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Adolescent and Parent Experiences with a Primary Care/ Internet-based Depression Prevention Intervention (CATCH-IT)

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Introduction

Reducing the burden of child and adolescent mental disorder is a major public health priority.¹ Mental disorders affect more than 40% of Americans over a lifetime, with over 20% of these manifesting before age 24.^{2–7} Most common mental disorders are characterized by a relapsing and remitting pattern over a lifetime with substantial disability adjusted life years.^{4,5,8–10} While many promising diagnostic and treatment strategies exist for child and adolescent mental disorders, most children and adolescents do not seek or obtain treatment.¹¹ Many new approaches, such as collaborative care and dual treatment with antidepressant medications and psychotherapy, improve treatment engagement, adherence, and outcomes

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for patients, particularly for ethnic minorities, but at additional cost.¹²⁻¹⁵ Cost containment strategies for mental health have increased pressure on health care professionals to provide more services at lower costs.¹⁶ Concurrently, both the National Institute of Mental Health and the Institute of Medicine of the National Academy of Sciences have endorsed the need for preventive interventions that “work” in “real world settings” outside of traditional care delivery environments, incorporate input from families and consumers, and utilize advances in information technologies. Internet-based interventions hold some promise in providing early interventions in order to prevent disorders, serve as support for ongoing treatment, or even as stand-alone treatments for those with mild to moderate symptoms of depression.¹⁷⁻¹⁹

Internet-based approaches have been developed to prevent and/or to treat a variety of health problems in adolescents and adults.²⁰⁻²² Internet-based interventions have demonstrated efficacy in reducing depression, in reducing symptoms of eating, anxiety, substance and alcohol abuse disorders,^{20,23-25} and in improving knowledge/attitudes (psycho-education) in adults.²⁶ Internet interventions have been developed to address somatic health problems among youth, including for obesity, smoking, HIV/AIDS risk, and sexual risk.²⁷⁻³³ However, Internet interventions remain dependent on their contexts (including setting and degree and form of supervision) as well as attitudinal factors (Trans-theoretical Model of Change and Theory of Planned Behavior),³⁴ with less than 10% of the population ready to engage a lifestyle change online at any given moment.^{35,36} For example, early studies involving adolescents have demonstrated that few adolescents will complete free-standing Internet-based depression treatment programs.^{37,38} This is particularly disconcerting considering that systematic reviews of Internet-based treatment programs show reduction in clinical symptoms, improvements in behavior and overall moderate to high satisfaction among adolescents who complete them.³⁹

Though a dearth of research exists enumerating the factors that influence adolescents’ participation and adherence, several considerations identify the direction in which such inquires ought to be made. The first is recognition of the fact that controlled trials randomized controlled trials boast higher retention rates than open access, suggesting that participants’ pre-intervention mindset is a major component. In fact, patient factors is one of WHO’s five theorized domains affecting treatment compliance (for all populations), the others being health system factors, socioeconomic factors, condition-related factors, and treatment-related factors. The latter is particularly important given the tremendous body of research in depression treatment in primary care demonstrating that case management and continuity of care are crucial for perseverance through therapy.⁴⁰ This has been demonstrated with Internet interventions, for example, by Titov and team indicating participant motivation can be externally potentiated.⁴¹ Further research will examine these domains in the specific context of known technology and software attitudes in populations, for instance the known sense of attachment people develop for their personal computers.

We have conducted research with Internet-based depression for adolescents. Our primary care/Internet-based intervention directly involves community-based caregivers and parents in order to overcome the propensity for Internet-based intervention to insufficiently engage either individuals or a significant portion of the at-risk population. Furthermore, our primary care/Internet-based preventive approach focuses on adolescents who are at risk (sub

threshold symptoms) for developing major depression in primary care. Our intervention, Competent Adulthood Transition with Cognitive Behavioral Humanistic and Interpersonal Training (CATCH-IT), is based on face-to-face interventions of demonstrated efficacy.⁴²⁻⁴⁵ CATCH-IT seeks to intervene using Internet technologies to “pre-empt occurrence” in youth at elevated risk by: (1) reducing vulnerability; (2) promoting resiliency; (3) reducing incidence; and (4) enhancing functional outcomes in realistic settings with diverse populations. The CATCH-IT intervention combines a sustained motivational program (two motivational interviews [MI] in primary care, coaching phone calls, behavior change contract, and activity schedule) with an Internet-based self-directed training program based on manuals from interventions of demonstrated efficacy.^{43,46,47} In a phase 2 randomized clinical trial (dose and feasibility), we compared two levels of primary care engagement: MI, in which the physician encouraged the participant to actively engage and persist with the intervention, and BA, in which the physician merely presented the existence of the intervention. We found that coupling the Internet-based intervention with MI was more successful than coupling it with BA (4.65% versus 22.5%, $p = 0.023$) in a diverse population (40% ethnic minorities).⁴⁴⁻⁴⁵ Similarly, participation in either level (MI versus BA), paired with exposure to the Internet program, was associated with favorable changes in depressed mood and several vulnerability and protective factors, such as weak or strong interpersonal relationships, respectively.⁴⁸

Several recent publications have summarized key concepts for the implementation of Internet interventions, such as the participant’s motivation, engagement, and support and the website’s design and usability.¹⁷⁻¹⁹ However, little is known about the fundamental experience of participating in an Internet-based intervention, and even less is known about the dimensions through which this experience engages a participant’s mental health. Similarly, there is insufficient knowledge about the parental perceptions and resultant influences of having an adolescent enrolled in these therapies.¹⁸ In this study, we attempt to further explore these inquiries by describing the experiences of parents and adolescents enrolled in CATCH-IT in order to build a knowledge base of relevant factors in an Internet-based intervention. We employ a mixed methods approach. Qualitative analyses use grounded theory to identify key themes of participation among adolescents and parents. Quantitative analyses assess the changes in attitudes and beliefs toward treatment and preventive interventions during the course of the intervention. We also seek to provide a unified schematic model that explains both the qualitative and quantitative data we analyzed.

Methods

Intervention model and Trial Design

CATCH-IT (Competent Adulthood Transition with Cognitive-Behavioural, Humanistic and Interpersonal Training) includes pre/post internet intervention primary care interview and standardized Internet-based training in Behavioral Activation, Cognitive Behavioural Psychotherapy, and Interpersonal Psychotherapy. The Internet program was carefully developed based on manuals of demonstrated efficacy in face-to-face setting and carefully matched to adolescent vulnerability and protective factors. Similarly, a parent workbook based program was developed based on Beardslee and Gladstone’s parent education

program.⁴² Both the intervention and development of the same have been reported in past publications.^{49,50} In this study, we conducted a randomized controlled trial comparing MI + Internet program (MI group) versus BA + Internet program in 13 US primary care sites within five different health systems across four U.S. Midwest and South states. All materials remain open for public use and are freely available to healthcare providers on the CATCH-IT Internet site at <http://catchit-public.bsd.uchicago.edu/>.^{49,51,52}

Recruitment

Using direct primary care screening for risk of disorder (sub-threshold depressive symptoms) and posted advertisements, 83 adolescents from 14 to 21 years of age (56% female) were recruited from February 1, 2007 to November 31, 2007. Adolescents with positive screens were asked to consent to (and, in the case of children under age 18, obtain parental consent for) first, eligibility assessment by study staff, and second, if eligible, actual study participation. Eligibility criteria included being ages 14 through 21 and experiencing persistent sub-clinical depression (reporting 1 core symptom of depression, i.e., depressed mood, irritability, or loss of pleasure for at least a few days in the past 2 weeks at 2 different assessment points). We excluded adolescents who were undergoing active treatment (within 1 year of treatment initiation) for any DSM-IV psychiatric disorder from the study. A completed discussion of the inclusion and exclusion criteria and has been described in a prior publication.^{42,53} Those found to meet criteria for a mental disorder were referred for further treatment. We required adolescent assent (and parental assent if subject < 18) at both screening and actual study enrolment. Those >18 consented for themselves at both steps. This study was approved by the University of Chicago IRB. The methods by which the study was conducted have been extensively described in prior publications.^{53,54}

Qualitative Data Collection:

Our qualitative data collections reflect a principal assertion that the subjective elements of any given experience can be well encapsulated by the subject's thoughts, concerns and reactions flanking and during that experience.

Adolescents: Adolescents' comments were obtained from two sources: pre-intervention interviews and typed comments on the CATCH-IT website while completing the six-week intervention. We enrolled N=84 adolescents in the primary care trial. N=40 received interviews from their actual primary care physician where by the remainder received them from the study physician based on practice preference. Only the N=40 were recorded by mutual consent, originally to ensure fidelity to the motivational interview protocol described earlier. Recordings for 40 participants' pre and post-intervention primary care physician interviews were available for playback and consequently transcribed in full (total of N=51/80 total interviews (2 interviews each participant scheduled)). For data manageability, 10 participants were randomly selected from the cohort for N=40 to have all their typed in comments from the intervention module exercises (skill builders) and suggestion boxes (feedback for the intervention) compiled for analysis with the aforementioned interview transcripts. We limited this to 10 because of the sheer volume on material made analysis for all 40 unfeasible. There were no significant differences in either the 40 interview participants or the 10 intervention-text participants from the larger 83-person study group.

Parents: Parents (of those who <18 years old) were interviewed 6-8 weeks after their child's enrollment using a schedule of questions intended to elicit their broad understanding on the parent Internet components' experience (KV or BVV). Parents were called for interviews, and all parents who agreed to the brief open ended questions were included. Questions asked were: "What aspects of the parent information book have you found most helpful?"; "Did any part of the modules feel hurtful at all?"; "Do you have any suggestions as to how we could make this program more helpful and/or user-friendly for parents in the future?"; "Do you have any comments with regard to your child's experience completing the Internet-based program?"; "Do you have any comments with regard to the interview your child had at the beginning of the study?"; "As a result of participation in this study, do you think about depression in a different way? If yes, how?"; "Is there anything you do differently as a result of being in the study?"; "What do you feel is unique or different about your child compared to other adolescents/ young adults?"; "What are five words that you would use to describe your child?"; and, "About how long did you spend with the parent information book and the modules?"

Quantitative Data Collection:

Our quantitative data collection reflect a principal assertion that changes in existing attitudes or the development of new ones can highlight specific areas of participants' mental health the experience of the intervention influenced.

Adolescent helpfulness questionnaire ratings: We report data on adolescents' perceived helpfulness based on the Ratings of Perceived Helpfulness in Behavior Change, adapted from an Internet intervention for eating disorders and has been previously described.^{25,50} On a scale from 1-10 where 1 represents "not helpful" and 10 represents "very helpful", we report the mean value for the Likert-scale responses in two domains: Understanding (e.g., "recognize thoughts and behaviors that tend to trigger depressed moods") and Behavior changes ("change my behavior in ways that have improved my mood") (Table 3).

Adolescent attitudes toward mental health interventions: We also sought to evaluate whether attitudes toward traditional interventions (e.g. medication and psychotherapy) and preferences for alternative Internet-based interventions changed during the course of the intervention. The beliefs and attitudes towards treatment behaviors ("beliefs and attitudes") and subjective social norm ("social norms") items were developed using a focus group methodology and were adapted *post hoc* to the Theory of Planned Behavior Model. Participants rated their agreement with several beliefs using a Likert-type scale (1=strongly disagree to 5=strongly agree). We have previously reported the reliability and validity of these items in predicting likelihood of seeking treatment.²¹⁻²³ With regard to preferences for alternative Internet-based interventions, we asked the adolescents, "For the following items, please think about how important they would be for you in starting and completing an Internet based program designed to teach you coping skills for managing your life and mood." They then rated on a 10-point scale (1= "not important at all" to 10= "very important") a series of options for such interventions (e.g. chatting online). Their attitudes were measured at baseline and at 6-8 weeks follow-up post-intervention (Table 4).

Parent helpfulness questionnaire ratings: The questionnaire was similar to that used for the adolescents. Only parents who were required to provide consent for their child's participation were given a questionnaire, reflecting an expectation of at least that much participation. We report the mean value for Likert-scale (1 = not helpful to 10 = very helpful) in the 3 domains of Learning (e.g. "How much did you learn about resilience, and about ways to promote resilience in your child?"), Benefit (e.g., "Overall, how much has your family benefited from participation in the program?"), and Behavior change (e.g., "Did being in the project inspire you to seek out any new information?") (Table 3).

Qualitative Data Analysis:

Adolescents: The comments collected from the interviews and from the intervention were compiled and assessed by four members of the research team for themes. We used grounded theory methodology, whereby materials were first independently reviewed by all members of the team. Second, potential themes were discussed and debated until consensus was reached about the most prominent themes of the comments and team members believed thematic saturation had been achieved. Third, two of the team members used the Atlas program to classify all the comments into the agreed-upon themes. Finally, these two team members reconciled any differences in the classification of comments until they reached 85% concordance in classification within the final taxonomy.^{55,56} To minimize bias, we employed several methods. First, we developed a team that had no prior exposure to the CATCH-IT program and worked independently of the intervention developer. Second, in order to reduce potential bias from preconceived notions, the two raters both maintained diaries during the study to recognize bias and optimize objectivity. Furthermore, to further evaluate possibility of bias in the taxonomy development, we read back comments and the classification taxonomy to some of the physician interviewers (N=3) in order to determine if the taxonomy and comments classification reflected the interviewers' experience in the interviews.

Parents: Atlas was not employed as a tool to evaluate the comments (N=82) from the parents, as the low volume of comments was easily managed by manual categorization. Nonetheless, a similar protocol was used to achieve their classification.

Quantitative Data Analysis:

Adolescents and parents completed ratings of the helpfulness of their respective interventions at the post-intervention interview conducted by the study coordinator approximately 8 weeks after enrollment. Additionally, adolescents completed baseline ratings of attitudes toward mental health interventions and then repeated assessments of the same ratings at the 8-week follow-up. We report descriptive statistics for all time points available, and where repeat measures are available, we use paired t-tests to compare pre- and post-intervention measures.

Results

Sample description:

We evaluated 116 adolescents for eligibility (13 were ineligible, 103 eligible, and 20 eligible but did not enroll) and enrolled 83 adolescents in the study (81% enrollment rate). This was

a diverse study sample study (56% female, 44% male; 38% Caucasian, 23% African American, 5% Hispanic, 6% Asian, and 4% other) with a mean age of 17.4 years (SD=2.14). More than half (55.7%, N=44) reported that their parents were married to one another. The median household income, calculated using the zip codes of the participants (according to the US Census 2000), was \$40,249 (SD=14,500).⁵⁷ Of these 83 individuals, nearly half (N=40) elected to have their interviews audio-taping for later analysis and 86% (N=72/84) completed at least part of the post-study questionnaire. For motivational interview participants (MI) – which meant that the physician offered encouragement to the participants on the potential advantages of engaging with and sticking to the intervention – the mean duration of the motivational interview was 5.96 minutes (SD=1.9), and they spent a mean of 143.7 minutes (SD=109) on the Internet site, with 3535 (SD=2085) characters typed into the exercises. For the brief advice interview group (BA) – meaning the physician merely relayed information about the intervention's existence and use – the mean duration of the primary care interview was 1.79 minutes (SD=0.45) with a mean of 98.4 (SD=124.6) minutes on the Internet site with 1915 (SD=2328) characters typed. Fourteen parents representing 22/45 adolescents under age eighteen (48%) completed the evaluation of the parent program.

Qualitative Analysis

Adolescent Themes—The comments (N=1677, Table 1) gathered during the pre- and post-intervention interviews, as well as from the skill builder section of the intervention, were organized into 9 themes, representing the 9 dominant faces of psycho-emotional cognition experienced by the adolescents over the course of the intervention period. Table 1 provides a summary of each theme and example quotes to further illustrate the summary. Several important broad concepts bear mention including the tendency for themes to be consistent across setting and time and the general sense of improvement in psycho-social function across the intervention. In particular, the qualitative analysts, who also listened to the tapes, noted a sense of tentative confidence and improvement from pre- to post-interview in the same participants. This was clear in both actual verbal expression and intonation as well as the physician response.

Parent Themes—Parent themes included CATCH-IT Change (challenges and benefits of using the intervention), Depression Attitudes (beliefs about depression), CATCH-IT Format (wanting more interactive format) and My Child (view of child, both positive and negative). As such, the parent experience was typified by recognition of the challenges their children faced in successfully and effectively completing the intervention coupled with a desire for more direct involvement, and by an appreciation of the considerable benefits to their child (Table 2). The juxtaposition of their desire to help their adolescents with their ability to do so as influenced by the intervention highlighted a critical disparity between understanding depression and participating in the intervention, which they identified as two parameters through which they could best help their adolescent. (Figure 2)

Quantitative Analysis:

Perceived helpfulness: Overall, the adolescents and parents rated the intervention favorably (Table 2). For adolescents, ratings of helpfulness of the domains of understanding and behavior change were in the moderately favorable range (7-8, 1-10 scale, not at all

helpful to very helpful). Parents reported that they'd found the intervention helpful on the learning, benefiting, and changing behavior, rating it in the “a great deal or nearly so” range (7-8 range rating on 1-10 scale, “not at all” to “a great deal”).

Adolescent attitudes toward traditional mental health and preferences for alternative Internet-based interventions: Adolescents' endorsement of several attitudes toward traditional mental health intervention and preferences for Internet interventions intensified during the course of the intervention. Compared to baseline, at post-intervention adolescent participants rated significantly stronger agreement with the statements: “depression is the result of stressful circumstances in a person's life” ($p=0.02$), “prayer can help heal depression” ($p=0.04$), “I can change my depression by changing my behavior” ($p=0.002$), and willingness to accept a physician diagnosis of depression ($p=0.01$). The level of agreement with “counseling brings up too many bad feelings like anger or sadness” declined significantly ($p=0.03$). With regard to Internet site preferences, adolescents reported greater importance of chatting online as part of intervention after participation than before ($p=0.01$).

Theoretical Model Derived from Both Analyses

While all three of our data sources – pre-intervention interviews, intervention components, and post-intervention interviews – individually contained the same 9 themes, each data source portrayed its own textual compilations in a unique way, further characterizing the experiences into three classes. Considering the quantitative data, the adolescents rated the experience of learning coping skills online and effective for them across a range of behavioral, cognitive and interpersonal risk domains. Pre-intervention interviews connoted the adolescent experience of having life situations thrust upon them without an adequate means with which to put those things in perspective or engage with them in healthy ways. Intervention component data suggested the adolescent experience of suddenly feeling empowered to actively engage such life situations, predicated on a newfound fundamental understanding of depression as a consequence and cause of negative behavior and cognition. Post-intervention interviews connected the adolescent experience of mitigating persistent life situations with newfound understandings and a consequent reduction in either (or perhaps both) the number of adverse life situations or the adverse effects of the persisting adverse life situations, primarily changed by a new willingness to face difficult situations instead of eschewing them. (Figure 1) With regard to the parent intervention model, the parental desire to help their adolescents is juxtaposed with their ability to do so as influenced by the Intervention. Understanding of depression was improved but parental ability to directly participate was limited (Figure 2). For example, many parents felt that the presentation of depression as an illness was somewhat negative and that the program lacked an interactive format that would have more fully enabled their participation.

Discussion

Comments and ratings by both adolescents and parents suggested an active engagement between participants and both the primary care and Internet-based components with thematic consistence across our three sequential samplings of experience (pre-intervention

interview, intervention, post-intervention interview). A qualitative analysis of the participants' experience by thematic classification of their comments made during the interviews and during the CATCH-IT intervention itself yielded nine themes, which were closely related to common adolescent stressors (e.g., body image, school and job/finances), potential vulnerability /protective factors (e.g., relationships, communication), and behavior change process (e.g., CATCH-IT experience, coping before CATCH-IT). These reflected experiences reliably consistent with existing understandings of the adolescent depression experience. Parental and adolescent experiences were not remarkably dissimilar: both adolescents and parents described considerable challenges posed by life situations, the difficulty of engaging in a process of changing coping strategies, and the appreciation of success and satisfaction in some cases. The adolescent and parent participants' reported moderate levels of helpfulness, which were consistent with both the evident challenge of completing the program and the benefits many of them perceived from this intervention. Most importantly, attitudes toward mental health treatments, particularly the ones based on counseling approaches, became more positive during the intervention, reflecting the principal psycho-cognitive domain in which the intervention was able to affect the adolescents. Also, adolescents expressed an increasingly strong preference to be able to chat online.

Descriptions of adolescents' experiences with, in, and of Internet-based mental health interventions are just now being developed, with thematic categorization emerging as a comprehensive analytic tool.⁵⁸ Qualitative work on depression treatment has identified a range of themes, which include personal experience with depression, help-seeking in primary care, control, autonomy, privacy and helplessness in engaging interventions, preferences for autonomy and enhancement of connectedness by adolescents, and spirituality, social support, coping, life experiences, stigma, and psychological receptivity.^{59,60,58,61} The themes reported in our study are less related to issues of treatment engagement (autonomy, help-seeking, stigma)^{59,60,58,61}, and more focused on adaptation to challenges in school, relationships and health and the intervention's effectiveness in ameliorating these (also noted in similar unpublished thesis by Bradley).⁵⁸ Common elements between this study and other focus group studies include references to depression itself, but this was only reflected in a few comments. In short, the intervention may have been successful in reducing the elicitation of negative attitudes about mental health treatments and in focusing the adolescents on risk factor modification.^{49,51} Consistent with this thesis, the overwhelming proportion of comments focused on addressing life challenges in family, school/peer and job domains, the primary fields of adolescent engagement, and sources of vulnerability and protection for depressive episodes rather than the dilemmas of treatment seeking itself.⁶²⁻⁶⁶ This we recognize as the adolescent experience in an Internet-based intervention being defined less by the nature of depression itself, and more by the parameters modulating it.

Thus, a new contribution is the reporting of the challenges youth face in completing self-directed programs and their ratings of perceived helpfulness of an Internet-based program. Kaltenthaler and colleagues have reported that completion rates vary tremendously across interventions with reasons for dropping out including lack of helpfulness, poor motivation, anxiety, and the length of program.⁶⁷ While youth appreciated the control they experienced

during the program, they found the reading and skill builder assignments lengthy and tedious to complete, despite extensive revisions to reduce such burdens after the intervention was piloted.⁵² However, the available evidence suggests that more intense homework-based interventions, such as our program, are superior to those with less intensity.⁶⁸⁻⁷⁰ Not surprisingly, youth expressed increasing preferences for interaction with peers, which is consistent with the popularity of social media-styled mental health-focused Internet sites. However, the clinical benefits of such sites have yet to be reported.⁷⁰

Adolescents' ratings of the intervention, comments about the intervention, and their attitudes toward traditional interventions appeared to fluctuate during the intervention. While ratings provided by adolescents support the general helpfulness of the intervention, several comments suggested that adolescents experienced difficulty actually changing behavior. However, adolescents did seem to change from passive, avoidance-based approaches seen in community surveys of "first aid for mental health" to the more active stance proposed by CATCH-IT.^{71,72} Perhaps increasing the level of professional guidance could support greater and more enduring behavior change.⁷³ Nonetheless, attitudes related to elements of the intervention (accepting physician diagnosis, role of stressful events, and the use of behavior change to alter mood) displayed the highest level of change, suggesting Internet-based interventions of this sort are particularly effective at helping adolescents gain confidence in both self-management and medical interventions during the course of the study. Similar changes have been reported for adults in Internet-based interventions.⁷⁴

Parental involvement in child and adolescent Internet studies is inconsistent and rare, making the ratings and the comments provided by parents in our study the first in the field.⁷⁰ Similarly to adolescent themes, parental themes seem to encompass normal development, parent-child relations, and process of change, all of which were consistent with the goals of the original intervention.⁴⁹ Our study's findings however, departed meaningfully from prior adult focus group work, which reported themes emphasizing disability and care needs.⁷⁵ Our study's findings are consistent with other findings that report that parents do not wish to accept the concept of depression as an illness, but rather view it as a behavioral response to adverse situations.⁷⁵ The parents' generally favorable ratings of the intervention are consistent with parental endorsement of both primary care physician mental health advice and value of self-help approaches.^{67,76,77} Similarly, parents in our study appeared to be yearning for an interactive format, such as a support group model, which may offer some benefit in depression but which also can expose group members to negative thoughts/moods of others.^{78,79} The fact that our study's parental experience did not focus on disability or care needs and the fact that they evinced a desire for increased participation is perhaps reflected in the low (below 50%) postintervention survey response. Despite our administration of the questionnaire to parents who had to consent for their adolescent's participation, we theorize that inadequacies in Intervention interfacing coupled with the lack of significant disability in our patient population put the parents in a state of mild disinterest.

The reader should consider several limitations and strengths. We provide in-depth text and ratings of parent and adolescent experience with a complex preventative intervention.

Possible sources of error in our qualitative assessment of the adolescent and parent experience include lack of open-ended queries and limited number of parents contacted and interviewed. Still, we chose to use grounded theory to minimize the bias of the investigators who actually designed the intervention. To that end, the intervention investigators played no role in the development of the qualitative analysis. The availability of comments from 40 participants for interviews and 10 from the Internet site, while not large, may be sufficient to identify most themes. While the number in the survey is small, few surveys are currently available with regard to youth participation in Internet-based mental health prevention strategies and as such, our findings are exploratory. The changes in attitude may also be reflecting that participants who completed the questionnaire were more likely to commit to the intervention, thus benefiting from it the most. However, the likelihood of this is small given the high response rate (84%). In terms of external validity, the approach of seeking to recruit successive visitors at primary care practices, while not a probability sample, is superior to a pure convenience sample which tends to over-represent highly motivated/favorably disposed persons. In conclusion, future models of an Internet-based therapy must endeavor to use the malleability of the medium to tailor the intervention to the particular needs of their patient population while balancing several strengths and limitations. The ambitions of Internet based approaches to alter deeper cognitive constructs (CBT) or unconscious ones (IPT) may be difficult to achieve without the traditional face-to-face relationship with a therapist or intensive guidance for many adolescents, but to a surprising degree, many adolescents and parents appeared to shift from passive to pro-active problem solving with evident benefit.^{53,54} A similar challenge may be meeting rising expectations for personalization and interaction, which, while offering the promise of greater engagement, comes at considerable added financial expense (creating personalization algorithms and monitoring of interaction) and potential risk (peer-to-peer interaction). Future Internet-based interventions will need to balance ambitions with realities and the paradox that many elements that adolescents find particularly appealing may be either too expensive or too high-risk to easily incorporate into research-only interventions. Perhaps some of these approaches will be considered by very large-scale mental healthcare delivery organizations, whether they are public or privately directed.

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Fig. 1.

The psycho-emotional state of the adolescents before, during and after the CATCH-IT intervention. Stressful cognitions or life events penetrate and consume the adolescents (red). During the intervention, they develop defenses and actively struggle (green) with the deep-seated negative emotionality. Following the intervention, adolescents experience a decrease in active defense but reestablish their baseline enough to reduce the effects and/or occurrences of psychologically adverse events.

Fig. 2. The parental desire to help their adolescents juxtaposed with their ability to do so as influenced by the intervention. Understanding of depression improved, but parental ability to directly participate was a deficiency.

Table 1:

Thematic breakdown of comments from adolescent participants

	Number of comments				Sample Quotation
Sub-Theme	Pre	Post	Internet	Total	
Body					
Body	1	0	18	19	That if only I was thinner, I'd be happier
CATCH-IT Experience					
Change	6	74	35	115	Umm it pretty much taught to umm how to cope with it umm and another thing what is in the past is done and you can't change it. You got to move on with bigger and better things.
Result	31	56	61	148	Think it went well it was interesting it was I uh I took a psychology class at school that touched on depression a little bit and id never heard of anything of kind of thinking your way out of it and I thought it was interesting.
Use	14	50	51	115	So you can learn how to control your depression like if it gets worse you can like bring it back down or stop it before it gets really bad and when you get older you'll know stuff about it
Communication					
Parents	1	4	12	17	We used to fight everyday just about and now we don't
Peers	12	10	20	42	I would like to change two specific things I do around people (actually two specific groups of people as well). I would like to change the way I act around people whom I have just met. I usually act out, make fun of them or others around to get attention
Siblings	0	0	1	1	[T]he outcome to the messy room. Was I kept trying to deal with him, prodding him to clean it. I came back in and he was watching tv. I got angray [sic] at him and was just so angry at him. He reacted by crying and just ignoring me. After I gave him an ultimatum [sic]
Coping Before CATCH-IT					
Coping Before CATCH-IT	12	4	10	26	I stay by myself
Jobs					
Financial	4	1	1	6	Not having spending money
Holding a Job	14	5	13	32	I just want to stay at my job and keep it, it looks so much on a resume
Performance	1	0	4	5	I am very preoccupied with many things and I am finding it hard to stay focused at work.
Health					
Health	3	6	10	19	Uh let's see I'm trying... I'm trying to eat better stuff trying to eat healthier, workout a little bit uh and that kind of stuff
Relationships					
Extended Family	10	3	7	20	And my family, I really love my family and I was cause we always like we always have a lot of deaths in my family and you know some people feel like grieving for that
Family of Origin	17	13	23	53	And things like that, that's I kind of get sad umm my relationship with my grandmother is not that good because she doesn't come and she doesn't understand me I feel like she doesn't understand me, and like makes my life hard...
Peers	26	14	95	135	My friends always wanna hang out but I'm always doing homework and sometimes when we hang out, they will literally tell me I'm not allowed to bring any books along. It's hard to enjoy hanging out with them when I'm always worrying about things I need to get done.
Romantic	3	4	31	38	finding a boyfriend
School	16	13	22	51	

	Number of comments				Sample Quotation
Sub-Theme	Pre	Post	Internet	Total	
Aspirations	9	6	12	27	If I'm depressed, I'll do poorly in school, I won't have the energy to apply for graduate programs or internships, I'll have poor relationships with my peers
Performance	7	7	10	24	While at school I totally failed my chemistry test and I got down on myself and I didn't try to do better next time I just kept looking at it as a bad thing and not a good learning experience. And I didn't think I could pass the class bc I failed the tes[t]
Understanding Depression Condition	10	10	20	40	Umm I kinda want to feel better about myself; I don't want to look at myself at the mirror and think uh I just wanna feel happier about who I am and what I am

Pre stands for pre-intervention interview, Post stands for post-intervention interview, and Internet stands for the skill building activities of the intervention itself. All numbers represent the number of comments of a particular theme or sub-theme collected from one or all sources.

Table 2:

Thematic Breakdown of Comments from Parent Participants

Theme	Number of Comments	Sample comment
CATCH-IT change	34	My kids remind me if I'm not communicating in a positive way. I probably haven't changed a lot, but my older son and I did have a "breakthrough" conversation where I responded to something he said in a typical manner and he confronted me. I was able to understand why he was bothered and he was able to hear my explanation of my thoughts. We both felt better because one of the modules explained to him how to respond in this kind of situation. Yes, I tell her to answer so I can hear her. I am listening better and finding the best time to talk
Depression Attitudes	30	Yes. It's a sickness and not something you can just pull yourself out of.
CATCH-IT Format	7	Maybe you could do the same for the parents, or a chat room The focus [of the workbook] was negative
My child	10	Strong willed, wants to be herself A blessing, outgoing, funny, my best friend, smile that would light up the world, sings like an angel.

Table 3:

Adolescent intervention ratings of helpfulness

Attitudes	N	Rating	Standard Deviation
On a scale of 1 to 10, please rate to what extent the program has helped you...			
Understanding	68.33	7.38	.36
Understand how my behavior and my habits can affect my mood.	68	7.53	1.79
Recognize thoughts and behaviors that tend to trigger depressed moods.	69	6.97	2.45
Identify behaviors (thoughts or ways of acting) that I would like to change.	68	7.63	2.16
Behavior change	68.8	7.03	.14
Change my behavior in ways that have improved my mood.	69	7.21	1.90
Keep negative unrealistic attitudes about myself from making me feel depressed.	69	7.00	2.36
Challenge negative thought patterns about myself.	68	6.90	2.28
Challenge negative thought patterns about everyday situation and problems.	69	6.91	2.42
Peer Relations (adolescent ratings)	68.5	6.98	.15
Express my feelings and reactions to important people in my life.	69	7.12	2.40
Cope with transitions in my life.	67	6.83	2.19
Solve relationship problems.	69	6.87	2.41
Peer relations perceived helpfulness scale (alpha = 0.84)	69	7.10	1.90

The rating scale of perceived helpfulness, given to the adolescents 4 to 6 weeks after enrollment in CATCH-IT, allows scores from 1 (not helpful) to 10 (very helpful).

Table 4:

Parent ratings of intervention of helpfulness

	N	Mean	SD
Learning	14	7.96	.07
How much did you learn about the connection between parental depression and depression in kids?	14	7.91	1.91
How much did you learn about resilience, and about ways to promote resilience in your child?	14	8.01	1.63
Benefit	11	7.99	.03
How much have the parent information books helped you to identify warning signs for depression in your child?	14	8.01	1.63
Overall, how much do you feel you benefited from the parent information book?	14	8.01	2.47
Overall, how much has your family benefited from participation in the program?	5	7.95	1.62
Behavior change	5	7.95	NA
Did being in the project inspire you to seek out any new information?	5	7.95	2.94

1, not at all, 7 a great deal, converted to 1-10 scale for ease of interpretation

Table 5:

Pre/post comparisons of attitudes and belief toward depression interventions and internet Intervention preferences

Attitude	Baseline Mean	SD	6 week Mean	SD	Pre/post P-value comparison
Beliefs about treatment					
Depression is inherited.	2.94	1.06	3.15	1.05	0.1652
Biological changes in the brain cause depression.	3.22	0.94	3.45	0.95	0.141
Depression is the result of stressful circumstances in a person's life.	3.56	1.11	3.98	0.78	0.0154
Depression is best treated by taking medication.	2.51	0.98	2.51	0.91	1
Some medicines are effective in treating Depression.	3.24	1.19	3.52	1.02	0.0551
Anti-depressant drugs are effective.	2.94	1.04	3.16	1.05	0.1319
For most people, counseling is as effective as medication in treating	3.44	1.01	3.61	0.98	0.0848
Prayer can help to heal depression.	2.95	1.22	3.08	1.16	0.0445
Attitudes toward Interventions					
I can change my depression by changing my behavior	3.36	1.09	3.92	0.86	0.0021
Counseling brings up too many bad feelings like anger or sadness	2.90	1.13	2.60	1.08	0.0282
The idea of taking medication for depression scares me.	2.99	1.26	2.93	1.19	0.731
The idea of face-to-face counseling for depression scares me.	2.63	1.13	2.57	1.12	0.6505
Social Norms					
If I had depression, my family would be disappointed in me.	2.10	1.06	2.36	1.24	0.0744
I would not want my employer to know that I was getting professional help	3.23	1.19	3.33	1.10	0.9209
Sometimes I feel like I have to hide my down mood from others.	3.48	1.29	3.66	1.03	0.1503
Intention					
If my doctor told me that I had depression, I could accept that.	3.49	1.22	3.93	1.03	0.01
Internet site preferences **					
For the following items please think about how important they would be for you in starting and completing an Internet based program designed to teach you coping skills for managing your life and mood.					
Personalize Website	4.65	2.78	5.25	2.67	0.09
Post Messages	5.34	2.94	6.22	2.59	0.10
Chat Online	5.21	2.98	6.05	2.59	0.01
Internet Based Rewards	5.38	2.96	5.52	2.53	0.65
10 dollar coupon for completion	6.00	2.69	6.18	2.44	0.73

* Likert scale ratings 1 (strongly disagree) to 5 (strongly agree)

** The ratings are from 1 (not important) to 10 (most important).

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