

Is Telemedicine as Effective as Usual Care?



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Telemedicine (TM) is a collection of communication tools used to deliver health care services such as asthma management to patients separated from their providers by distance or time. Because TM circumvents the need for providers and patients to interact with each other in person or even at the same time, its primary advantage lies in creating opportunities for various types of provider-patient interaction that do not require in-person visits.

Various types of TM have been used for asthma management. These can broadly be divided into asynchronous (the provider and the patient are not together at the same time) and synchronous (live communication) interactions. Examples of asynchronous interactions in asthma care include use of text messages between patients and health care professionals, remote monitoring of chronic diseases, store and forward of lung function and asthma control information for subsequent interpretation, and systems that remind patients to take medications or evaluate asthma control. Synchronous asthma care interactions include tele-case management (often by an asthma educator or social worker), tele-education (often Web- or app-based), and tele-consultation. The latter can be divided into on-demand direct-to-consumer visits (patients connect to a provider from home when they want a service) and facilitated visits in which patients are seen in a clinical setting with a facilitator who operates the equipment and assists in doing a physical examination using digital cameras and a stethoscope, the results of which are evaluated remotely by the provider.

Because a large variety of interventions are loosely grouped under the rubric of TM, it is difficult to generalize TM's broader effectiveness for treating asthma as compared with ordinary, in-person care for patients with asthma. Yet such an analysis of TM modalities is critical both to determine which of TM's interventions provide benefit and to ensure that quality of care is not compromised if TM replaces usual care.

In the current issue of the *Journal of Allergy and Clinical Immunology: In Practice*, Chongmelaxme et al¹ performed a

systematic review of the literature to identify controlled studies of TM for asthma treatment. Out of an initial 2765 articles screened, 22 were included in a qualitative synthesis and 16 underwent quantitative analysis. The resulting articles were classified into 4 of the categories initially identified by Bashshur et al²: tele-case management, tele-consultation, tele-education, tele-reminder systems, and a fifth category included a combination of interventions. Asthma control and quality-of-life figures were compared for patients seen using either the TM interactions or what the authors referred to as usual care.

Telemedicine techniques proved advantageous in some ways over usual care. The authors found that combinations of TM involving tele-case management or tele-consultation improved asthma control and quality of life when compared with usual care. Although single tele-case management by itself improved patient quality of life, it did not improve asthma control more than usual care.

Among the 38 research reports included in this literature review, the interventions differed for each study, rendering findings difficult to generalize in the aggregate. Thus, a brief review of the more salient interventions described in the analyzed research reports may be helpful to better illuminate TM modalities used and their varied effectiveness.

Clinics have included various forms of TM in their asthma treatment practices. Tele-education³ consisted of a Web site using vignettes aimed at helping patients to recognize when their asthma is uncontrolled and how to respond. Tele-reminder⁴ consisted of daily text messages reminding patients to take their medicine. Finally, tele-consultation⁵ consisted of nurses contacting patients by telephone instead of seeing them in person. When each of these were compared with not doing the intervention, none was found to significantly improve asthma outcomes.

The only individual intervention that was studied in more than 1 article was tele-case management. These interventions included repeated tele-contact by an asthma nurse with routine clinic follow-up if needed,⁶ daily self-monitoring of FEV₁ connected to a smartphone with weekly automated feedback using an algorithm,⁷ and use of an interactive Web site that provided feedback and recommendations.⁸ Of these, Zairina et al⁷ and Pool et al⁸ found a significant improvement with the intervention, whereas Gruffydd-Jones et al⁶ did not.

Two studies of combining tele-case management with other modalities showed positive effects. One consisted of self-monitoring of asthma symptoms using a Web-based questionnaire with feedback and weekly assessments of lung function that would result in a clinical visit if deterioration was detected.⁹ The other consisted of an app to monitor asthma symptoms with 2-way text messaging for support and a diary to track medicine use with automated reminders.¹⁰ Both these interventions led to improved outcomes when compared with not offering these services.

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Two more studies found positive outcomes when combining tele-consultation with tele-case management. One of these consisted of weekly electronic monitoring of asthma control and lung function, use of an action plan, and communication with a nurse via text messaging.¹¹ Another used a patient portal to facilitate communication with a care team and weekly interactions to review the action plan, obtain feedback, and offer suggestions.¹² Both these resulted in improved asthma outcomes.

Tele-consultation was combined with other techniques in 5 more studies, with varied effectiveness. Interventions in 1 study included initial telephone counseling, weekly reminders to keep a diary, and telephone counseling at 2-week intervals to address various aspects of asthma management.¹³ Another study used an interactive voice response system to answer questions, monitor asthma control, and offer recommendations to call their provider if the asthma worsened.¹⁴ In another study, patients received text reminders daily with information about asthma and the ability to have questions answered by text.¹⁵ Other research included 6 telephone counseling sessions at 2-week intervals, another contact by an asthma counselor, an asthma education kit, weekly postcards reminding patients to complete asthma diaries, and a final call at the end of the study.¹⁶ The final study in this category involved education on a smartphone, the ability to interact with a physician when desired, and app-based reminders to take medicine with a timer.¹⁷ Although only the Lv et al¹⁵ and Clark et al¹³ interventions showed benefit, the meta-analysis found that when combined, the interventions improved asthma outcomes. The problem with generalizing these results is that each study used different interventions, so it is difficult to know precisely which interventions are more or less effective.

Some TM interventions described in the included studies either add to or replace usual care. In offering add-on services, given the cost and burden of implementing the TM interventions, at minimum the TM options should provide benefit over no additional intervention or they should not be used. Other interventions replace in-person care with electronic substitutes. This usually provides patient convenience in terms of both avoiding time off from school or work and reducing travel to the provider location. These replacement interventions also improve convenience by avoiding the need for patients and providers to interact at the same time. Given these benefits, it is probably sufficient to assert that the add-on and replacement interventions are equivalent to, and ideally not inferior to, usual care.

It should be noted that none of the included studies involved real-time facilitated clinic visits, which is the type of synchronous TM that is used to see patients at a distance via video calls. In addition, most of the interventions that have been referred to as TM in the past are becoming common and expected elements of usual care, blurring the distinction between TM and usual care.

Eventually, it is likely that virtual and asynchronous visits will become routine. When that happens, TM will simply fall under the general umbrella of “care.”

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