

**Table A3.1.** Extracted characteristics of included studies in Meta-analysis

Study	Research design	Population & Sample Sizes	Intervention	Intervention effects
Ostojic et al., (2005)	Study: Equal 2 arm RCT (Parallel); Platform: SMS Duration: 16 weeks Interactivity: Daily; Recruitment: Pulmonary clinic;	Participants <i>N</i> : 16 (MTI: 8, PB: 8); Demographics: Adults Mean age: 25 years; Female: 44%, Asthma: Moderate for 6 months according to GINA Country Croatia;	PB: paper diary to record PEF measures, medication use, and asthma symptoms. Diary reviewed at end of study. MTI: SMS PEF measures daily to Dr, receive weekly reply of therapy adjustments and recommendations for follow-up. If PEF exacerbated received SMS for office visit.	Outcomes: <ul style="list-style-type: none"> <li>• Adherence - ICS Dosage – Post Mean (SD): MTI 625 (332) vs. PB 530 (200); <math>P = .57</math></li> <li>• Adherence - PEF – Post %: MTI 66.2 vs. PB 61.3, <math>P = .88</math></li> <li>• Lung Function - FEV<sub>1</sub> % Predicted – Post Mean (SD): MTI 81.25 (17.31) vs. PB 78.25 (21.09); <math>P = .57</math></li> <li>• Unscheduled Visits – MTI 25% vs. 88%</li> <li>• Engagement: 99%</li> <li>• Attrition: MTI 0% vs. PB 0%</li> </ul>
Liu et al., (2007)	Study: 2 arm RCT (Parallel); Platform: Mobile App Duration: 6 months Interactivity: Daily Recruited: Outpatient clinic;	Participants <i>N</i> : 120 (MTI: 60, TAU: 60); Demographics: Adults Mean age: 52 years; Female: 51%, Asthma: Moderate-severe persistent according to American Thoracic Society, Country Taiwan;	PB: Asthma education, self-management plan, and standard treatment. Record daily PEF and asthma symptoms on a diary. Follow-up every 1 month MTI: same as PI but electronic diary for recording weekly plus based on these measures received daily reply of asthma status and therapy adjustments.	Outcomes: <ul style="list-style-type: none"> <li>• Adherence - ICS Dosage – Post Mean (SE): MTI 709 (32) vs. PB 630 (39); <math>P &lt; .05</math></li> <li>• Lung Function - FEV<sub>1</sub> % Predicted – Post Mean (SE): MTI 65.2 (3.2) vs. PB 56.5 (2.8); <math>P &lt; .05</math></li> <li>• QoL -SF-12 PCS – post Mean (SE): MTI 45.5 (1.4) vs. PB 40.0 (1.5), <math>P &lt; .01</math></li> <li>• Unscheduled Visits – MTI 4% vs. PB 20%, <math>P &lt; .05</math></li> <li>• Attrition: MTI 28% vs. PB 23%</li> </ul>
Prabhakaran et al., (2010)	Study: RCT Study; Platform: SMS Duration: 3 months Interactivity: daily SMS; Recruited: patients admitted to hospital for asthma	Participants <i>N</i> : 120 (MTI: 60; TAU: 60); Demographics: 21+ years Mean: 55 years Female: 65%, Asthma: undefined Country Singapore;	TAU: asthma education MTI: SMS for 2 weeks regarding asthma symptoms, If yes, thank. Weekly SMS for 10 weeks regarding ventilation use and report on achieved control. If not achieved contacted for advice and change of appointment if required. If no reply then sent another SMS in evening.	Outcomes: <ul style="list-style-type: none"> <li>• Well Controlled ACT - %: MTI 62% vs. TAU 49%, <math>P = 0.11</math></li> <li>• Fewer Unscheduled Visits – %: MTI 85% vs. TAU 95%, <math>P = .06</math></li> <li>• Engagement: 82%</li> <li>• Attrition: MTI 3% vs. TAU 5%</li> </ul>

Strandbygaard et al. (2010)	<p>Study: RCT Study;  Platform: SMS  Duration: 3 months  Interactivity: daily SMS;  Recruited: advertisement in local paper</p>	<p>Participants <i>N</i>: 26 (MTI:12; TAU: 14);  Demographics: 18-45 years  Mean: 32 years  Female: 46%,  Asthma: undefined mild-severe persistent  Country: Denmark</p>	<p>TAU: education on ICS treatment, asthma knowledge, correct inhaler technique  MTI: TAU + daily SMS to take meds for 8 weeks at 10am</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Adherence - ICS – Change Mean (95%CI): MTI 3.6 (-8.5, 15.7) vs. TAU -14.2 (-24.2, 4.1); <i>P</i> = .02</li> <li>• Lung Function - FEV<sub>1</sub> % Predicted – Change Mean (95%CI): MTI 3.28 (-1.94, 8.50) vs. TAU 7.65 (0.22, 15.07); <i>P</i> = .32</li> <li>• QoL - Mini AQLQ – Change Mean (95%CI): MTI 0.57 (0.05, 1.10) vs. TAU 0.59 (0.13, 1.05), <i>P</i> = .96</li> <li>• Asthma Control - ACQ – Change Mean (95%CI): MTI 0.57 (0.05, 1.10) vs. TAU 0.59 (0.27, 0.90), <i>P</i> = .39</li> <li>• Attrition: MTI 17% vs. TAU 14%</li> </ul>
Lv et al., (2012)	<p>Study: RCT Study;  Platform: SMS  Duration: 3 months  Interactivity: Twice Daily;  Recruited: Outpatient clinic</p>	<p>Participants <i>N</i>: 150 (TAU:50, PB:50, MTI:50);  Demographics: 18+ years  Mean age: 38 years  Female: 42%,  Asthma: 3+ months according to GINA  Country: China</p>	<p>TAU: asthma education  PB: TAU + action plan, monitor PEF and asthma symptom on paper diary), how to adjust plan from data  MTI: TAU + daily SMS (10am, 8pm) on asthma management, asthma medications, device use, triggers and how to them, how to make an action plan, and how to handle asthma acute attacks. Send SMS to staff to answer questions.</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Adherence - %: MTI 80% vs. PB 74% vs. TAU 50%; <i>P</i> = .11</li> <li>• Lung Function - FEV<sub>1</sub> % Predicted – Change Mean (SD): MTI 11.42 (17.07) vs. PB 14.61 (20.19) vs. TAU 1.62 (8.21); <i>P</i> = .07</li> <li>• QoL - AQLQ – Change Mean (SD): MTI 31.4 (30.42) vs. PB 16.52 (21.1) vs. TAU 4.21 (30.98), <i>P</i> =.01</li> <li>• Asthma Control - PCAQ-6 - Change Mean (SD): MTI 7.07 (4.44) vs. PB 4.78 (5.77) vs. TAU 3 (5.31), <i>P</i> = .046</li> <li>• Unscheduled Visit: MTI 18.3% vs. PB 28.9% vs. 32.7%, <i>P</i> = .09</li> <li>• Attrition: MTI 40% vs. PB 46% vs. TAU 72%</li> </ul>

<p>Petrie et al., (2012)</p>	<p>Study: RCT Study; Platform: SMS Duration: 18 weeks Interactivity: daily SMS; Recruited: pamphlets with asthma meds and emails of marketing website</p>	<p>Participants <i>N</i>: 147 (MTI:73; TAU: 74); Demographics: 16-45 years Mean: ? Female: 68%, Asthma: undefined with adherence issues Country: United Kingdom</p>	<p>Baseline Illness perceptions assessed TAU: Baseline Illness perceptions assessed MTI: SMS for 18 weeks targeted at illness beliefs (~24 texts generated per belief) 1-6 weeks: 2 texts per day; 7-12 weeks: 1 per day; 13-18 weeks: 3 per day.</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Adherence - Post Mean (SD): MTI 57.8 (27.1) vs. TAU 43.2 (26.0); <i>P</i> = .03</li> <li>• Attrition: MTI 22% vs. TAU 38%</li> </ul>
<p>Ryan et al., (2012)</p>	<p>Study: RCT Study; Platform: Mobile App Duration: 6 months Interactivity: Twice Daily; Recruited: 32 GP databases (2.4% recruitment rate)</p>	<p>Participants <i>N</i>: 288 (I: 145, PB: 143); Demographics: 12+ years Mean age: 49 years Female: 63%, Asthma: ACQ <math>\geq</math> 1.5 (no exacerbation in 3 months) Country: United Kingdom</p>	<p>PB: twice daily paper-based recording of symptoms, drug use, and PEF MTI: exactly the same but via mobile phone with immediate feedback prompting action according to an agreed plan</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Adherence - %increased meds: MTI 59% vs. PB 55%</li> <li>• QoL - mini AQLQ – Change Mean (95%CI): MTI -0.75 (-0.94, -0.57) vs. PB -0.65 (-0.84, -0.46), <i>P</i> &gt; .05</li> <li>• Asthma Control - ACQ - Change Mean (95%CI): MTI 0.75 (0.61, 0.89) vs. PB 0.73 (0.57, 0.89), <i>P</i> &gt; .05</li> <li>• Well-controlled (%): MTI 21% vs. 22%</li> <li>• Unscheduled Visit: MTI 2% vs. PB 1%</li> <li>• Attrition: MTI 1% vs. PB 1%</li> </ul>
<p>Cingi et al., (2015)</p>	<p>Study: RCT Study (parallel); Platform: Mobile App Duration: 12 week Interactivity: Daily; Recruited: Multi-site Pulmonary Research Hospital</p>	<p>Participants <i>N</i>: 136 (MTI: 68, TAU: 68); Demographics: 24-41 years Mean age: 33 years Female: 53%, Asthma: Mild to severe persistent asthma according to GINA Country: Turkey</p>	<p>TAU: Educated on use of prescribed medication and ACT. Received mobile application to enter ACT score at start and end of trial. Educated on use of prescribed medication and ACT MTI: Educated on use of prescribed medication and ACT. Received mobile application to record health status, track medication use, send and receive messages, request help and automated reminders.</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Well Controlled asthma = MTI 49% vs. TAU 27%, <i>P</i> &lt; .05</li> <li>• Unscheduled Visits = MTI 10.9% vs. TAU 32.1%, <i>P</i> = .02</li> <li>• Engagement: median 90 times</li> <li>• Attrition: MTI 12% vs. TAU 57%</li> </ul>

Zairina et al., (2016)	Study: RCT Study (parallel); Platform: Mobile App Duration: 24 week Interactivity: Weekly; Recruited: Multi-site (2) Antenatal Hospital Clinic	Participants N: 72 (MTI: 36, TAU: 36); Demographics: 18+ years Mean age: 31 years Female: 100%, Asthma: undefined mild to severe asthma Country: Australia	TAU: informed about health consequences of asthma and pregnancy MTI: Monitor symptoms and medication, were provided with action plan, automatic feedback on asthma status	Outcomes: <ul style="list-style-type: none"> <li>• Lung Function - FEV<sub>1</sub> % Predicted – Change Mean (SE): MTI 4.27 (1.86) vs. TAU 1.54 (1.72); P = .29</li> <li>• QoL – mini AQLQ – Change Mean (SE): MTI 0.51(0.16) vs. TAU 0.22 (0.15); P = .002</li> <li>• Asthma Control - ACQ – Change Mean, SE: MTI 0.30 (0.11) vs. TAU 0.06 (0.10); P = .02</li> <li>• Well Controlled asthma = MTI 82% vs. TAU 58%</li> <li>• Unscheduled Visits = MTI 0% vs. TAU 2.9%</li> <li>• Attrition: MTI 11% vs. TAU 3%</li> </ul>
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Abbreviations:

ACQ: Asthma Control Questionnaire  
ACT: Asthma Control Test  
AQLQ: Asthma Quality of Life Questionnaire  
FEF: Forced Expiratory Flow  
FEV<sub>1</sub>: Forced Expiratory Volume in 1 second  
GINA: Global Initiative for Asthma  
ICS: Inhaled Corticosteroids  
Mobile App: Mobile Application  
MTI: Mobile Technology Intervention  
PAQLQ: Pediatric Asthma Quality of Life Questionnaire  
PB: Paper-based monitoring  
PCAQ: Perceived Control of Asthma Questionnaire  
PedsQL: Pediatric Quality of Life  
PEFR: Peak Expiratory Flow Rate Meter  
QoL: Quality of Life  
RCT: Randomised Control Trial  
SD: Standard Deviation:  
SE: Standard Error:  
SF-12: Short form (SF)-12 Questionnaire  
SMS: Short Message Service

TAU: Treatment as Usual  
95%CI: 95% Confidence Interval

**Table A3.2.** Extracted characteristics of included studies in narrative review

Study	Research design	Population & Sample Sizes	Intervention	Primary and Secondary Outcomes
Yun et al. (2012)	Study: RCT Study; Platform: SMS Duration: 3 months Interactivity: SMS; Recruited: Private paediatric asthma clinic	Participants <i>N</i> : 30 (10 each); Demographics: 10-16 years Mean: 14 years Female: 50% Asthma: undefined mid-severe persistent Country: United States of America	TAU: No SMS MTI-Symptom: Text re symptom awareness every second day MTI-KS: Daily SMS about symptom awareness and knowledge of asthma (alternate days). Once SMS received, replied with True/False. Knowledge queries triggered another text that provided feedback on accuracy and fact about asthma	Outcomes: <ul style="list-style-type: none"> <li>• Lung Function - FEF 25–75% - MTI-KS vs. TAU Cohen’s <math>d = 1.36</math>, <math>P = .036</math>.</li> <li>• QoL -PAQLQ – MTI-KS vs. TAU; <math>P &lt; .05</math></li> <li>• Engagement: 87% (75-99%)</li> <li>• Attrition: MTI-KS 40% vs. MTI-S 60% vs. TAU 50%</li> </ul>
Yun et al. (2013)	Study: RCT Study; Platform: SMS Duration: 3 months Interactivity: SMS; Recruited: Private paediatric asthma clinic	Participants <i>N</i> : 30 (10 each); Demographics:10-16 years Mean age: 13 years Female: 57% Asthma: undefined mid-severe persistent Country: United States of America	TAU: No SMS MTI-K: Text re symptom knowledge every second day MTI-KS: Daily SMS about symptom awareness and knowledge of asthma (alternate days). Once SMS received, replied with True/False. Knowledge queries triggered another text that provided feedback on accuracy and fact about asthma	Outcomes: <ul style="list-style-type: none"> <li>• Lung Function - FEF 25–75% - MTI-KS vs. TAU - Cohen’s <math>d = 0.85</math>, <math>P &lt; 0.09</math></li> <li>• QoL - PAQLQ – MTI-KS vs. TAU <math>0.56 \pm 0.34</math> vs. <math>.50</math>), <math>P ?</math></li> <li>• Engagement: 85.6% (36-100%)</li> <li>• Attrition: MTI-KS 30% vs. MTI-K 20% vs. TAU 40%</li> </ul>

Abbreviations:

- MTI: Mobile Technology Intervention
- MTI-K: Mobile Technology Intervention – Knowledge
- MTI-KS: Mobile Technology Intervention – Knowledge/Symptom
- MTI-S: Mobile Technology Intervention - Symptom
- PAQLQ: Pediatric Asthma Quality of Life Questionnaire
- QoL: Quality of Life
- RCT: Randomised Control Trial
- SMS: Short Message Service
- TAU: Treatment as Usual