



Letter

Identifying the relationship between beliefs and medication adherence in asthma

Many individuals with asthma choose not to take their medication in the way it was prescribed despite strong evidence recommending regular use of inhaled corticosteroids (ICSs).¹ Medication nonadherence in asthma is associated with the majority of asthma-related morbidity, mortality, and excess health care use.^{2,3}

Individuals' beliefs play an important role in determining their medication-taking behavior and eliciting these beliefs can help to tailor interventions to improve adherence.^{3,4} A meta-analysis reported that beliefs elicited by the Beliefs about Medicine Questionnaire (BMQ),⁵ that is, beliefs about the *necessity* and *concerns* of medicines, are a consistent predictor of medication adherence across different chronic conditions including asthma.⁶ The observed effect sizes were small in magnitude, suggesting other beliefs are important in medication adherence.⁶ It is unlikely that one set of beliefs completely describes adherence behavior, yet most studies only investigate how one set of beliefs correlate to a measurement of medication adherence. This has limited our ability to understand how different beliefs relate to medication adherence. Other beliefs that might be associated with medication adherence are illness perceptions and locus of control beliefs.^{7,8} Better understanding the beliefs patients hold can inform strategies for supporting medication-taking behavior in patients with chronic conditions.

The aim of this study was to explore the relation of beliefs about medicines, illness perceptions, and locus of control beliefs to self-reported medication adherence in individuals with asthma.

This was a cross-sectional study that recruited individuals prescribed an ICS for the treatment of asthma for at least 3 months. Participants were at least 16 years old and responsible for administering their own medicine(s). Participants were recruited through community pharmacies and online advertisement. Ethics approval was obtained for the study (ethics committee, School of Pharmacy, University of Queensland, Woolloongabba, Queensland, Australia; 2014/8). Once written consent was given, participants completed a survey to elicit their medication adherence to and health beliefs about their ICS treatment.

Self-reported medication adherence was elicited using the Medication Adherence Report Scale (MARS).⁹ The MARS consists of 5 questions and gives a summed score from 5 to 25. Higher scores indicated better adherence. To elicit individuals' beliefs about their medicines, illness, and ability to control their health, the BMQ,⁵ the Brief-Illness Perception Questionnaire (B-IPQ),⁷ and the Multi-Health Locus of Control Scale (MHLCS)⁸ were used, respectively.

Independent *t* tests (2 levels), analysis of variance (≥ 3 levels), and Pearson correlation (*r*) were used to analyze the association between MARS score and categorical and continuous variables, respectively.

A total of 219 participants enrolled into the study from May 2014 to May 2015. Most participants were recruited online (*n* = 196) and the remaining 23 participants were recruited in a community pharmacy. Participants who did not complete the questionnaire beyond demographic questions were excluded (*n* = 21). This left 198 participants included in the study.

There were 161 women (81.7%) and the mean age $\pm$ SD of participants was 39.8 ± 12.7 years (range 19–74 years). Participants had a mean $\pm$ SD duration of asthma of 24.4 ± 14.2 years and 163 (83.6%) were on a preventer that contained an ICS and a long-acting β -agonist. Seventy-seven participants (54.2%) were using their short-acting β -agonist at least 3 times per week.

The mean $\pm$ SD MARS score of the sample was 19.2 ± 4.5 , with the lowest score being 7 and the highest score being 25.

There was a significant positive correlation between age and MARS score, with older participants more likely to self-report that they adhere to their ICS treatment ($r = 0.18$, $P = .02$). Individuals who reported they had been admitted to hospital in the past 2 years because of their asthma had a statistically significant higher mean $\pm$ SD MARS score (21.2 ± 3.8) than those who did not (18.6 ± 4.6 ; $P < .001$). There were no other statistically significant associations between patient characteristics and MARS score.

Table 1 presents the observed correlations between subscales from the BMQ, B-IPQ, and MHLCS and the MARS score. Participants with a high BMQ necessity score and/or a low BMQ concerns score had better adherence. Individuals who believed their asthma could be controlled by their ICS (B-IPQ treatment control) and self-reported that they understood their asthma (B-IPQ understanding) reported better medication adherence. From the MHLCS, believing in the physician to control asthma (MHLCS physician) was strongly correlated with medication adherence. This correlation ($r = 0.41$, $P < .0001$) was stronger than any other reported in the study.

Overall, in this sample of individuals with asthma, individuals who believed their ICS was necessary and had few concerns reported better medication adherence than those who did not. Similarly, individuals who believed their treatment would help, reported that they understood the condition, and believed that the physician was important to their asthma control were more likely to adhere to their ICS treatment as measured by the MARS.

There was a range of self-reported medication-taking behaviors reflected in the distribution of MARS scores. The relatively low mean MARS score suggests that many participants are not taking their medicines as prescribed and this is comparable to a previous study in asthma.¹⁰

The most interesting finding was the relation between physician locus of control beliefs and medication adherence, which was stronger than any other correlation found in the study ($r = 0.41$).

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Table 1
Belief Subscales and Associations With MARS Score

Subscale	Cronbach α	Mean $\pm$ SD	min–max	Correlation with MARS score	P value
BMQ					
Necessity	0.77	19.0 $\pm$ 3.8	8–25	0.17	.03
Concerns	0.80	12.9 $\pm$ 4.7	5–23	–0.19	.02
Necessity-concerns Differential	—	6.1 $\pm$ 5.0	–8 to 17	0.32	<.0001
B-IPQ					
Consequences	—	4.9 $\pm$ 2.7	0–10	–0.01	.88
Timeline	—	9.2 $\pm$ 1.7	1–10	–0.05 ^a	.55
Personal control	—	6.4 $\pm$ 2.2	0–10	0.08	.29
Treatment control	—	7.9 $\pm$ 2.2	1–10	0.16	.04
Identity	—	5.2 $\pm$ 2.4	0–10	–0.06	.42
Emotional representation 1	—	5.0 $\pm$ 2.8	0–10	0.06	.48
Emotional representation 2	—	3.8 $\pm$ 3.1	0–10	–0.06	.44
Understanding	—	7.2 $\pm$ 2.4	0–10	0.20	.01
MHLCS					
Internal	0.78	19.4 $\pm$ 4.5	8–30	–0.11	.16
Chance	0.75	16.8 $\pm$ 5.2	6–29	–0.06	.45
Physician (doctor)	0.71	12.8 $\pm$ 3.0	5–18	0.41	<.0001
Other people	0.74	8.3 $\pm$ 3.2	3–18	0.02	.76

Abbreviations: B-IPQ, Brief Illness Perception Questionnaire; BMQ, Beliefs about Medicines Questionnaire; MARS, Medication Adherence Report Scale; max, maximum; MHLCS, Multi-Health Locus of Control Scale; min, minimum.

^aSpearman rank correlation (ρ) was used because of non-normally distributed data.

Individuals with strong physician locus of control beliefs might be more receptive to the advice and recommendations given by the physician compared with internally orientated individuals. There is limited literature exploring the relation between locus of control beliefs and medication-taking behavior. We suggest further research in this area because other facets of the patient–physician relationship are important for medication adherence.³

It is not known whether online recruitment captures more motivated individuals and whether these individuals hold different beliefs and/or report different levels of medication adherence. Differences in medication-taking could influence how beliefs associate with medication adherence in patient populations.

This study provides insight into the way individuals with asthma conceptualize their medicines, illness, and ability to control their health. Belief in the physician to help control asthma was strongly associated with medication adherence, which further supports the importance and need for a strong patient–physician relationship. Interventions to support medication adherence in asthma should consider the beliefs an individual holds.

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References

- [1] Global Initiative for Asthma (GINA). *Global strategy for asthma management and prevention 2015*. <http://ginasthma.org/>. Accessed February 24, 2017.
- [2] Mäkelä MJ, Backer V, Hedegaard M, et al. Adherence to inhaled therapies, health outcomes and costs in patients with asthma and COPD. *Respir Med*. 2013;107:1481–1490.
- [3] Sabaté E. *Adherence to Long-Term Therapies: Evidence for Action*. Geneva: World Health Organisation; 2003.
- [4] Nguyen TM, La Caze A, Cottrell N. Validated adherence scales used in a measurement-guided medication management approach to target and tailor a medication adherence intervention: a randomised controlled trial. *BMJ Open*. 2016;6:e013375.
- [5] Horne R, Weinman J, Hankins M. The Beliefs about Medicines Questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol Health*. 1999;14:1–24.
- [6] Foot H, La Caze A, Gujral G, et al. The necessity-concerns framework predicts adherence to medication in multiple illness conditions: a meta-analysis. *Patient Educ Couns*. 2016;99:706–717.
- [7] Broadbent E, Petrie KJ, Main J, et al. The Brief Illness Perception Questionnaire. *J Psychosom Res*. 2006;60:631–637.
- [8] Wallston KA, Stein MJ, Smith CA. Form C of the MHLC scales: a condition-specific measure of locus of control. *J Pers Assess*. 1994;63:534–553.
- [9] Horne R, Hankins M. *The Medication Adherence Report Scale (MARS)*. Brighton: University of Brighton; 2004.
- [10] Axelsson M. The function of medication beliefs as mediators between personality traits and adherence behavior in people with asthma. *Patient Prefer Adherence*. 2013;7:1101–1109.