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Barriers to Asthma Self-Management in Adolescents: Relationships to Psychosocial Factors

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Summary

Asthma morbidity in adolescents often results from inadequate asthma self-management. This study was to explore barriers to self-management perceived by adolescents and to examine the associations between barriers and psychosocial factors including knowledge, attitude and self-efficacy. This cross-sectional study included a total of 126 adolescents with asthma (13–21 years) representing diverse race/ethnicity groups with a wide range of socioeconomic status. Self-reported data were analyzed using descriptive statistics, factor analysis and hierarchical regression. The most frequently endorsed barrier (63%) was adolescents' unwillingness to give up "the things the doctors say I have to give up," followed by difficulty in remembering to take care of their asthma (53%), and then "trying to forget" that they have asthma (50%). Psychosocial factors accounted for 32% of the variance in total barrier perceptions. Factor analysis revealed barriers in four domains including negativity toward providers and the medication regimen, cognitive difficulty, peer/family influence and denial. Self-efficacy was found to be the most influential factor that showed strong negative association with all four barrier subscales independent of the levels of asthma control and sociodemographic characteristics. Poor attitudes toward asthma were also associated with barriers of cognitive difficulty and social influence after adjusting for other factors. Males consistently reported higher total barriers and barriers of negativity, social influence and denial. The gender differences were not explained by psychosocial and sociodemographic factors. This study suggests that psychosocial factors are strong predictors of barriers to self-management in adolescents. Particularly, promoting self-efficacy may be beneficial in addressing the barriers. Special attention is needed to address the higher propensity for barriers in males.

Keywords

Asthma; Adolescents; Barriers; Self-management; Psychosocial factors

INTRODUCTION

According to a recent Centers for Disease Control and Prevention (CDC) report,[1] 6.2 million (8.5%) children less than 18 years of age have asthma. Over 16% of high school students reported a current diagnosis of asthma, of which nearly 38% had experienced asthma attacks during the preceding 12 months.[2] Asthma mortality among adolescents (4.4 per 1,000,000) is approximately twice that of younger children.[3]

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Asthma-related morbidity in adolescents can be largely preventable by effective self-management.[4, 5] Self-management requires active commitment to engage in care by establishing individual routines including trigger avoidance, symptom monitoring and adherence to medication plans.[6] Adolescence is a particularly challenging period for adequate self-management. With adolescents' desire for independence and autonomy, parents become less able to manage asthma in their adolescents[7] who assume more responsibility for disease management.[8] Inadequate adherence in adolescents has been consistently reported, [8–12] issues of poor adherence have been attributed to developmental characteristics such as belief in invincibility and the desire to maintain normalcy.[13] Albeit plausible, this generic speculation is limited in providing disease-specific understanding of the underlying reasons for poor adherence to self-management.

It has been documented that complex beliefs and perceptions affect patients' adherence to self-management.[14, 15] These beliefs and perceptions produce barriers that prevent patients from taking necessary measures to improve their illness. Studies have reported negative associations between the number of barriers and adherence.[16, 17] Specific understanding of these barriers is essential for addressing adherence issues in adolescents with asthma. To date, little is known about barriers that adolescents perceive hindering self-management even though the age group has typically been known for the poorest adherence.[18]

Buston and Wood[19] argue that asthma care should start with the awareness of barriers to nonadherence as a way of assisting adolescents to overcome these barriers. However, the question of "how to address the barrier perception" remains to be answered given limited information regarding factors that could be modified to bring changes in barrier perception. The Health Belief Model elucidates knowledge, attitudes, and self-efficacy as factors influencing individuals' behavior in conjunction with barrier perceptions.[20, 21] In the present study, we conceptualized these three psychosocial factors as modifiable predictors of barrier perception and explored the extent to which barrier perceptions are explained by them.

The purpose of the present study was (1) to assess the common types of barriers perceived by adolescents with asthma, and (2) to examine the association between barrier perception and psychosocial factors including knowledge, attitude and self-efficacy after controlling for symptom scores and sociodemographic factors.

METHODS

Design

This is an exploratory study of adolescents with asthma based on a cross-sectional data collected in the Summer of 2007 in the Northeast part of the United States. The study protocol was approved by the Institutional Review Board. Adolescent participants and their parents were informed of the purpose of the study before being screened for eligibility and again during informed consent. Data collection was performed in a university facility affiliated with the researchers who were independent from participants' providers. Participants received a payment for completing questionnaires.

Sample

Study participants included 126 adolescents (13–20 years) with asthma. To be eligible, participants were required to have an asthma diagnosis for at least 1 year and to have persistent asthma as specified by the Expert Panel Review 3 (EPR3).[22] Only those who understood spoken and written English were enrolled in the study. Adolescents were excluded if they reported other major chronic/emotional health issues requiring daily medications or learning disabilities based on reports from parents, teachers or clinicians. Participants resided in either

urban or suburban areas in the upstate New York. We used multiple recruitment methods such as flyers, advertising in the community and referrals from health care providers and local middle and high schools. High schools with the highest enrollment of minority students were targeted for recruitment of minority participants. We screened 173 interested adolescents and found 30 ineligible. Of those 143 eligible adolescents, 17 declined to participate or were lost after screening. We found no significant differences in gender and age between the participants (n=126) and the non-participants (n=17). Thirty-six percent of the sample were recruited through referrals from health care providers, 39% from school systems, and the rest from flyers, newspaper ads and personal referral.

Measurements

Illness Management Survey—This 5-point scale consisted of 27-items assessing perception of barriers that increase the risk for poor self-management in adolescents with chronic illness.[16] Each item represents potential barriers involving interactions with health care professionals, regimen protocol, cognitive ability, family/peer influences and denial. Responses range from strongly disagree (1) to strongly agree (5). The possible range of total scores is from 27 to 135; with higher scores indicating greater perceived barriers. Validity of the original instrument was established through correlations with other measures of adherence attitudes and behaviors in an adolescent sample with asthma.[16] Cronbach's alpha for the scale in the current sample was.84. Logan et al.[16] suggested five subdomains of barriers in a sample of adolescents with asthma. However, because the five-factor solution of the original author was not supported in our current sample of adolescents, we conducted a factor analysis to identify adequate subcategories of barriers reflecting our data. Outcomes of factor analysis are presented in the result section.

Asthma Knowledge Questionnaire—We modified Bartholomew's children's asthma knowledge questionnaire.[23] Our adapted version consisted of 30 items. Each item presented a brief scenario involving asthma triggers, symptom identification and asthma management (i.e., what to do and how to do it) for which participants responded on a yes/no scale. A total score was calculated by summing correct answers so that higher total scores indicate higher asthma knowledge. Cronbach's alpha in the current adolescent sample was .62.

Attitude Toward Illness Scale—Adolescents' attitude toward their health condition was measured using the 13-item 5-point scale.[24] The scale included questions such as "how fair is it that you have asthma?" and, "how often do you feel that you will always be sick?" A total score reflects respondents' overall attitudes with higher scores indicating more positive attitudes. Cronbach's alpha in the current adolescent sample was .85.

Asthma Self-Efficacy—Adolescents' confidence in preventing and managing asthma attacks and episodes was measured using the 14-item scale with a 5-point response set from 1 to 5.[7] Total scores were computed with higher scores indicating higher self-efficacy. Cronbach's alpha was .83 for the current sample of adolescents.

Asthma Control Questions—This questionnaire consisted of 4 items capturing the level of asthma-related impairment as recommended by EPR3[22] on a 4-point scale ranging from 1–4 (high values indicate poorer symptom control). The types of impairment include the frequency of asthma symptom occurring during daytime and nighttime, the degree of activity limitation, and use of short-acting beta agonist (SABA). The possible range of total symptom scores was from 4 to 16. Higher total scores indicate lower levels of asthma control. Cronbach's alpha was .71.

Demographic Information including age, race, gender, insurance type, family income, and parental education was collected from the parents. Annual gross family income was assessed on a 7-point ordinal level scale. Parents indicated their education in years. Information about insurance types was used as a proxy for poverty. Medication data were collected through visual inspection of the medications that participants brought to the meeting with the study team or through the review of medical record.

Statistical Analysis

Descriptive statistics were used to assess the level of barriers for the sample. One-way analysis of variance and Pearson correlation coefficients were used to examine bivariate relationships between barriers and socio-demographic variables. An exploratory principal axis factor analysis (PFA) with promax rotation[25] was performed on the items of the Illness Management Scale. The number of factors extracted from the analyses was determined by review of the scree plot and by eigenvalues of one or greater. We used factor loadings of >= .40 as a criterion to define salient factor loadings.[26] To examine the extent to which barrier perception was predicted by asthma control, knowledge, attitude and self-efficacy, hierarchical regression analysis was conducted with the total barriers and four subscales as dependent variables. Asthma knowledge, attitude and self-efficacy were entered in the first step. In step 2, asthma symptom score was added to the model. Insurance, parental education and family income were included in step 3. In the final step gender and race were added to the model. Values of $p \leq 0.05$ were considered as statistically significant. Values of $p \leq 0.10$ were considered as trends. The SPSS version 16 software package was used for the statistical analyses.

RESULTS

Descriptions of the Sample

A total of 126 adolescents participated in the study. The mean age of participants was 15.5 years (SD =1.7), and 40.5% (n=51) were males. Diverse race/ethnicity groups were represented in the sample: 49.2% whites, 38.1% blacks, 11.1% Hispanic and 1.6% Asians. About 41% lived in a household with an annual income below $30,000. Some type of public health insurance was reported by 46% of the participants, while no insurance of any type was reported by 3 participants. Fifty-eight percent of parents reported educational levels beyond high school.

Based on EPR3's[22] classification of asthma control, well-controlled asthma was reported in 24% of the sample, while 38% reported not-well-controlled and 38% reported very poorly-controlled asthma. Almost all of participants reported current use of quick relief medications (e.g., Short Acting $Beta_2$ Agonists [SABA]), and the majority were on long-term control medications (71.4%). Long-term controller medications included inhaled corticosteroids (ICSs) (26.2%), Leukotriene Receptor Antagonists (LTRAs) (27%), Long Acting $Beta_2$ Agonists (LABAs) in combination with ICSs (41.3%) and Theophllyne derivatives (1.6%).

Common Types of Barriers and Subdomains of Barriers

Responses of "agree" and "strongly agree" were combined as an indication of the presence of barriers. Adolescents' unwillingness to give up "the things the doctors say I have to give up" was the most frequently endorsed barrier (63%), followed by difficulty in remembering to take care of their asthma (53%), and "trying to forget" that they have asthma (50%). Overall, 46% of the sample reported 5 barriers or more. The maximum number of barriers was 17.

Factor analysis of the IMS revealed the 4-factor solution that accounted for 96% of the total variance in the data (Table 1). Factor 1 (alpha = .80) consisted of 9 items describing barriers that indicate poor relationships with the providers and negative perceptions about medication regimen ("negativity"). Factor 2 (alpha = .76) involved 5 items pertaining to cognitive

challenges in adhering treatment ("cognitive difficulty"). Four items constituted Factor 3 (alpha = .64) explaining social barriers involving peers and family ("social influence"). Factor 4 (alpha = .52) consisted of only 2 items concerning a tendency for downplaying and denial ("denial"). Based on the identified four subdomains, 4 subscales were constructed, and the mean score of each subscale was computed for further analyses.

Relationships between Barriers and Sociodemographic and Illness-Related Factors

Table 2 compares mean scores for the barriers by gender, race and insurance type. Notable gender difference was found in denial ($F[1,124]= 6.39$), with males showing a higher tendency for denial. Because we found no significant differences between black and Hispanic adolescents with regard to the barrier total score and the four barrier subscales, we combined these two race/ethnic groups to create the "non-whites" category. Two Asian participants were excluded. When compared to whites, overall barrier scores ($F[1,122]=4.91$) were significantly higher among non-whites. Specifically, non-whites reported greater levels of negativity related to providers and medication ($F[1,122]= 5.63$) and cognitive difficulties ($F[1,122]= 7.76$). Overall, those with public health insurance reported significantly higher total barrier scores ($F[1,121]= 5.74$) than those with private insurance. In terms of specific types of barriers, adolescents with public insurance scored higher on barriers of cognitive difficulty ($F[1,121]= 4.91$).

Pearson correlations were calculated to examine the relationships between barriers and other sociodemographic variables including age, parental education and family income. No relationships were found between barriers and age. Parental education showed negative associations with both barrier total scores ($r = -.19$, $p < .05$) and barriers on cognitive difficulty ($r = -.19$, $p < .05$). Similar patterns of associations were found between annual family income and barrier total scores ($r = -.17$, $p < .05$) and cognitive difficulty ($r = -.18$, $p < .05$). These findings indicate that adolescents of parents with higher education or of greater household income had fewer barriers overall and fewer cognitive barriers.

Symptom scores were significantly associated with barrier total scores ($r=.33$, $p<.0001$) and the negativity subscale ($r=.36$, $p<.0001$). No relationship was found between the duration of asthma diagnosis and barrier total scores and the barrier subscales. Participants who were on control medications did not differ from those who were not on control medications in total barriers scores or barrier subscales. Because of the lack of relationships with barrier perceptions (either total or subscales), the duration of asthma and control medication were not included in the subsequent regression analyses.

Psychosocial Factors as Predictors of Barrier Perception

Table 3 shows the extent to which perceived barrier total scores and the negativity subscale were explained by psychosocial factors, symptom scores, and sociodemographic factors. In the first step for the total barrier score, knowledge, attitude, and self-efficacy were all significant. The higher one's knowledge, attitude and self efficacy, the lower one's perceived barriers. At the second step, when adding symptom scores, these three psychosocial factors remained significant. Adding socioeconomic status (SES) variables did not change the relationship between attitude, self-efficacy and total barriers. When adding gender and race in Step 4, attitudes and self-efficacy remained significant and knowledge was no longer significant. In addition, gender difference emerged; where females perceived significantly lower total barriers than males. The final model in Step 4 explained 39% of the variance in total barrier scores. The pattern was similar for the subscale of negativity although the symptom score was significantly and positively related to negativity barriers. Higher levels of asthma symptoms were related to a higher level of negativity. Twenty eight percent of the variance in negativity barriers was explained by the final model.

Table 4 displays the extent to which cognitive difficulty, social influence, and denial barriers were explained by the psychosocial factors, the symptom score, and sociodemographic factors. In Step1, significant negative associations were found between the cognitive difficulty subscale and attitudes and self-efficacy. More positive attitudes and higher self-efficacy were related to lower cognitive difficulty while knowledge was not a significant predictor. In the subsequent steps, adding symptom scores and sociodemographic variables did not change these relationships. The final model accounted for 23% of total variance in the cognitive difficulty subscale. For the social influence subscale, knowledge, attitude, and self-efficacy were all significant in the first step. That is, social barriers were predicted by a lack of knowledge, negative attitudes and low self-efficacy. When adding the symptom score at the second step, knowledge, attitudes, and self-efficacy remained significant. Adding SES variables did not change the relationship between attitude, self-efficacy and the social influence subscale. When adding gender and race in Step 4, attitudes and self-efficacy remained the same, and knowledge was no longer significant. Gender was significantly related to the social influence subscale, where males perceived significantly higher social barriers than females. The final model explained 23% of total variance in the social influence subscale. For the subscale of denial, knowledge and self-efficacy was the significant predictor where higher levels of knowledge and self-efficacy related to lower levels of denial in Step1. Adding the symptom score (Step 2) and SES variables (Step 3) to the model did not change the significant relationship between denial and knowledge and self-efficacy. Borderline significance ($p = .057$) was found between denial and gender indicating that males reported higher perceived denial than females. Fourteen percent of total variance in the denial subscale was accounted for by the final model in Step 4.

DISCUSSION

Confounded by the normative challenges associated with development, attaining optimum asthma management has often been elusive in adolescents with asthma. This study provides a snapshot of the ways in which selected psychosocial factors including barrier perceptions, knowledge, attitude and self-efficacy might undermine effective self-management among adolescents with asthma.

Our participants perceived a variety of barriers to self-management. Indeed, it is concerning that many participants presented a combination of multiple barriers with nearly 50% reporting five or more barriers of the original 27-item scale. Earlier studies often reported unintentional errors (e.g., forgetfulness) as common barriers to asthma management.[15, 17] However, our findings show that the barriers in adolescence could be more of an intentional nature as the majority of our participants reported their reluctance to comply with medical advice and their intentional disregard (“try to forget”).

We found that two types of barriers representing poor patient-provider relationships and medication misconceptions were classified into a single category, negativity. Modi et al.[17] reported considerable discrepancies between providers’ actual prescription and parents’ understanding, and attributed the lack of understanding about prescription to poor communication or disruptive relationships between patients (parents) and the provider.[17] Therefore, it appears natural that these two seemingly discrete barriers are combined together in the factor solution.

We found that negativity toward the provider and medications was the most prominent barrier to self-management perceived by adolescents. Studies have documented that patients’ adherence is associated with provider attributes perceived by patients such as good communication skills (e.g., explaining and listening) and genuine concern for patients.[27, 28] Studies of adolescents with chronic illness including asthma documented support and feedback from the providers as an important factor influencing adherence to treatment regimens.[29–

[31] Thus, continuous efforts to promote provider-patient relationships need to be directed to ultimately improve optimum asthma self-management in adolescents.

Our study demonstrated that psychosocial factors including knowledge, attitudes and self-efficacy were powerful predictors of barriers to self-management in adolescents. It is striking that 32% of the variance in total barrier perceptions was accounted for by these three variables alone. Of the psychosocial variables, self-efficacy emerged as the universal predictor for all four subcategories of barriers. Self-efficacy has been recognized as a central feature of asthma self-management.[23, 32, 33] Zebracki [12] reported self-efficacy as an important predictor of adherence to treatment regimens in adolescents with asthma. Our findings provide evidence that self-efficacy could foster adherence through its mitigating effect on barrier perceptions in adolescents with asthma. A future study is warranted to test the causal paths among these involved factors, which will provide invaluable information in designing an intervention to promote asthma self-management in adolescents.

Negative attitudes toward asthma are widespread in adolescents.[34] Previous studies,[15, 34, 35] elucidated negative attitudes toward asthma as a compelling predictor of inadequate adherence to management regimens in children and adolescents. In understanding the relationship, our findings suggest that the negative attitudes may make individual become more susceptible to cognitive barriers (e.g., forgetfulness or difficulty in keeping track of or following treatment regimens) which leads to poor adherence. It appears that negative attitudes may limit individuals' mental capacity to direct their attention to specific management plans and to effectively accommodate these plans within their daily life.

We found cognitive challenges as a common barrier. Adolescents' everyday life becomes increasingly complex with extended roles and social activities. Assuming daily asthma care may compete with other activities on which adolescents place priority; thus taking care of asthma becomes easily forgotten or neglected. Interestingly, we found that cognitive difficulty was more often reported by non-white adolescents and those with disadvantaged SES. It is assumed that children and adolescents of low SES tended to experience more adverse life situations (e.g., poor material circumstances and chaotic lives) which may divert their attention from optimal self-management of asthma.[36] In addition, our results to some extent reflect previous studies demonstrating correlations between lower SES and poor neurocognitive functioning, such as language, cognitive control, memory and working memory, in children and adolescents.[37] Given the cognitive profile of SES disparity, it may be beneficial to tailor patient education and counseling and simplify the management plans for vulnerable groups so that adherence requires minimum cognitive capacity and alteration of daily routines.

Given that social milieu involving peer dynamics often dictates adolescents' emotions and behaviors, it is not surprising that our data identified social influences involving peers as a barrier. Cohen et al.[34] reported that only 39% of adolescents with asthma had disclosed their asthma to their friends, and 29% felt embarrassed about having an asthma attack in front of their friends. Adolescents who experience embarrassment about their asthma in the presence of peers are reluctant to take their asthma medication in the presence of their friends.[29, 30, 34, 38, 39] Similarly, we found that social barriers involving peers were associated with negative attitudes (e.g., embarrassment, sadness, pessimism) and low self-efficacy. To assist adolescent in overcoming the social barriers, therefore, it is important to alter adolescents' overall perspectives about asthma and foster self-confidence in managing asthma.

It is also worth mentioning that males consistently reported higher levels of barriers (except for the barrier of cognitive difficulty), which was not explained by other factors including knowledge, attitudes, self-efficacy, symptom scores, SES, or race. Gender differences found in this study deserve further investigation to identify underlying mechanisms and to determine

the extent to which the higher barrier reports translate into actual adherence and asthma morbidity. Literature is limited about gender differences in barrier perceptions to adherence in adolescents with asthma. This study provides a platform for subsequent discussion of the gender differences and its implications for gender specific interventions.

This study is subject to several limitations inherent to the study design. First, we used a convenience sample of adolescents, thus limiting the generalizability of the findings. Lower reliability in two barrier subscales (social influence and denial, .64 and .52 respectively) due to small numbers of items may have been responsible for some of nonsignificant associations involving these subscales. Specifically, the results from the denial subscale which consisted of only two items need to be interpreted with caution. In addition, because we did not measure actual adherence in the sample, we were unable to determine the degree to which adherence is negatively affected by the presence of barriers. Owing to the cross-sectional nature of the study, causal inferences between barriers and psychosocial variables cannot be established. Lastly, as in most studies relying on self-reported data, we cannot rule out the possibility that social desirability might have influenced the data.

Despite the identified limitations, this study is important in that our findings extend the existing knowledge base on barriers to asthma self-management in adolescents. Subsequent research using a large representative sample of adolescents is needed to validate our findings. Prospective longitudinal studies will aid our understand about not only the extent to which the presence of barriers is actually translated into adolescent patients' poor adherence to asthma treatment, but also the detailed psychosocial and behavioral mechanisms through which barrier perception undermines adherence. Such information can provide directions for intervention programs that potentially ameliorate barriers through the modification of psychosocial factors.

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Table 1

Factor Loadings of Individual Items of the Illness Management Survey (N=126)

	Factor1 Negativity	Factor2 Cognitive Difficulty	Factor3 Social Influence	Factor4 Denial
The doctors do a good job of explaining things to me. (R)	**0.62319**	−0.14137	−0.00590	0.21006
The doctors don't seem to understand how much my regimen gets in the way of important things in my life.	**0.61940**	0.06885	−0.02928	−0.06591
It feels like the doctors are too busy or rushed to talk to me about my illness and my regimen.	**0.59779**	0.05414	−0.05053	0.10984
The doctors treat me like a little kid who can't take care of her/himself.	**0.57844**	0.04301	−0.08732	0.14852
I don't always trust the doctors and nurses.	**0.54171**	0.10748	−0.04006	0.11084
My doctors are friendly and easy to talk to. (R)	**0.51156**	−0.19916	0.10006	0.46346
My regimen causes changes to my body that I don't like.	**0.49785**	−0.07050	0.10827	−0.13402
My regimen has side effects that I really don't like.	**0.49074**	0.21364	0.02828	−0.25688
Following my regimen causes me physical pain or discomfort.	**0.40946**	0.26787	0.06575	−0.07288
It's hard for me to stay organized enough to keep track of medications or other things related to my illness.	−0.09246	**0.72703**	−0.05466	0.26975
When there are changes to my regimen I sometimes get confused.	0.01996	**0.72022**	0.09770	−0.07162
Sometimes I can't remember everything I'm supposed to do about my illness.	0.02376	**0.67232**	−0.07449	0.09619
When I feel nervous or worried, it's hard to follow my regimen	0.24501	**0.50870**	0.02578	−0.15727
It's hard for me to plan things out carefully, so sometimes I don't get around to following my regimen.	0.05676	**0.47603**	0.08994	0.24605
I don't want my friends to know about my illness.	0.00321	−0.00347	**0.67911**	0.09965
I don't mind if my friends bring up my illness or ask me questions about it. (R)	−0.15940	−0.00935	**0.61125**	0.16268
None of my friends has to deal with this, why do I?	0.07611	0.02860	**0.56934**	−0.11648
My family doesn't understand what it's like to live with my illness.	0.22545	0.03789	**0.40747**	−0.04561
Nothing bad would happen to me if I didn't follow my regimen.	−0.07129	0.15082	0.12182	**0.55967**
I refuse to give up time with friends to take care of my illness.	0.09049	0.13770	−0.06608	**0.53723**

Note: (R) reverse coded items.

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Table 2

Means and Standard Deviations (SD) of Barrier total and Subscales by Gender, Race, and Insurance Types

	Gender					**Race**					**Insurance Type**				
	Female (n=75)		**Male (n=51)**			**Whites (n=62)**		**Non-whites (n=62)**			**Public (n=58)**		**Private (n=65)**		
	Mean	SD	Mean	SD	p	Mean	SD	Mean	SD	p	Mean	SD	Mean	SD	p
Barrier-total	2.19	0.51	2.36	0.55	NS	2.12	0.54	2.39	0.50	<.05	2.35	0.53	2.16	0.53	<.01
Negativity	2.01	0.62	2.17	0.64	NS	1.93	0.61	2.19	0.62	<.05	2.18	0.66	1.97	0.60	<.06
Cognitive	2.66	0.84	2.67	0.83	NS	2.47	0.87	2.88	0.76	<.01	2.82	0.84	2.50	0.81	<.05
Difficulty Social	2.01	0.77	2.28	0.89	<.07	2.02	0.73	2.23	0.92	NS	2.18	0.91	2.08	0.76	NS
Influence Denial	2.15	0.76	2.56	1.02	<.01	2.25	0.96	2.35	0.85	NS	2.26	0.88	2.35	0.94	NS

Table 3

Factors Influencing Total Barrier Scores and Negativity Subscale (N=126)

		Total Barriers				Negative Barriers			
Step	**Model**	**B**	**Beta**	**R2 Δ**	**F Δ**	**B**	**Beta**	**R2 Δ**	**F Δ**
1	Knowledge	−0.02	−0.11			−0.01	−0.07		
	Attitudes	−0.02	−0.27 **			−0.01	−0.19		
	Self-efficacy	−0.02	−0.40 ***	0.32	18.01 ***	−0.02	−0.32 ***	0.25	12.80 ***
2	Symptom Score	0.02	0.10	0.00	0.37	0.07	0.27 **	0.03	5.04 *
3	Insurance	0.04	0.04			0.03	0.03		
	Parental Education	−0.01	−0.04			0.00	0.02		
	Family Income	0.01	0.03	0.00	0.28	0.02	0.06	0.00	0.11
4	Gender	−0.27	−0.25 **			−0.28	−0.22 **		
	Race	0.16	0.15	0.07	6.34 **	0.19	0.15	0.06	4.64 **
	Constant	4.63				3.59			
	Total R^2			0.39				0.28	

Notes:

* p <.05;

** p < .01;

*** p < .001

Table 4

Factors Influencing Cognitive Difficulty, Social Influence and Denial Subscales (N=126)

		Cognitive Difficulty				Social Influence				Denial			
Step	**Model**	**B**	**Beta**	**R^2 Δ**	**F Δ**	**B**	**Beta**	**R^2 Δ**	**F Δ**	**B**	**Beta**	**R^2 Δ**	**F Δ**
1	Knowledge	0.01	0.03			−0.04	−0.14			−0.06	−0.21 *		
	Attitudes	−0.03	−0.27 *			−0.03	−0.28 *			0.01	0.12		
	Self-efficacy	−0.03	−0.30 ***	0.18	8.75 ***	−0.02	−0.26 **	0.16	7.63 ***	−0.02	−0.18 *	0.08	3.27 *
2	Symptom Score	−0.02	−0.07	0.00	0.14	−0.02	−0.07	0.01	0.79	0.00	−0.01	0.00	0.58
3	Insurance	−0.20	−0.12			0.25	0.15			0.29	0.16		
	Parental Education	−0.03	−0.10			−0.03	−0.10			0.04	0.13		
	Family Income	0.04	0.10	0.03	1.39	−0.05	−0.13	0.02	0.81	−0.02	−0.04	0.02	0.72
4	Gender	−0.16	−0.10			−0.37	−0.22 *			−0.33	−0.18		
	Race	0.21	0.13	0.02	1.20	−0.02	−0.01	0.04	3.05 *	0.28	0.15	0.04	2.66
	Constant	5.65				6.29				3.39			
	Total R^2			0.23				0.23				0.14	

Notes:

* p <.05;

** p < .01;

*** p < .001