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Effects of medication, treatment, and behavioral beliefs on intentions to take medication in patients with familial hypercholesterolemia

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ABSTRACT

Background and aims: Although familial hypercholesterolemia (FH) can be effectively managed using cholesterol-lowering medication, patients often fall short of complete treatment adherence. Identifying the psychological factors associated with self-regulation of FH medication is important to inform interventions to maximize adherence. The aim of the present study was to test an integrated psychological model in predicting FH patients' intentions to take medication.

Methods: FH patients attending clinics in seven countries were invited to participate in a cross-sectional survey study. Consenting patients (N = 551) completed self-report measures of generalized beliefs about medication overuse and harms, beliefs in treatment effectiveness, specific beliefs about taking medication (attitudes, subjective norms, perceived behavioral control), and intentions to take medication. Participants also completed measures of demographic variables (age, gender, education level, income, cardiovascular disease status). Data were analysed using path analysis controlling for country and demographic variables.

Results: Attitudes ($\beta = .331$, $p<0.001$), subjective norms ($\beta = .121$, $p=0.009$), and beliefs about medication overuse ($\beta = -.160$, $p<0.001$) were significant predictors of intentions to take medication. Treatment beliefs predicted intentions indirectly ($\beta = .088$, $p<0.001$) through attitudes and subjective norms. There was also an indirect effect of beliefs about medication overuse on intentions ($\beta = -.045$, $p=0.056$), but the effect was small compared with the direct effect.

Conclusions: The findings indicate the importance among FH patients of specific beliefs about taking medication and generalized beliefs about medication overuse and treatment in predicting medication intentions. When managing patients, clinicians should emphasize the efficacy of taking cholesterol-lowering drugs and the importance of treatment outcomes, and allay concerns about medication overuse.

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1. Introduction

Familial hypercholesterolemia (FH) is co-dominantly inherited form of hyperlipidemia characterized by chronically high levels of low-density lipoprotein (LDL) cholesterol and premature onset of atherosclerotic cardiovascular disease (ASCVD) [1]. ASCVD risk in patients with FH can be effectively managed through cholesterol-lowering medication [2,3]. Although medication adherence rates in FH patients are relatively high, a substantial proportion of patients fall short of full compliance or follow regimens inconsistently [4]. Non-compliance may have deleterious effects on patient health including substantive increase in ASCVD risk [5–8]. As patients with FH are typically treated as outpatients, adherence to medication regimens is largely dependent on patients' capacity to regulate their own behavior, so understanding the factors that affect treatment adherence is paramount to informing the development of effective interventions to maximize compliance [9,10].

1.1. Theories of medication adherence

Psychological theories from the 'social cognitive' tradition have been applied to guide understanding of the belief-based factors associated with taking medication and the processes involved [11–13]. Two prominent perspectives have been adopted, one focusing on individual beliefs about the effectiveness of treatment to control the illness or condition, the other focusing on beliefs in the act of performing specific treatment-related behaviors in future. The first perspective is derived from Leventhal et al.'s [14] common sense model of illness self-regulation. According to the common sense model, lay or 'common sense' beliefs about the illness motivate individuals to engage in problem-focused behaviors to manage their illness. In particular, beliefs about treatment and general beliefs about medication, such as whether medication is perceived as overused by health professionals, harmful, and has negative side effects, are proposed to be related to decisions to take medication [15–20]. For example, if an FH patient perceives his or her condition as treatable, and believes that medication is not overused or harmful, and does not have negative side effects, he or she will be more likely to be motivated to take their medication.

A second perspective is offered by Ajzen's [21] theory of planned behavior. This theory focuses on beliefs about performing the specific behavior and how they relate to intentions to perform the behavior in future. Intentions, a key construct in the theory, reflect individuals' motivation toward engaging in a target behavior in future. For example, an FH patient with strong intentions to take their medication in future is highly likely to do so. Intentions are a function of three sets of beliefs about the behavior: *attitudes*, an individual's positive or negative beliefs about whether performing the target behavior will result in desirable outcomes, *subjective norms*, beliefs about whether significant others endorse performance of the behavior in future, and *perceived behavioral control*, beliefs in general capacity to engage in the behavior in future. Intentions are proposed to mediate the effects of the three sets of beliefs on behavior [21]. Together, the two theories provide complimentary perspectives on the psychological constructs that lead individuals make decisions to engage in treatment for illnesses and conditions, and together may offer a comprehensive explanation of medication adherence in FH.[1]

[1] Further detail of the tenets of the common sense model and theory of planned behavior can be found in the original articles by Leventhal et al. [14] and Ajzen [21], respectively, and in meta-analyses of the effects of the theories in health behavior and chronic illness [22,23]. We have also provided further description and details in Supplementary Materials.

1.2. A comprehensive theory of medication adherence

Recent research has integrated beliefs relating to illness and treatment from the common sense model and beliefs relating to performing specific behaviors from theory of planned behavior to arrive at a comprehensive explanation of health behavior adherence including medication adherence [9,24–26]. Research has demonstrated that beliefs relating to the behavior from the theory of planned behavior, rather than those relating to the illness itself and its treatment, tend to have the largest and most consistent effects on behavior. For example, research has shown that attitudes and subjective norms are the most pervasive predictors of intentions to engage in behaviors aimed at managing chronic conditions such as taking medication and screening attendance [9,25]. However, previous research has not tested the simultaneous effects of medication and treatment beliefs alongside beliefs about the behavior on intentions to take medication. Furthermore, integrated models may mask the processes by which medication and treatment beliefs relate to intentions and behavior. In particular, generalized beliefs about medication and treatment may be mediated by the specific beliefs, consistent with theory predictions [27–29]. The mediation effect suggests that generalized factors serve as sources of information in the formation of beliefs toward the behavior. For example, generalized beliefs about the effectiveness of medication to treat FH may assist patients in forming specific beliefs and intentions with respect to taking cholesterol lowering medication. This is an important process because it outlines how beliefs regarding illness management behaviors, such as medication adherence, are formed.

1.3. Aims and hypotheses

Our study had two objectives: (1) to examine relationships between FH patients' intentions to take cholesterol-lowering medication, their general beliefs about medication and treatment for FH, and their beliefs about taking the medication itself; (2) to test how patients' beliefs about taking medication serve to explain, or *mediate*, relations between their medication and treatment beliefs and their intentions to take medication. We realized these objectives by testing a novel process model in which generalized beliefs about medication harm and overuse, treatment effectiveness, and side effects of FH medication were proposed to predict FH patients' intentions to take cholesterol-lowering medication in future. Specific beliefs about taking medication were expected to mediate relations between the generalized beliefs and medication intentions, consistent with previous research combining the common sense model and the theory of planned behavior [9,24–26]. The model was tested in a large sample of FH patients prescribed cholesterol-lowering medication from clinics in seven countries [30].

Our proposed model is presented in Fig. 1. We predict that FH patients' intentions to take their medication in future will be related to their attitudes, subjective norms, and perceived behavioral control. Generalized beliefs about medication harms and overuse, treatment control, and perceived side effects are proposed as distal beliefs that predict intentions mediated by attitudes, subjective norms, and perceived behavioral control. We therefore propose indirect effects of each of the distal medication and treatment beliefs through the beliefs about taking medication. Direct effects of the distal beliefs about medication and treatment on intention are, therefore, expected to be zero. Finally, we predict that both sets of beliefs will mediate effects of past medication adherence on intentions to take medication in future, consistent with research examining effects of past behavior in social cognitive models [29]. We expect our process model to provide detail on the