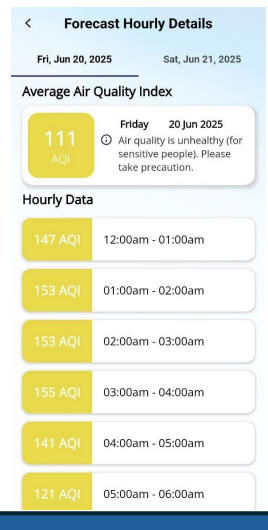
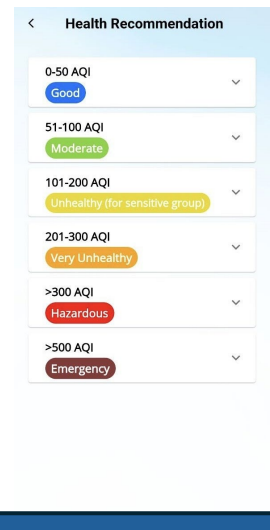




Background

- Outdoor air pollution, particularly haze, is common in Malaysia.
- Increased air pollutants → higher risk of asthma exacerbation.

Methods

The intervention: AQA app

A mobile app to provide 48-hour air quality **forecast** data using the Atmospheric Dispersion Modelling System (ADMS) model

Aim of study:

Assess feasibility of the app and its impact on asthma control

Study design

- Pilot RCT

RCT design

- Parallel two-arm trial - 1:1 block randomization (block size 2)

Site

- Single centre; public primary care clinic in Malaysia

Sample

- Adult patients with asthma; reported exacerbations with haze

Groups

- Intervention: AQA app + usual care (n=30)
- Control: Usual care only (n=30)

Assessments

- Asthma control (GINA tool) at baseline, 1, 3, 6, 12 months.
- Secondary: Exacerbations, emergency visits, medication use
- Usability: System Usability Scale (SUS).
- App utility: Dashboard analytics

Results at 1-month follow up (n=30 per arm)

Similar baseline characteristics for both arms (p>0.05)

- Mean age 39-40 years old
- Predominantly female (>80%)
- 56-60%: non-tertiary education
- 60-70% are working
- 97% non-smokers
- Equal exposure to indoor air pollutants (e.g. mosquito coils, joss-sticks)

Challenges:

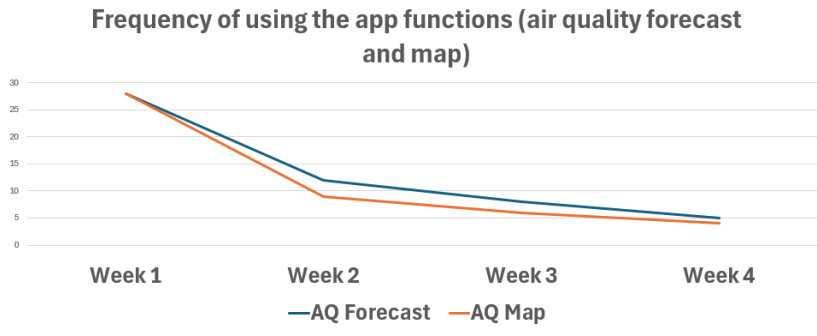
Technical issues: Auto log offs from app, forecast data interruptions

Low utility issues → qualitative study to evaluate this at the end of trial

No significant difference in asthma control (p = 0.637).

Mean SUS score: **70.1** → indicates **good usability**.

Utility reducing at 1-month follow-up



Conclusion

App shows promise in usability.

Ensuring smooth data flow is key to optimal app performance.

Investigating the low utility issue may improve future app design.