

Asthma apps use and interest among patients with asthma: a multicentre study

Asthma apps use in patients with asthma

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Mobile applications (apps) are promising for improving self-management behaviours in patients with asthma as they can be easily integrated into adolescents' and adults' everyday lives [1, 2]. Smart mobile devices have the advantages of being personal, portable, connected, (increasingly) low cost and computationally powerful. It is hypothesised that apps through gamification and patient-to-patient (peer) interaction [3] may be ubiquitous solutions capable of improving and maintaining self-management behaviours in the long run and impacting large numbers of patients, especially adolescents and adults as they were described as the demographic groups most comfortable with smartphones. However, the current use of smart devices, social networks and apps among patients with asthma as well as their interest in apps for asthma remains unexplored. The lack of published studies on the use of mHealth in allergic diseases has been highlighted in the recent position paper of the European Academy of Allergy and Clinical Immunology (EAACI) [1]. Thus, we aimed to investigate the use of smart devices, social networks and apps as well as the use and interest in using asthma-apps among adolescents and adults with asthma.

Data from a prospective observational study focusing on adherence to asthma inhalers among adolescents and adults with persistent asthma were used [4]. Patients were recruited during medical visits by convenience sampling at 25 allergy, pulmonology and paediatric outpatient clinics in Portugal. The study was approved by the ethics committee of each hospital. Patients were included if they had persistent asthma; were at least 13 years old; and had an active prescription for an inhaled controller medication. Patients were surveyed regarding ownership of cell phones (simple devices for voice calls and text messages), smartphones (combined phone, web browser and computer capabilities) and tablets. To characterise the use of smart mobile devices, we used 5 items of the Media and Technology Usage and Attitudes Scale (use GPS, browse the web, take pictures, play, check social networks) [5]. We also included questions on patients' use of social networks,

previous download/use of general, health/fitness or asthma apps; their willingness to use an app to monitor their asthma and to improve inhaler adherence; and their willingness to participate in studies evaluating apps for asthma. Descriptive statistics were used to describe the data collected and chi-squares to compare proportions between adolescents and adults.

This study included 336 participants: 104 (31%) adolescents and 232 (69%) adults. Participants were mostly female (62%) and their mean age was 34.3 ± 19.2 years (supplementary material). Results on use of social networks, mobile devices and apps are summarised in Figure 1. Social networks were used by almost all adolescents (98%), and by 78% of adults ($p < 0.001$). Instagram was the most common used network by adolescents (64%), and Facebook by adults (74%). Only 5% of participants have ever referred to their asthma in social networks.

288 (86%) participants owned a smart mobile device: 274 (82%) a smartphone and 71 (21%) a tablet. The rate of smart devices ownership was higher in the adolescents' group (96% vs. 81%, $p < 0.001$) as well as the frequency of use of smart devices in activities such as browsing the web, taking pictures, playing and checking social networks ($p < 0.015$).

Most adolescents (93%) and adults (62%) had downloaded/used an app ($p < 0.001$), with 87% of adolescents using apps daily, in contrast with 54% of adults ($p < 0.001$). However, only 1/3 of participants had ever used a health/fitness app, with 3% reporting the use of an asthma app. Nevertheless, around 2/3 of patients would be interested in using an asthma app, and specifically an app to improve inhaler adherence, as well as in participating in studies for asthma apps validation.

The rates of adolescents and adults owning a smartphone in this study are in line with those described among patients with allergic respiratory diseases, mental health conditions, among others [6-8]. Furthermore, our results are in accordance with findings in the general population in Europe [9] and USA [10].

The use of social networks among patients with asthma followed the pattern observed in the general population: with adolescents more engaged with social networks than adults [11]. Also, the dominant online platforms were distinct between age groups, in line with other studies: Instagram for adolescents (61% and 72% [10, 12]) and Facebook for adults (53% to 82% [11-13]).

Regardless of the age group, about 3/4 patients with asthma had downloaded/used an app but only 1/3 had used a health/fitness app. These findings are in line with described frequencies of general (71% to 79% [7, 8])

and health/fitness (28%[8]) apps use, although in the lower end of the range found in the literature. The most discouraging result was that only 3% of the participants had ever used an app directly related to their asthma. Indeed, asthma apps only capture less than 1% of the target market [14]. This contrasts with other app market segments, such as diabetes, mental health or nutrition, which have been able to attract and retain users to a much greater degree [7, 14]. This result may be explained by the lack of patients' and health professionals' knowledge of existing apps and of their benefits for asthma management. But may also be related to the fact that most asthma apps are exclusively tracker apps, do not provide behaviour change support/coaching solutions and do not enable automated data input or personalized feedback [2, 14].

Importantly, about 2/3 of patients expressed interest in using an app to manage their asthma, namely to improve inhaler adherence, a well-known problem among patients with asthma. This interest is similar to that reported by patients with other health conditions [6, 15]. Moreover, 2/3 reported being interested in participating in studies for validation of asthma apps, which may reflect the sampling method and the voluntary participation in the study. The contrasting findings of low use but high interest in asthma apps, may be linked to previously reported reasons and highlight the need to develop asthma apps supported by evidence-based, user-informed and attractive approaches [1, 2, 14].

Our sample was composed of adolescents and mainly young and middle-aged adults with persistent asthma, who were mostly recruited from secondary healthcare centres. Population studies with larger samples of subjects with an extended age range (including children and older adults) should be conducted in future. Patients' allergic profile was not collected but might play a role in mHealth-related habits. Future studies could also address this issue.

Most patients had access to smart devices and apps, but only 1/3 were ever engaged with health/fitness apps. Despite this low engagement, 2/3 were interested in using apps to support asthma management as part of their care. Smartphone and apps are integrated in patients' routines and might be promising tools for improving asthma monitoring and management.

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Conflicts of interest

The authors have declared that they have no competing interests in relation to this study.

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Figure 1. Use of social networks, mobile devices and mobile applications (n=336). * significant differences between adolescents and adults.

