EFFECT OF INTERNET BASED HEALTH PROMOTION ON COLLEGE PREPARATORY STREAM ADOLESCENT GIRLS' KNOWLEDGE OF DEPRESSION

by

M. Suzanne Johnston

Bachelor of Nursing, University of New Brunswick, 1992

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Nursing

In the Graduate Academic Unit of Nursing

Supervisors: Grace Getty, BN, MN, Nursing
Mary Dupuis, BN, MN, DNSc, Nursing

Examining Board: Patricia Davidson, BN, MN, Nursing, Chair
Marilyn Merritt-Grey, BN, MN, Nursing
James Croll, BA, BEd, MA, EdD, Education

THE UNIVERSITY OF NEW BRUNSWICK

September, 2000

© M. Suzanne Johnston, 2000
The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author’s permission.

L’auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L’auteur conserve la propriété du droit d’auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-65495-8
Abstract

Prevalence of depression among girls by mid-adolescence, and the propensity for this trend to continue through young adulthood into middle age, emphasizes the importance of examining current approaches to the delivery of health information about adolescent depression. A quasi-experimental, comparison group design was used to assess the effectiveness of the Internet for the provision of information about adolescent depression to college preparatory grade 11 and 12 adolescent girls. The Knowledge about Depression Scale (KaDS) was administered to a sample of 72 adolescent females at a girls only public high school in eastern Canada. The Theory of Planned Behaviour provided the conceptual framework for the study.

The principal finding indicated a significant difference in knowledge about depression for those subjects in the experimental group who received information via the Internet. Significant relationships were found between subjects having a personal history of depression and those currently taking antidepressants, subjects with a family history of depression and having a friend with depression. A negative correlation was found between importance of religious beliefs and those currently taking antidepressants. Limitations and significance of the research are addressed, implications for practice, education, and research discussed. Knowledge generated from this study will be useful for determining future directions for the delivery of health information about adolescent depression.
Acknowledgements

Thank you to my Committee Members Grace Getty, BN, MN, and Mary Dupuis, BN, MN, DNSc. Their commitment throughout the entire process of this research is worthy of a standing ovation!

Thank you to James C. Croll, BA, BEd, MA, EdD, for his advice, encouragement, and guidance with statistical analysis. His contribution as external reader is truly appreciated.

Thank you to Marilyn Merritt-Grey, BN, MN, for her contribution as internal reader.

Thank you to Patricia Davidson, BN, MN, for agreeing to serve in the role of Chair.

Thank you to Enrico DiTommaso for sharing his expertise in scale development.

Many thanks to the students who participated in the pilot study of the Knowledge about Depression Scale and to all of the students who so willingly participated in the study.

A special thanks to my niece and aspiring nurse Christine Stoddart, questionnaire collector extraordinaire and a real "trooper". Follow your dream!
For my husband, John S. Johnston, P.Eng.
# Table of Contents

Abstract ii

Acknowledgements iii

Table of Contents v

List of Tables viii

List of Figures ix

Chapter 1: Introduction 1

Statement of the Problem 2

Statement of Purpose 3

Research Question 3

Chapter 2: Literature Review 5

Prevalence of Adolescent Depression 7

Current Impact of Major Depressive Disorder on Adolescent Girls 10

Long-term Consequences of Adolescent Depression 14

Current Health Promotion Programs 16

Web-site Evaluation 17

Adolescent Girls – Their Use of the Internet 20

Barriers to the Use of the Internet 21

Internet – A Vehicle for Health Promotion 22

Conceptual Framework 24

Chapter 3: Method 31

Educational Programs 32
Internet based educational program.

Traditional paper based educational program.

Development of the Data Collection Instrument

Content validity.

Reliability method.

Measures.

Procedure.

Pilot test results.

Discussion of pilot test results.

Population and Setting

Sampling

Data Collection Process

Data Analysis

Rigor

Threats to internal validity.

Threats to external validity.

Ethical Considerations

Limitations of the Research

Chapter 4: Results

Chapter 5: Discussion

Prevalence of the Problem

Symptoms of Adolescent Depression
Disclosure of Depressive Symptoms
Significance of the Research
Implications for Future Research
Contributions to Theory Development
Final Summary

References
Appendix A Internet Based Educational Program
Appendix B Traditional Paper Based Educational Program
Appendix C Knowledge about Depression Scale
Appendix D Information Letter to Students
Appendix E Information Letter for Parents/Guardians
Appendix F Student Consent
List of Tables

Table 1 Internal Reliability Coefficient – Knowledge about Depression Scale 40

Table 2 Sampling Plan 43

Table 3 Spearman rho Nonparametric Correlation Analysis 58

Table 4 Knowledge about Depression Scale Raw Scores 59

Table 5 Pretest and Postest Mean Scores 64

Table 6 ANCOVA – Tests of Between – Subjects Effects 66
List of Figures

Figure 1 The Theory of Planned Behaviour 26
Effect of Internet Based Health Promotion on College Preparatory Stream Adolescent Girls' Knowledge of Depression

Chapter 1

Introduction

To date, health promotion programs have relied heavily upon the dissemination of health information, targeting health messages to the public in the expectation that this would somehow bring about the desired changes in people's lifestyles. Although this approach did produce changes in knowledge, attitudes and health behaviours, these changes have been slight and slow (Mechanic, 1999). It is, therefore, increasingly evident that to effectively change knowledge, attitudes and behaviour, health information must be offered in a format that is accessible, user friendly and meaningful to the target group (Edelman & Mandle, 1998; Pender, 1996).

In the past ten years, health promotion programs have targeted depression in the adolescent population. Based on the belief that such programs will help to prevent depression, these efforts have included (a) broad based mental health promotion efforts, including strategies for achieving mental wellness, and (b) programs targeting specific risk factors and known causes of adolescent depression (Andrews, Page, & Neilson, 1993; Canadian Mental Health Association, 1998; Clarke & Lewinsohn, 1989; Dryfoos & Dryfoos, 1993; Hains, 1992; Kumpfer & Hopkins, 1993; Lewinsohn, Rohde, & Seeley, 1998; Lewinsohn, Clarke, & Hoberman, 1989; Rhode, Lewinsohn, & Seeley, 1994).
Despite these sporadic efforts to address the problem of depression among adolescents, depression remains a major health issue for young Canadians (Raphael, 1996). Research also indicates that depression occurs more often in female adolescents and that the incidence of depression in this age group is increasing (Baron & Perron, 1986; Campbell, Byrne, & Baron, 1992; Lewinsohn, Rhode, & Seeley, 1998; McClure, Rogeness, & Thompson, 1997; Nolen-Hoeksema, & Gurgus, 1994; Petersen, Sarigiani, & Kennedy, 1991; Schraedley, Gotlib, & Hayward, 1999). Equally important, studies evaluating methods of program delivery related to adolescent depression are limited (Webb, Zimet, Fortenberry, & Blythe 1999). It is, therefore, appropriate to examine whether current approaches to the delivery of health information about adolescent depression are the most effective way to increase knowledge or is there a better way?

**Statement of the Problem**

Health information has been delivered to adolescent females by a variety of sources including friends, educators, physicians, nurses, parents, magazines, television, youth organizations, newspapers, and the film industry. The wide availability of the Internet has provided yet another vehicle for the delivery of health information to this population. Recent studies indicate increasing numbers of young women are actively navigating the Internet (Takayoshi, Huot, & Huot, 1999). In fact, the Internet provides the anonymity preferred by many individuals in this age group (Webb, Zimet, Fortenberry &
Blythe, 1999). Nonetheless, health information continues to be delivered primarily via traditional sources.

Unfortunately, there has been little research evaluating the effectiveness of various methods used for the delivery of health information. Consequently, there is no substantive evidence to verify the effectiveness of these methods. This study aims to contribute information that will help to fill the research gap by evaluating a program delivery approach suited to help adolescent girls acquire knowledge about adolescent depression.

**Statement of Purpose**

The purpose of this study was to assess the Internet’s effectiveness to provide health information about adolescent depression to college preparatory grade 11 and 12 girls. Easy and appealing ways of accessing information enables adolescents to both acquire more knowledge about adolescent depression and evaluate their beliefs, attitudes, and individual behaviours.

"While hardly sufficient to guarantee healthy behaviour, health knowledge is probably a precursor of healthy personal choices" (Statistical Report on the Health of Canadians, 1999, p. 150). Knowledge generated from this study will be useful for determining future directions for the delivery of health information about adolescent depression.

**Research Question**

The research question for this study was: Is there a significant difference in knowledge of depression between adolescent girls in college preparatory
grades 11 and 12 receiving information via the Internet versus information provided in a traditional paper based format. It is hypothesized that there is no significant difference in knowledge about depression in college preparatory grade 11 and 12 adolescent girls who have received the information via the Internet versus information provided in a traditional paper based format.
Chapter 2

Literature Review

The focus of this literature review was to explore current research pertinent to (a) the prevalence of adolescent depression, (b) current impact of depression on the adolescent, (c) long-term consequences of adolescent depression, (d) health promotion programs that educate adolescents about depression, and (e) an evaluation of web-sites providing information about depression to adolescent girls. Because of limited research concerning the use of the Internet as a vehicle for delivering health information and research describing the prevalence and the prevention of adolescent depression in general, a broad view of the literature was taken.

During the past ten years, as depression has become increasingly evident at younger ages, significant attention has been directed towards the diagnosis, prevention, and treatment of depression in adolescents (Birmaher et al., 1996). While the concept of adolescent depression is not well defined in the literature, there is consensus that adolescents experience depressed moods. However, controversy continues to exist when differentiating adolescent depression from adult depressive disorders (Lewinsohn, Rohde, & Seeley, 1998). It must be acknowledged that a fundamental difference between adolescents and adults is the ongoing developmental changes that adolescents experience. Often, many of the feelings associated with depression, such as
hopelessness, sadness, and anxiety, are perceived as the expected reactions to the stresses of growing up (Townsend, 2000).

For the purposes of this study, depression in adolescents encompasses Major Depressive Disorders (MDD) outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (1994).

**DSM IV Criteria - Major Depressive Episode**

Five or more of the following symptoms have been present during the same two-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure.

**Note:** Do not include symptoms that are clearly due to general medical condition, or mood incongruent delusions or hallucinations.

1. Depressed mood most of the day, nearly every day, as indicated by either subjective report or observation made by others. In children and adolescents, can be seen as irritable mood.

2. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly everyday (not merely self-reproach or guilt about being sick).

3. Diminished ability to think, or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).

4. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or specific plan for committing suicide.

5. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day.
6. Significant weight loss when not dieting or weight gains, or decreases or increases in appetite nearly every day. In children, consider failure to make expected weight gains.

7. Insomnia or hypersomnia nearly every day.

8. Fatigue or loss of energy nearly every day.

9. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).

B. The symptoms do not meet a criterion for mixed episode.

C. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

D. The symptoms are not due to direct physiological effects of a substance (e.g. drug abuse, a medication) or a general medical condition (hypothyroidism).

E. The symptoms are not better accounted for by bereavement (i.e. after the loss of a loved one), the symptoms persist for longer than two months or are characterized by marked functional impairment, morbid preoccupation with worthlessness, suicidal ideation, psychotic symptoms, or psychomotor retardation.

**Prevalence of Adolescent Depression**

While adolescence is a high-risk period for the onset of Major Depressive Disorder (Roberts, Roberts, & Chen, 1998; Sorenson, Rutter, & Anashensel, 1991), the antecedents for major depression occurring during adolescence are unclear (Burke, Burke, Regier, & Rae, 1990; Sorenson et al., 1991).

Researchers have found it difficult to document the prevalence of depression in adolescents for several reasons. Firstly, due to the controversy about the definition and diagnostic criteria of Major Depressive Disorder in adolescents,
distinctions between symptoms, disorders, and syndromes remain unclear (Lewinsohn, Rohde, & Seeley, 1998). For example, Beck (1967) suggested that depression was a complex pattern of deviations in feelings, cognition, and behaviour. Conversely, Townsend (2000) stated that depression was characterized by prolonged feelings of sadness and melancholy that was not grounded in reality. In any case, the literature has established the concept of depression as a complex phenomena that may exist in adolescents (Brage, 1995; Kashini et al., 1987; Lewinsohn, Rhode, & Seeley, 1998; Peterson et al., 1991). Secondly, researchers have historically used symptom oriented standardized interviews and questionnaires to diagnose depression (Brage, 1995). Since the various types of assessments were not equal in diagnosing depression in all subjects, considerable differences were found in prevalence rates depending upon the sample studied (Hammen & Compas, 1994; Kaslow, Deering, & Racusin, 1994).

The lifetime prevalence rate of Major Depressive Disorder in adolescents has been estimated to range from 15-20%, which is comparable with the lifetime rate of Major Depressive Disorder in adult populations (Kessler, McGonagle, Nelson, Hughes, Schwartz, & Blazer, 1994; and Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). It has been estimated that, in Canada, at least 9% of adolescent girls between the ages of fifteen and nineteen exhibit symptoms of depression (Statistical Report on the Health of Canadians, 1999). However, few longitudinal prospective studies on adolescent depression have
been done to date and the available research has been based on the
population in the United States (Hankin, Abramson, Moffitt, Silva, McGee, &
carried out by Lewinsohn, Rohde, and Seeley (1998) of The Oregon Adolescent
Depression Project cohort study found that Major Depressive Disorder is the
most prevalent form of depression among adolescents (15.3% lifetime
cumulative incidence by 16.6 years); rates among girls were consistently higher
than among boys. The sample consisted of 1709 high school students between
the ages of 14 and 18 years. These figures parallel the work of Lamb and
Pusker (1991), who found similar figures of 15.9% in their study sample.

In a ten year prospective longitudinal study including 653 subjects of
which 334 were male, Hankin, Abramson, Moffitt, Silva, McGee and Angell
(1998) found a dramatic increase in the incidence of Major Depressive Disorder
in adolescents from the ages of 15 to 18. The prevalence of female adolescent
depression was twice that of boys (Hankin et al., 1998). Similarly, Silberg and
associates (1999) assessed self reported depression in a population based
prospective study of more than 1400 male and female twin pairs ranging in age
from 8 to 16 years (Silberg et al., 1999). The objective of the study was to
compare the trajectory of depressive symptoms among boys and girls from
childhood to adolescence. Results indicated the prevalence of adolescent
depression is greater in girls compared with boys (Silberg et al., 1999).
In addition, Schraedley, Gotlib, and Hayward (1999) investigated gender differences in correlates of depressive symptoms of adolescents. Data was collected using a self-administered questionnaire of students between the ages of 9 and 20 years (M = 14). The nationally representative sample was taken from public, private, and parochial schools in the United States. Of the 6943 subjects, 49.5% were female. Results supported the findings of similar studies that documented adolescent girls had a 10% higher prevalence of depressive symptoms than boys did.

The sample sizes in these studies were adequate and drew subjects from similar age groups and gender mix. In each study, self-administered questionnaires were used to collect the data. Although instruments varied across the studies, measures of validity and reliability were included with results clearly illustrated in tables and described in text. Therefore, variability in results can be attributed to differences in the definition of depression and the various measurement techniques applied. Studies built on previous research substantiate that adolescent girls have a higher prevalence of Major Depressive Disorder than boys. Also, these studies found that depression in adolescents is associated with an increased risk for suicidal behaviour, homicidal ideation, tobacco use, and alcohol and drug abuse (Birmaher et al., 1996).

**Current Impact of Major Depressive Disorder on Adolescent Girls**

There is no specific research available on the current impact of Major Depressive Disorder on adolescent girls. Therefore, research contained within
studies examining risk factors hypothesized to be associated with adolescent depression and symptoms of depression in the adolescent population was reviewed. A multifaceted view of adolescent depression is supported in the current research literature. Adolescent depression interferes with an individual's social and academic functioning, placing him or her at greater risk for problems such as substance abuse and suicidal behaviour. Depression in adolescents also often co-occurs with other disorders such as anxiety. This comorbidity can further impede normative development and may result in a negative life course (Angold & Costello, 1993; Birmaher et al., 1996; Hammen & Compas, 1994).

The research literature identified several issues that may contribute to the development of Major Depressive Disorder in adolescent girls. For example, variables of life stress, social support, and coping have been associated with depressive symptoms (Schraedley et al., 1999). Petersen, Sarigiani, and Kennedy (1991) examined the developmental patterns of depressed affect over early and middle adolescence, focusing on patterns of boys compared with girls. Longitudinal data from this study of 160 subjects followed through grades 6-12 indicated that girls were at increased risk of developing a depressed affect by 12th grade because they experience a more stressful developmental period during adolescence than do boys. Similarly, Allgood-Merten, Lewinsohn & Hops (1990) claimed that adolescence is a more stressful developmental period for girls than for boys.
Likewise, a study conducted by Lewinsohn, Seeley, and Gotlib (1997) of 10,200 senior high school students supported the notion that other variables, such as anxiety, self-esteem, and self-consciousness, were uniquely associated with depression in adolescence (1997). Interestingly, Lewinsohn et al. (1997) did not find significant correlation between academic success and popularity with depression in their study. Conversely, in an earlier study of 688 adolescents in grades 7-12, where 438 of the subjects were female, the measure of self-consciousness showed a significant correlation with depression and was significantly associated with negative cognitive self-statements (Garber, Weiss, & Shanley, 1993).

McClure, Rogeness, and Thompson (1997) conducted the first research of characteristics of adolescent girls with depressive symptoms in a so-called normal sample. Thirty-one adolescent girls without diagnosed psychiatric disorders, ranging in age from 12 to 17 years (M=13.8), were recruited from a local school district for this study. Results indicated that 44% of the adolescent girls in the study had at least mild depressive symptoms, though they had no history of diagnosed psychiatric disorders. The authors suggested that these results reinforce the view that adolescence is a turbulent time and periods of depressed mood are a normal part of the adolescent experience. Additionally, a study carried out by Lewinsohn et al. (1994) identified psychosocial characteristics of depressed adolescents. Their sample consisted of 1508 adolescents (M = 16.6) where half of the subjects were female. Their findings
indicated that (a) almost twice as many girls were depressed, and (b) the depressed older adolescent (14-18 years) is more likely than the non-depressed adolescent to have "a history of substance abuse, anxiety disorders, a previous suicide attempt, low self-esteem, practices less effective coping mechanisms, likely to be smoking cigarettes and has less social support" (Lewinsohn et al., 1994 p. 311). In a later study, Lewinsohn et al. (1998) also found a relationship between depression and conflict with parents, poor school performance, and relationship breakups and physical illness.

In a broad review of more than eighty studies, McCullough and Larson (1999) examined the relationship between spirituality and depression. Their findings indicated that valuing spirituality and active participation in a religious group substantially reduced the risk of experiencing a Major Depressive Disorder across the life span. Children do not have the anchors or emotional support they used to have in growing up (National Institute of Mental Health, 2000). According to McCullough and Larson (1999) spiritual roots can provide meaning and social support that serve as anchors of hope but the authors caution that further research is required to identify potential explanations beyond these.

Furthermore, it has been noted in clinical practice that the rate of prescriptions for antidepressants for this population has seen an 80% increase between the late 1980's and 1996 (Mohr, 1998). Yet, the efficacy of antidepressant therapy in this population has not yet been shown to be of
benefit (Ambrosini, Emslie, Greenhill, & Kutcher, 1995; Mohr, 1998). Teens are presenting to their family physician's office with sleep disturbances, stress and anxiety, eating disorders and a multitude of other physical complaints; many of which are symptoms of depression. The lack of knowledge about the signs and symptoms of depression among this population is evident during clinical assessment. Teens willingly attribute these symptoms to the often-publicized turbulence of adolescence (Townsend, 2000).

Long-term Consequences of Adolescent Depression

The most striking consistent finding in the literature is the predominance of depression among girls by mid-adolescence and the propensity for this trend to continue through young adulthood into middle age (Antognoli-Toland, 1999; Silberg et al., 1999). In fact, in Canada, “women are twice as likely as men to be depressed and the duration of their depression is likely to be longer” (Statistical Report on the Health of Canadians, 1999, p. 292). It is, therefore, incumbent on health professionals to understand the experience of adolescent depression in order to help prevent long term chronic depression in adult females. Clearly, the economic cost of treating depression in adults is greater than the cost of providing health promotion educational programs to adolescents (Lewinsohn, Rohde, & Seeley, 1998). Although increasing health knowledge does not guarantee that individuals will pursue healthy behaviours, it is a “key precursor to healthy personal choices” (Statistical Report on the Health of Canadians, 1999, p. 150).
Harrington, Fudge, Rutter, Pickles, and Hill (1990) conducted a longitudinal study to investigate whether depression in children and adolescents was associated with an increased risk of depression in adulthood. The 104 subjects aged 6 to 16 years were divided into two groups: one with depressive symptoms and one without. At the mean age of 30.7 years, the follow-up indicated that a substantial number of the original group with depressive symptoms continued to be depressed in adult life.

In another study of 153 children, aged 6 to 19 years, it was found that children of parents with a history of affective disorder had higher rates of psychiatric diagnoses and decreased adaptive functioning than did children of parents who had never experienced a psychiatric disorder (Beardslee et al., 1988). A longitudinal study on the impact of parental affective disorder on depression in children showed that rates of Major Depressive Disorder were higher in the children of parents with affective disorder (26%) compared with those whose parents had no disorder (10%) (Beardslee, Keller, Lavori, Staley, & Stacks, 1993).

Research literature supports the notion that depression in adolescence has the potential to lead to long-term depression during adulthood. Moreover, there is an increased risk of depression in the next generation should the predominance of depression among girls by mid-adolescence continue through young adulthood into middle age (Antognoli-Toland, 1999; Silberg et al., 1999). Health professionals have recognized this trend and programs aimed at
providing health information to adolescents about depression have been carried out over the past ten years. However, there has been little evaluation of the effectiveness of health promotion efforts directed towards helping adolescents understand the experience of depression and know how to access services when they are needed.

**Current Health Promotion Programs**

There have been health promotion programs targeting HIV/AIDS education, tobacco use, and substance abuse that have been evaluated and found to be successful in changing knowledge, attitudes and beliefs in the adolescent population (Dryfoos & Dryfoos, 1993; Ganley, Young, Denny, & Wood, 1998; Kumpfer, & Hopkins, 1993). Yet, there were no current studies found that evaluated success in changing knowledge, attitudes, and beliefs in the adolescent population about depression in adolescents. However, there has been some success noted in programs aimed at the treatment of depression.

Lewinsohn, Clarke, and Hoberman, (1989) and Lewinsohn, Rohde, & Seeley, (1998) described an intervention suitable for adolescents with major depression — the Coping with Depression Course. The program focused on cognitive-behavioural interventions and results sustained over six months in large samples have been positive in that subjects developed additional coping skills. Techniques, such as the value of implementing peer helper groups, were found that can be applied to the delivery of health information for adolescents (Clarke et al., 1995; Lewinsohn et al., 1998; Rhode, Lewinsohn, & Seeley,
Programs aimed at the treatment of depression have the potential to increase knowledge about depression thereby influencing future attitudes and beliefs.

This review of the research literature confirms there has been little evaluation of the effectiveness of current health promotion programs directed towards helping adolescents understand both the experience of depression and know how to access services when they are needed. Consequently, there is little evidence to verify the effectiveness of these programs.

**Web-site Evaluation**

Only one study was located that presented findings from a survey of Internet resources from a health promotion perspective. Mallory, (1997) conducted a survey of Internet services for people affected by HIV/AIDS, to discover the availability of resources specific to female needs. In a descriptive cross-sectional study, the Internet services for people affected by HIV/AIDS were examined using content analysis. Of 69 sites located for girls, only twelve were rated to be excellent. The author argued that her findings were a reflection of the social invisibility of women affected by HIV/AIDS.

The theoretical literature does offer a potential explanation for these results. The rapid pace of technological change makes it difficult to make an accurate assessment of available resources on the Internet at any given point in time. Web-sites are constantly being added, updated, or deleted and information that is available online today may be offline tomorrow.
For the purposes of this review, four web-sites related specifically to educating teens about depression were evaluated. Cyberisle (www.teennet.ca) paints a vivid portrait of the trials, tribulations, and experiences particular to the experiences of adolescent depression. The most useful component of this web-site is the opportunity for adolescents to discuss issues that affect them and to obtain peer support. The graphic design is attractive and the site is easy to navigate which in itself, makes it very appealing to teens. Cyberisle has had 106,000 visits between July and October 1999 and 63.4% of those who visited were teen girls (Dr. Harvey Skinner, personal communication, October 1999).

The web-site developed and maintained by the National Institute of Mental Health (www.nimh.nih.gov/dart/letstalk.htm) provides an avenue for adolescents and their families to become educated about the symptoms and the experience of having depression. It uses straightforward and understandable language to explain issues of diagnosis and treatment and debunks the myths associated with adolescent depression and suicide. In addition, the web-site focuses on other issues related to depression, such as substance abuse. The site is both motivating and informative, offering visitors opportunity to take a quiz to determine whether they have symptoms of depression. A portal to other sites containing related information is available. In sharp contrast to this, the Canadian Mental Health Association web-site (www.cmha.ca) bills itself as being geared toward consumers of mental health services, yet primarily focuses on information for practitioners and researchers.
However, it does offer information regarding local chapters and features links to current research and a calendar of current events.

The most interesting web-site located was www.phenomenalwomen.com, which caters to adolescent girls. The Phenomenal Women of the Web Poem captures the emotional power of the site:

All women are diverse and complex as snowflakes.
Let no person ever be so narrow minded,
That they do not see the other’s beauty and form
Because they think their own is the only pattern.
The challenge of the mind bears the fruit of knowledge.
Reach high girls, and grow into strong women.
There are no bounds to learning - if the reach is constant and determined.
A woman rich within herself, is a Phenomenal Woman.

www.phenomenalwomen.com

More and more individuals are recognizing the potential of the Internet to both access and distribute a wealth of valuable information that might not be readily available through traditional sources. Despite this, society continues to hold the expectation that girls lack the technical know how to use computers (Levine & Donitsa-Schmidt, 1998). From an early age, children are taught this gender script in schools, on television and in cartoons. Whitley (1996) found that research on gender differences in attitudes towards computer usage is either contradictory, or, if differences do exist, are statistically insignificant. However, a recent survey conducted at Georgia Technical University found that girls represent 51% of new web users (Takayoshi et al., 1999).
Adolescent Girls – Their Use of the Internet

Adolescent girls have discovered the Internet as a means to "create places of their own" (Takayoshi et al., 1999, p.90) and the web-site www.phenomenalwomen.com provides evidence of this. The Internet has the potential to facilitate empowerment by providing information and access to personal social support. Self-consciousness, self-esteem and anxiety have been found to be correlates of depression in adolescent girls (Garber et al., 1993; Kearney-Cooke, 1999; Lewinsohn, Seeley, and Gotlib, 1997; Schraedley et al., 1999). Therefore, it seems plausible that the Internet could provide a means of anxiety free, nonjudgmental social support for adolescent girls (DuGas, Esson, & Ronaldson, 1999; Igbaria & livari, 1995). Carlip (1995) also refers to a number of studies where it was found that girls have a tendency to become self-conscious and turn inward during adolescence. In her book, Girl Power: Young Women Speak Out, Carlip (1995) advocates that young girls communicate their feelings and speak freely; the Internet provides this opportunity. In other words, the Internet assists in operationalizing the feminist perspective of giving voice (Jackson & Jones, 1998). According to Takayoshi et al. (1999), "search engines from WebCrawler™ to Yahoo™ acknowledge that girls' spaces on the Web are distinct from boys spaces by collecting links to web-sites where girls are authors or audience" (p.90).
Barriers to the Use of the Internet

Despite the potential value of the Internet, it can also be used to misinform and harm individuals. By its very nature, the Internet provides an opportunity for sexual predators to prey on adolescents. Many such individuals have had great success in luring teens into a variety of dangerous situations (F. Mackin, 2000, personal communication). The accessibility of pornographic images and text that can be effortlessly downloaded is also attractive to inquisitive teenagers.

Not everyone has ready access to the Internet. This fact has the potential to exacerbate inequalities in the health and well being of a population (DuGas, Esson, & Ronaldson, 1999). In the final report of the learning and training working group from the Information Highway Advisory Council – Canada (1995), households in the highest income quintile were five times more likely to have a home computer than those in the lowest quintile. Five years later, 58% of Canadian households have at least one personal computer (PC) and view the Internet as a valuable resource for health information (News Canada, 2000). In addition, the availability of Internet access for all individuals is increasing via schools, libraries, and cyber-cafes, thereby reducing this inequity.

Aside from Internet access, skill level may pose another barrier to use of the Internet for delivery of health promotion programs. Levine and Donitsa-Schmidt (1997) applied the Theory of Reasoned Action in their study of the
relationship between computer experience, computer-related attitudes, confidence, and perceived computer-based knowledge among 309 students in grades 7-12. Their findings that computer experience has a positive effect on computer confidence and attitudes towards computers have implications for educational programs and educators. This, combined with a crossover effect found between computer confidence and computer attitudes, positively effects computer-based knowledge (Levine & Donitsa-Schmidt, 1997). These findings support research by Igbaria and Livari (1995) who examined the effect of self-efficacy on computer usage. In a sample of 450 microcomputer users in Finland, they found that self-efficacy had effects on usage, highlighting how much the belief in one's own capabilities of using a computer influences computer usage.

Internet — A Vehicle for Health Promotion

The Internet is helping to shape the future of health promotion. Health Canada's directory alone lists over two hundred organizations involved with health promotion activities. Many of these organizations have their own website; each of these sites has numerous hyperlinks to other sites with similar health promotion information and again, more links. The magnitude of information accessible through the Internet is indeed difficult to comprehend but the opportunity to provide information towards increasing health knowledge is well within the grasp of health professionals.
In summary, this literature review explored the current research pertinent to the prevalence of adolescent depression, the current impact of depression on the adolescent, long-term consequences of adolescent depression, the health promotion programs that educate adolescents about depression, and an evaluation of web-sites providing information about depression to adolescent girls. The prevalence and incidence of adolescent depression is much higher than originally thought (Lewinsohn, Rohde, & Seeley, 1998). Most of the current research located in this broad view of the literature focused on the concept of adolescent depression and risk factors that predispose adolescents to depression. Theoretical and empirical knowledge about the concept of adolescent depression is growing rapidly and research on risk factors is extensive. However, research on the prevention of depression is scarce. This suggests that strategies for prevention of adolescent depression may not be available, or research demonstrating the value of such strategies is not yet convincing. Targeting the knowledge level of adolescents in health promotion and prevention programs for depression may well aid in addressing this public health problem since "health knowledge is a precursor of healthy personal choices" (Statistical Report on the Health of Canadians, 1999, p. 150).

Furthermore, there is limited research about the use of the Internet as a vehicle for delivering health information. Testing the effectiveness of this vehicle is, therefore, an important step to contribute information that will help to fill current gaps in the research literature.
Conceptual Framework

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) provided the conceptual framework for this study. The Theory of Planned Behaviour is an extension of the Theory of Reasoned Action (TRA) developed by two social psychologists, Ajzen, and Fishbein, in 1967 (Fishbein & Ajzen, 1975). TRA puts forth the notion that individuals are rational and make systematic use of information available to consider the implications of actions prior to making a decision to perform certain behaviours (Fishbein & Ajzen, 1975). The intent of TRA was to provide an explanation for predicting and understanding attitudes and behaviour (Fishbein & Ajzen, 1975). The TRA framework viewed behavioural intentions, rather than attitudes, as the main predictors of behaviours.

TRA was useful in describing behaviours under an individual’s volitional control, but fell short when attempting to describe behaviours an individual felt little or no control over (Godin & Kok, 1996). To account for this shortcoming, Ajzen extended the theory to include the concept of perceived behavioural control (Ajzen, 1991). Perceived behavioural control is akin to Bandura’s concept of self-efficacy which suggests that behavioural change is facilitated by a personal sense of control and that varying levels of self efficacy can enhance or impede motivation to act and, consequently perform an intended health behaviour (Bandura, 1994).
The purpose of this study was to evaluate the effectiveness of the Internet in providing health information about depression to adolescent girls in college preparatory grades 11 and 12. Application of the TPB framework in this study is limited to providing a useful framework for conceptualizing the influence of knowledge on individuals' beliefs. Beliefs do affect attitudes and the individual's behavioural intentions to perform certain behaviour; however, discussion of these concepts is beyond the scope of this research.

TPB contends that beliefs about behaviour lead to attitudes toward it and in turn, attitude leads to behavioural intentions regarding the behaviour. Therefore, if an individual holds strong beliefs that positive outcomes will result from performing a specific behaviour, that individual usually holds a positive attitude towards that behaviour (Levine & Donitsa-Schmidt, 1998). There are three predictors to behavioural intention: namely (1) attitude, (2) subjective norm, and (3) self-efficacy. According to TPB, attitudes toward the behaviour, subjective norms, and self-efficacy predict behavioural intentions. Behavioural intentions and perceived behavioural control predict performance of the target behaviour (Figure 1: Godin & Kok, 1996, p.88). That is, self-efficacy can influence behaviour through intentions but it can also influence behaviour directly and circumvent intentions.
Figure 1

The Theory of Planned Behaviour

Attitude towards the behaviour is the first predictor of behavioural intention and is the "expression of one's positive or negative evaluation of performing a given behaviour" (Godin & Kok, 1996, p.88). Attitudes do not directly determine behaviour; rather they influence behavioural intentions, which are the immediate antecedents of action. However, attitude alone is not the only determinant of behavioural intentions. Subjective norms and self-efficacy also have a significant impact on behavioural intentions (Madden, Ellen, & Ajzen, 1992).

Subjective norm is considered to be the second predictor of behavioural intention, and is described as the influence of social pressure perceived by an individual to perform or not to perform a certain behaviour (Godin & Kok, 1996). Therefore, subjective norms are determined by a set of normative beliefs concerning approval or disapproval by parents, members of the social peer group, and others whose opinion is deemed important concerning the
behaviour. This is weighted against the motivation an individual has to comply with the social pressure and the opinions of others (DeVries, Backbier, Kok, & Dijkstra, 1995). This means that a person's subjective norms (with respect to increasing knowledge about depression) are influenced by his or her belief that others support or oppose the increase in knowledge, weighted against the individual's motivation to please others or to reject other's opinions. By creating a social environment where it is important for adolescents to increase their knowledge about depression, the effect of perceived approval from others could influence the motivation of individuals to increase their knowledge.

Self-efficacy is the third predictor of behavioural intention. An important construct of TPB, it is defined as the individual's belief concerning how easy or difficult performing the behaviour will be (Godin & Kok, 1996). According to Glanz, Lewis, and Rimer (1997), "self-efficacy is an independent determinant of behavioural intention along with attitude toward the behaviour and subjective norm" (p. 91). According to TPB then, the ultimate determinants of any behaviour then are attitudes, subjective norms, and self-efficacy. Therefore, by influencing one or all of these components, behavioural intentions and even overt behaviours can be indirectly influenced.

In contrast, relationships among health knowledge, health attitudes and health behaviours revealed that attitudes, rather than knowledge, shaped behaviour (Ajzen & Fishbein, 1973). To date, results of studies using TPB indicate that an increase in knowledge does not automatically transfer to
changes in behaviour (Albarracin, Fishbein, & Middlestadt, 1998; Armitage & Conner, 1999; Brenes, Strube, & Storandt, 1998; Parker, Manstead, Stradling, Reason, & Baxter, 1992). However, increasing knowledge may well influence individuals' beliefs, thereby changing attitude toward the behaviour and positively influencing intention to perform the behaviour.

"Beliefs are the lens through which the world is constructed" (Levine & Donitsa-Schmidt, 1997, p. 128), representing all of the knowledge an individual has about something, holds to be true, and utilizes to guide behaviour. Therefore, individuals' beliefs about depression are based on their knowledge of depression. Beliefs form the basis of behaviour and are the precursors of intentions. If an adolescent believes that it is a personal flaw to feel depressed, that individual is not apt to seek out information or help for fear of reprisal. Since beliefs are derived from knowledge, increasing knowledge may change beliefs.

TPB has successfully provided the framework for at least fifty-eight studies of health and risks behaviours (Godin & Kok, 1996). For example, Norman, Bennett and Lewis (1998) applied the theory of planned behaviour to identify the key beliefs underlying binge drinking in a sample of 136 undergraduates (M = 20) at a Welsh university. The importance of self-efficacy and positive control beliefs were the two essential factors that emerged from the results of this study. Specifically, Norman et al. (1998) report that binge drinking is a social behaviour facilitated by the environment, and the effective interventions may be those that attempt to influence the context of the binge
drinking. As such, these researchers suggested that media images modeling appropriate drinking behaviour and formal educational programs could be used to modify social norms surrounding alcohol consumption. Hence, it is important to increase knowledge in order to influence beliefs.

In addition, the theory of planned behaviour purports to account for underlying beliefs that lead not just to attitudes, but to subjective norms, and self-efficacy. In a study by Courneya & Friedenreich (1997), the Theory of Planned Behaviour was applied to determinants of exercise during colorectal cancer recovery. The 110 study subjects (M = 60.9) were survivors of colorectal cancer who were not undergoing any form of chemotherapy or radiotherapy at the time of the study. Intention to exercise and self-efficacy were found as two of the direct determinants of exercise during colorectal cancer recovery. In addition, Brenes, Strube, and Storandt (1998) applied TPB to exercise among older adults. In their sample of 105 older adults, it was found that self-efficacy accounted for 27% of the variance in exercise behaviour as opposed to the measures of attitude and subjective norm.

Yet, the literature also supports the notion that subjective norms do influence a person's intention to perform certain behaviours. In a study of 881 car drivers, the theory of planned behaviour was assessed for its ability to account for drivers' intentions to commit specific driving violations, such as drinking and driving, speeding, close following and overtaking in risky situations. The relationship between behavioural intentions and subjective norm was
consistently stronger than between behavioural intentions and attitudes (Parker, Manstead, Stradling, Reason, & Baxter, 1992). Disapproval of risky driving habits by others was an important factor in the individual’s intention to refrain from committing driving violations.

In summary, the Theory of Planned Behaviour has received empirical support in health behaviour literature. There is evidence that information individuals have gained through health education has contributed to these behaviours. Therefore, increasing knowledge may well influence an individual’s beliefs, thereby changing their attitude toward behaviour and positively affecting their intention to perform the behaviour. TPB can be applied to health education because it is useful in (i) predicting and understanding the factors that influence healthy and unhealthy behaviour that are outside an individuals’ volitional control, and (ii) the outcome of those behaviours (Glanz, Lewis & Rimer, 1997). TPB holds important implications for health education by identifying how and where to target strategies for changing behaviours through examining health-related beliefs and delivering health information to address the knowledge needed to impact beliefs.
Chapter 3

Method

A quasi-experimental, comparison group design was used to assess the effectiveness of the Internet for the provision of information about adolescent depression to college preparatory grade 11 and 12 adolescent girls. A quasi-experimental research design was chosen as an appropriate research strategy because the stronger design of the true experiment was not an option (Anderson, 1998; Brink & Wood, 1998; Gall, Gall, & Borg, 1999; Nieswiadomy, 1998; Norwood, 2000). The very nature of the quasi-experimental design lends itself to close approximation to the real world of subjects (Nieswiadomy, 1998). Since this study was carried out in the public school system, where a random assignment of students to a particular classroom was not possible, quasi-experimental design was an appropriate strategy to answer the research question.

A pretest-posttest design with non-equivalent groups was the quasi-experimental design warranted to discover whether there was a significant difference between the Internet and traditional paper based methods for providing information about depression to the study population. In this study, the dependent variable was the student’s knowledge level as measured by the Knowledge about Depression Scale (KaDS). The independent variable was the vehicle used to deliver the information about depression (Internet based educational program or traditional paper based educational program).
Educational Programs

Internet based educational program.

The Internet is a rich medium capable of providing individuals a unique visitor experience. Microsoft’s® FrontPage® 2000 product was used to create the web-site used in this study. Initially the web-site was created as an adjunct educational tool to a prototypical health manual based on the comprehensive school health model. The goal of the web-site was to provide an easy to navigate and easy to read means for adolescents to find answers to everyday health questions that arise for individuals in this age group. The combination of ‘high tech’ web-site, health information, and the opportunity for questions and comments made this web-site appealing to adolescents. The web-site is based on individual choice and offers the opportunity for teens to explore options regarding health behaviours based on their specific interests and needs.

The initial development of web-site content focused on providing information about the major health issues for Canadian adolescents identified in the literature (Raphael, 1996). These issues included, but were not limited to (a) tobacco and alcohol use, (b) healthy sexuality, (c) physical activity and nutrition, (d) suicide and mental health, and (e) healthy weights (McMurray, 1999; Raphael, 1996). Content was drawn from professional journals, health promotion brochures, and the Internet during the initial construction of the web-site.
The female adolescent population (n > 40; Mean Age – 16.5 years) found in a general practitioner's office reviewed the content and corroborated the findings in the literature. Personal contact with adolescent girls during a six-week clinical practice experience provided the opportunity for evaluating the appropriateness of content. In fact, the current web-site content was identified by adolescent girls, as being important to their health information needs. Since more than half of these individuals were taking prescribed antidepressants and had limited knowledge of depression, the information about depression was of particular interest to them. Therefore, development of web-site content was guided by two principles (a) participation – involvement by teens, and (b) relevance – focused on issues identified by teens.

In addition, a registered nurse in a general practitioner's office used the web-site as a teaching tool with adolescent patients during the fall of 1999. In anticipation of this research study, access had been blocked to the depression-related content of the web-site. For the purpose of this research study, subjects' access to the web-site information was focused on depression information only. The web-site was not an all-inclusive effort at providing health information about depression, but did reflect the expressed needs for information from the target population for this study.

The web-site (Appendix A) was created on the NBNet network, where the study subjects could readily access it with the web address or Uniform Resource Locator (URL). The web-site was structured in a hierarchical fashion
beginning with a Home page. From the Home page, subjects could navigate to various topical areas, one of which was depression. Moreover, subjects could jump to other related items either on this or on other web-sites as necessary to help them understand or clarify certain points.

The web-site was constructed in keeping with the principles of good web-site design recommended by Microsoft®. Several factors distinguish good web-site design:

- **Focus** – information has a purpose and is grouped logically so that the participant can jump immediately to a point of interest.

- **Consistency** – both content and navigation should be consistent. Navigation should be logical on each page and between pages and topical areas. Colour schemes should be pleasing to the eye and encourage the participant to remain at the site.

- **Efficiency** – the site should be constructed such that a normal dial up network connection can provide the participant with a pleasant surfing experience. This is accomplished by striking a balance between graphic content (which slows the site) versus site appeal which makes the material more interesting (especially when compared with paper based media).
Navigation – as mentioned above, navigation around the site should be consistent. This site utilizes shared borders (rather than frames which are cumbersome and awkward for most users). Themes are applied to give the navigation bars and button a consistent look and feel, while maintaining an efficient use of bandwidth. This ensures that the content is experienced as intended.

Portability – a good site supports all subjects who have a basic skill set in accessing and navigating the Internet, regardless of the technology that is being used. In this instance, the site is designed such that it supports multiple versions of today’s leading browser software.

Maintenance – to encourage repeat visits to the site, the content, or its presentation should be kept fresh. As new content becomes available, it should be integrated into the site. For the purpose of this exercise, the content was fixed; however, the site design was set up such that maintenance was simplified.

Feedback – the ability for the user to interact with a site is a major factor in the overall success of the site. The host server used for this study supported the use of email to the webmaster.

Traditional paper based educational program.

The traditional paper based educational program (Appendix B) was directed towards providing adolescent girls with information about depression.
Program content was a duplication of the web-site created on the NBNNet network. With the exception of the graphics and navigational capability, the program contained exactly the same information.

The traditional paper based program afforded subjects the opportunity to scan the contents of the entire program to discover points of interest. The information was presented on brightly coloured paper in a consistent format using black typeset and a 12 point Arial font.

**Development of the Data Collection Instrument**

No existing knowledge scales were found in the literature to measure knowledge of depression in adolescents. Drawing on personal expertise in Mental Health Nursing, and following an extensive review of the literature, KaDS scale was developed. The Knowledge about Depression Scale (KaDS) was developed specifically to answer this research question: Is there a significant difference between the Internet and traditional paper based methods for providing information about depression to grade 11 and 12 adolescent girls? Validity and reliability of the data collection instrument are the two most important quality indicators in a quantitative study (Polit & Hungler, 1999; Reynolds & Mazza, 1998). To assess the level of reliability and validity of this instrument a pilot test was carried out on 45 subjects with characteristics similar to those of the proposed study sample. In addition, piloting allowed the researcher to detect problems with clarity of instructions and readability of the questionnaire (Nieswiadomy, 1998).
For the purposes of this study, validity is described in terms of how well the instrument measured the construct of interest, knowledge about depression. Reliability is described in terms of the homogeneity of the measuring instrument. An instrument is homogeneous when all items measure the same characteristic or construct (Litwin, 1995). Homogeneity reflects the internal consistency of an instrument, and, when a test is said to be internally consistent, it will yield consistent results.

**Content validity.**

Content validity was assessed using a panel of five experts (four practicing Mental Health Nurses specializing in adolescent mental health and one Ph.D. prepared psychologist who is also an expert in adolescent mental health). Based on their review, a content validity index was completed using this process:

Each panel member was asked to evaluate the relevancy of each item for the construct – knowledge of depression, by assessing each question according to this scale: (1) not relevant, (2) somewhat relevant, (3) quite relevant, and (4) very relevant. Interrater agreement was calculated for item relevancy using this formula:

\[
\text{Content Validity Index} = \frac{\text{Number of items rated 3 or 4}}{\text{Total number of items}} = \frac{29}{35} = .8286
\]

This result indicates that this instrument has good content validity since results
equal to or greater than .80 on the Content Validity Index are considered to be a good measure of content validity (Norwood, 2000).

**Reliability method.**

Forty-five female adolescent volunteers enrolled in the college preparatory stream at a local high school participated in the pilot test of KaDS. The students ranged in age from 16 to 18 years with a mean grade level of 11.40.

**Measures.**

The questionnaire consisted of two sections. Section A included a demographic questionnaire that contained questions such as: age, gender, grade level, family history of depression, having a friend with a history of depression, past treatment for depression, currently taking antidepressants, and personal importance of spirituality. Section B consisted of 35 items where subjects selected the correct answer from three options. Possible scores ranged from zero (no correct answers) to 35 (all answers correct).

**Procedure.**

The research study was explained to the potential subjects via an information letter handed out by the researcher one week before the scheduled pilot test. The information letter was read to the potential subjects and they had an opportunity to ask any questions at that time. In addition, the researcher and faculty advisor telephone numbers were made available to any student who may have had further questions. The weekend before the pilot test, a letter of
explanation to the parents/guardians about the pilot test and request for consent was sent home with those students wishing to participate. The teacher, upon request, handed out these letters to the students.

Three days later before formal class time at 12:30 p.m., the students wishing to participate in the pilot test assembled in the designated classroom. The purpose of the pilot was explained again and an opportunity for questions was provided. Parental/Guardian consent letters were collected and each student was given a consent form to complete in order to participate in the pilot of KaDS. Students were again reminded of the volunteer nature of participation and advised they were free to change their minds about participating. Consent forms were completed. The questionnaire was distributed and the students completed them accordingly. All forty-five students who volunteered to complete the questionnaire did so.

Pilot test results.

The mean age of the subjects was 16.58 years. The demographic data was analyzed using Section A of KaDS. According to the results of the analysis of the demographic data 22.4% of the subjects reported a history of familial depression and 12.4% of the subjects were being treated for depression themselves at the time of the pilot test. In addition, 12.8% of the students had been treated for depression in the past and 28% of the subjects reported that they had friends who had been treated for depression at one time. Spirituality played an important role in 42% of the participant's lives.
Internet Based Health Promotion

Table 1 displays the Cronbach Alpha Coefficient for KaDS.

Table 1

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>KaDS</td>
<td>.7481</td>
</tr>
</tbody>
</table>

Discussion of pilot test results.

The characteristics of desirable scales are reliability and validity. The reliability measurement should be accurate and relatively error free. The Internal Consistency of KaDS was .7481 (>= .70) indicating that the items were homogeneous and the test as a whole measured only one construct (Polit & Hungler, 1999). According to Brink and Wood (1998), “the criterion level for coefficient alpha with a new scale has been suggested to be at about .70 or above…” (p. 268). In addition, factor analysis was conducted to confirm the intended dimensionality of the scale. Poor items (e.g., those with little variability, or those that did not correlate with other items) were discarded. Of the 35 original items, the final KaDS was comprised of the demographic questions and sixteen knowledge items (Appendix C). A scale consisting of sixteen items with an internal consistency rating of .7481 shows a high degree of reliability. Results from this pilot test demonstrated the reliability and validity of KaDS.
Population and Setting

The study population consisted of adolescent girls in grades 11 and 12 enrolled in the college preparatory stream at an all girls' public high school in eastern Canada. The school draws students from a catchment area that includes all regions of the city proper and outlying suburban areas. Consequently, a wide spectrum of socioeconomic levels is evident among the student body.

Sampling

The purpose of sampling in a quantitative study is to generate a statistically representative group that permits confident generalization to a larger population (Ostbye, 1992). However, the extent to which any quantitative sample allows generalizations is determined primarily by the sample's representativeness, which, in turn, is related to sampling error and sampling bias (Norwood, 2000). Opportunities for generalizations of results increase when careful consideration is given to (i) selecting an appropriate sampling method, (ii) developing inclusion criteria that generate a homogeneous sample, (iii) considering sample size and (iv) using a reliable data collection instrument (Drew, Hardman, & Hart, 1996; Fink, 1993; Norwood, 2000). It was impractical to sample the entire population of female adolescents in grades 11 and 12 enrolled in the college preparatory stream in area high schools. Therefore, only grade 11 and 12 students enrolled in a college preparatory stream at one exclusively female high school were asked to participate.
Subjects for the study were selected based on the inclusion criteria of (i) being female, (ii) enrolled in grade 11 or 12 in the college preparatory stream, (iii) able to navigate the Internet, and (iv) having obtained written parental/guardian consent. The exclusion criterion for this study included being (i) enrolled in grade 9 or 10 and not in the college preparatory stream, (ii) unable to navigate the Internet and (iii) without written parental/guardian consent.

In this study, cluster sampling, a variation of random sampling, was used as a means for obtaining a sample that was unbiased and representative of the target population (Fink, 1993; Norwood, 2000). With this sampling technique, all members of the population were identified, and groups were initially selected from the population. Therefore, each member of the population had an equal chance of being selected for the study.

In a two-step process of random selection, the subjects were chosen. In step one, seven grade 11 and 12 classrooms within the high school were randomly selected. A numerically arranged list of all college preparatory stream classroom numbers for grades 11 and 12 in ascending order was provided by the school administration. This list was sampled by fixed intervals. To minimize sampling bias, the first classroom was selected at random and then every second classroom in the total list selected until the desired sample was obtained (Norwood, 2000; Polit & Hungler, 1999). Step two involved the random selection of twelve subjects from those classrooms by selecting the student in
the second seat in the first row of the designated classroom and then every
second student in the total class was selected until the desired sample was
obtained (Norwood, 2000; Polit & Hungler, 1999).

Table 2

**Sampling Plan**

<table>
<thead>
<tr>
<th>Sampling Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Population</strong></td>
</tr>
<tr>
<td><strong>Step One</strong></td>
</tr>
<tr>
<td><strong>Step Two</strong></td>
</tr>
</tbody>
</table>

Lastly, consideration must be given to sample size. The appropriate
number of subjects for a study is based on a variety of factors, including type of
research design, statistics and significance level, and variables being measured
(Nieswiadomy, 1998). In this study, sample size was dictated by the choice of
statistics. In consideration of reducing the risk of Type I errors, claiming there
was a significant difference when in fact there was not, the alpha level for this
study was established at $p < 5\%$. The hypothesis is non-directional, with a two-
tailed level of significance of 1.68. The risks of Type II error was minimized by
the research design, data variability, sample size and the type of statistical test
being used. The primary method of reducing the risk of a Type II error is
increasing the sample size – the larger the sample, the more powerful the
statistical test (Diekhoff, 1992). “There are few instances in behavioural
research when a sample size smaller than 30 or larger than 500 can be justified" (Nieswiadomy, 1998, p. 181). Even with a sample size of 30, the benefits of the central limit theorem can be realized and the sampling distribution of the mean will closely approximate the normal curve (Nieswiadomy, 1998). According to standard sample size tables where $\alpha = .05$ (two tailed test), standardized effect size is established as medium (.50), and power is .80, then a minimum of 26 subjects are required for each group (Norwood, 2000). A sample size of 84 subjects was used in this study.

**Data Collection Process**

To obtain meaningful answers to the research question in this study, careful consideration was given to developing the data collection procedures. In this study, knowledge about depression among the subjects in both the comparison and experimental groups was tested using KaDS. According to Norwood (2000), questionnaires are the most frequently used data-collection strategy.

On Day One eighty-four potential subjects attended a general information session, where the research study was explained and an information letter describing the study was distributed (Appendix D). All potential subjects had an opportunity to ask questions during this session. In addition, researcher and faculty advisor telephone numbers were provided so that any student who had additional questions could have requested further information. Two days after the general information session, a letter of
explanation to the parents/guardians about the study and request for parental/guardian consent (Appendix E) was sent home with all potential subjects.

On Day Five seventy-two subjects who met the inclusion criteria and voluntarily agreed to participate in the study met in the designated area. The purpose of the study was explained again, the exclusion criteria reviewed, and opportunity for questions was provided. The subjects were again reminded of the volunteer nature of study participation and advised that they were free to change their minds about participating. Each subject was given a consent form (Appendix F) to complete. The subjects in this study were guaranteed anonymity and provided with the following instructions to develop a unique code on both the consent and the knowledge scale:

First, please provide a five character unique code designed by you in the space below by writing the first letter of your favorite color, followed by the last letter of your least favorite color, followed by the first two letters of the month of your birth, followed by the last letter of your first name.

Consent forms were collected and the pretest administered to all seventy-two subjects. In order to match pretest and posttest results, subjects were asked to use their unique code consistently throughout the study on both the pretest and the posttest instrument. The pretest instrument required about 20 minutes to complete.

According to Brink and Wood (1998), a two week waiting period between administration of the pretest and the intervention and posttest minimizes
carryover effects where subjects recall the responses made on the initial pretest. Therefore, two weeks later, the subjects were randomized into the experimental or comparison group. Subjects were asked to maintain confidentiality regarding the specific intervention they received until the posttest was completed.

Thirty-six subjects comprising the comparison group were given health information about adolescent depression in the traditional paper based format on fluorescent pink paper. Likewise, thirty-six subjects in the experimental group were provided with the URL address for the study web-site. Subjects were reminded of the importance of maintaining confidentiality about the specific intervention received until completion of the posttest the next morning. The posttest was administered to each group in isolation from one another and thirty minutes apart. This procedure allowed for spatial separation of the comparison and experimental groups in order to minimize opportunity for contamination of experimental group subjects by those in the comparison group (Brink & Wood, 1998).

Data Analysis

Research data was collected using KaDS. Statistical Package for the Social Sciences (SPSS) Version 10.0 was used to organize and interpret numerical information and describe the study population (Fink, 1995). The sample was composed of seventy-two adolescent girls in grades 11 and 12
enrolled in the college preparatory stream at an all girl's high school in eastern Canada.

Nominal data was collected from Section A of KaDS and this data was organized to create a picture of the average study participant. All subjects were female, in either grade 11 or 12 with an average age of 16.97 years. Correlation analysis was used to identify relationships between the dependent variable (level of knowledge) and the descriptive data. Correlation analysis specifically answered the questions: Is there a relationship between knowledge of depression and (a) age, (b) having an immediate family member suffering from depression, (c) having a close friend who has been treated for depression, (d) having ever been treated for depression, (e) currently taking antidepressants prescribed by your physician for the treatment of depression, and (f) the importance of religion in your life?

Data collected in Section B of KaDS in response to the sixteen knowledge items on the scale was summed and treated as continuous, parametric data. To determine whether there were differences in knowledge about depression between the experimental and comparison groups, subject’s test items were analyzed using inferential statistics to promote generalizations about a population from the study sample (Diekhoff, 1992). In this study, numerical results from each of the sixteen knowledge items on the pretest were calculated to determine both individual subjects’ overall knowledge of depression scores and the sample’s mean knowledge of depression scores.
Differences in knowledge about depression between the experimental and comparison groups were analyzed using analysis of covariance (ANCOVA), recommended for data analysis in pretest-posttest designs as it "achieves a more powerful comparison of the intervention groups (Brink & Wood, 1998, p.118). The initial assumption in the research design was that groups of subjects were equal, therefore, they would have done equally well on the pretests, and any differences would be due to sampling error. Differences in scores on the posttest would, therefore, reflect the study intervention. With a study population such as the one in this research, it was expected that there would be some differences on pretest means between two groups, respectively the comparison and experimental group. Since there was a significant difference between pretest means of the comparison and experimental groups the ANCOVA technique was used for the detection of differences between groups.

ANCOVA answers the same research question as ANOVA and is used to equate groups (Munro, 1997). Although a random sampling technique was used to obtain the sample, there may have been initial differences among the groups. For example, although all potential subjects were enrolled in the college preparatory stream, groups might have differed on scholastic ability (Munro, 1997).

The use of inferential statistics in any study presents a risk of error that falls into two categories, namely (a) Type I errors, and (b) Type II errors (Drew,
Hardman, & Hart, 1996). In this study, the results of the statistical analysis will provide evidence to retain or reject the null hypothesis, thereby exposing the results to either a Type I or Type II error.

**Null Hypothesis** - there is no significant difference in knowledge about depression in grade 11 and 12 adolescent girls who have received the information over the Internet versus information provided in a traditional paper based format.

**Alternative Hypothesis** – adolescent girls in grade 11 and 12 who have received information about depression via the Internet will have a significantly greater increase in knowledge about depression than those who receive information about depression from a traditional paper based format.

**Rigor**

Error that occurs anywhere in the research process has the potential to compromise the quality of the outcomes of a study and limits the usability of the data. In particular, data collection strategies (instruments and procedures) are particularly susceptible to a variety of influences that can affect the information they provide.

**Threats to internal validity.**

To increase the likelihood that study findings resulted solely from the intervention, several threats to internal validity associated with non-equivalent groups design needed to be managed (Brink & Wood, 1998).
Firstly, selection-bias was a significant threat to internal validity (Brink and Wood, 1998). Selection-bias is problematic in any study that relies on volunteer subjects who self-select into the comparison and experimental groups in a pretest/posttest design such as this (Polit & Hungler, 1999). The concern arises from the idea that a subject may self-select into a group based on some intrinsic characteristic that has the potential to affect the dependent variable such as an initial high level of knowledge about depression (Fink, 1993).

In this study, selection bias was addressed by using cluster sampling to generate the study sample. In step one, grade 11 and 12 classrooms within the high school were randomly selected, and secondly, subjects from those classrooms were randomly selected until the sample was obtained (Norwood, 2000; Polit & Hungler, 1999).

Cluster sampling, a form of random sampling, did hold an element of self-selection. Specifically, although eighty-four subjects were randomly selected, only seventy-two subjects chose to participate. In this way, subjects did hold an element of self-selection. However, subjects held no control over their membership in either the comparison or experimental groups. Although potential subjects could choose whether to obtain parental consent or to participate themselves in the study, there was still an equal chance of bias being present in either group thus increasing the equivalency of the groups.

History and maturation was a second threat to internal validity that arose from the condensed period scheduled for the study. The longer the period
designated to conduct a study, the greater the chance that history can affect internal validity (Fink, 1993). Like history, maturation is likely to be a problem in studies completed over a longer period.

Although condensing the period for the study decreased the risk to internal validity for some factors, it increased the chance for other types of threats. For example, testing was a threat to internal validity in this study where the possibility that pretesting had influenced posttest results. According to Brink and Wood (1998) a two week waiting period between the administration of the pretest and the intervention and posttest minimizes carryover effects where subjects recall responses made on the initial pretest. In this study, having a comparison and experimental group controlled the threat of carryover effects were outweighed by the threat of history. Since the nature of the knowledge scale is about depression, and the incidence of depression and suicide is on the rise in the population under study, there was a potential that such an event could occur, thereby raising the threat to internal validity from history to a greater degree than testing would.

Finally, the comparison of pretest scores from both groups was an important strategy for controlling threats to internal validity. By carrying out initial calculations on the pretest scores for each group, and statistically controlling for the identified threats to internal validity, the results were clearly testing the effectiveness of the interventions (Brink & Wood, 1998).
**Threats to external validity.**

Studies that have attended to issues of external validity contribute to evidence-based practice in that the findings can be generalized (Polit & Hungler, 1999). Since the nature of this study, a variation of random sampling known as cluster sampling, was limited to adolescent females in college preparatory stream grades 11 and 12 at one high school, the generalizability of the results are limited to this population (Polit & Hungler, 1999). However, the results of this study may prove useful for other adolescents from similar populations.

There were three threats to external validity to consider (a) interaction of selection and the independent variable, (b) interaction of setting and the independent variable, and (c) reactive effects of experimental arrangements (Norwood, 2000; Polit & Hungler, 1995).

Firstly, interaction of selection and the independent variable is similar to the threat to internal validity – selection bias. It was minimized in this study by ensuring a representative sample population. Secondly, quasi-experimental studies are not true experiments in that the setting is often a "real life" environment; therefore, chances of a threat to external validity - interaction of selection and the independent variable, occurring is possible. However, by requesting subjects refrain from discussing the interventions given, this threat was controlled to the degree that was possible. Lastly, reactive effects of experimental arrangements are a threat to any study design. Reactive effects
include such things as the Hawthorne effect, novelty of participating in a study and experimenter’s effects (Norwood, 2000; Polit & Hungler, 1999).

It is important for researchers to consider that study subjects may be reacting to the experimental environment rather than to the independent variable. In this study, the threat to external validity posed by the Hawthorne effect was minimized since the comparison group also received an intervention. Moreover, the nature of the study did not lend itself to novelty threats as the literature clearly indicates that the number of girls using the Internet continues to rise. Indeed, use of the Internet is not new (Takayoshi et al., 1999). As well, in this study, the exclusion criteria of not being able to navigate the Internet also helped to control for this particular threat by excluding those students who had no experience with the Internet and might have engaged in the study as a novelty. Finally, experimenter effects were minimized by carefully following the outlined data collection procedure and by having the same researcher administer all instruments.

**Ethical Considerations**

Ethical approval for the study was obtained from the University of New Brunswick’s Faculty of Nursing Ethics Committee and Research Ethics Board before data collection. The Tri-Council Guidelines for Research Involving Human Subjects (1999) served as a guide. Permission to carry out the study was also received from school administration. Before initiating the research, the
nature of the study, the subject's right to decline involvement, and the risks and benefits (if any) were explained to the subjects (Polit & Hungler, 1999).

The informed consent process took place following the explanation of the study. Each individual was given a consent form to read and the researcher verbally explained the content and the implications therein. Each participant was able to read the information letter provided and given the opportunity to raise questions with the researcher or her advisor at the University of New Brunswick. Parental/Guardian consent was also obtained to ensure the protection of minors. All questionnaires remained anonymous and all subjects were assured of the utmost confidentiality during and after the research process.

According to the Canadian Nurses Association (1997), nurses are responsible to ensure that research is ethically sound and involves the principles of respect, and beneficence (CNA, 1997). Respect for persons means respecting the dignity and autonomy of others. In this study, it included the right of each individual involved in this investigation to discontinue participation without ramification.

Beneficence includes doing what is right for an individual and managing risks and benefits (DuGas et al., 1999). During this study, issues or concerns about adolescent depression could have arisen. Although this was not the case, the researcher reviewed the school protocol of making a referral to the Mental Health Clinic with the subjects. Subjects were also provided with an individual
card noting the twenty-four hour emergency telephone number for the Community Mental Health Clinic, along with both the telephone numbers and email address of the researcher and her Faculty Advisor. Each individual was made aware of the nature of the study and frequently reminded of the opportunity to withdraw.

Limitations of the Research

Limitations of this research were taken into consideration while interpreting study findings. Firstly, the exclusive enrollment of females in the high school where the sample was taken, coupled with the fact that the sample represented those students in grades 11 and 12 enrolled in the college preparatory stream, limits the generalizability of the findings to this population in this particular school. Including all students enrolled in the school might have provided a clearer depiction of any significant differences in knowledge about depression depending upon the method of delivery of health information the subjects received. Moreover, there is the potential that differences in knowledge about depression might vary in subjects from a mixed-gender high school.

Secondly, larger sample sizes are desirable in quantitative studies to ensure credible and meaningful study findings (Norwood, 2000). Effort was made to maximize numbers of subjects that were available for this study, and of eighty-four potential subjects, seventy-two voluntarily agreed to participate. Increasing sample size may have generated greater differences in knowledge about depression among the subjects. However, sample size "is only one
contributor to the overall power of a study" (Norwood, 2000, p.236) and other aspects of the research design must be considered in evaluating this limitation. For example, smaller sample sizes are acceptable when there is careful consideration given to the sampling method and the data collection instrument shows high reliability (Munro, 1998; Norwood, 2000).

In this study, the sampling plan generated a sample size that was appropriate based on the research design, statistics and significance level, and variables being measured (Nieswiadomy, 1998). In addition, the data collection instrument was reliable. "There are few instances in behavioural research when a sample size smaller than 30 or larger than 500 can be justified" (Nieswiadomy, 1998, p. 181).

Finally, individuals choosing to participate in the study may be more motivated and interested in the topic of depression than those who choose not to participate may. Therefore, the participation of such subjects may have influenced the findings (Fink, 1995).
Chapter 4

Results

Of eighty-four potential subjects, seventy-two (N=72) completed the KaDS both pretest and posttest with matched codes, yielding a participation rate of 85.7%. Subjects ranged in age from 16 years to 19 years (M=16.97 years) and were enrolled in either grade 11 or 12 (M=11.44) in the college preparatory stream. Pretest results (N=72) indicated less than one third of the subjects (27.8%) had a family history of depression. The majority of subjects had either no family history of depression (36.1%) or was unaware of whether there was a family history of depression (36.1%). About one fifth (18.1%) were aware that a friend was currently depressed, 41.7% stated that they did not have a friend who was depressed, and 40.3% did not know if their friends were depressed or not.

Concerning their individual situation, 32.5% stated they had a personal history of depression while 56.9% did not, leaving 5.6% who did not know. About one third (30.6%) of subjects were taking antidepressants when they completed the pretest, leaving 69.4% who were not. Only 6.9% stated that religious beliefs were not important at all, with the balance (93.1%) stating that religion was at least somewhat important (15.3%), important (58.3%), very important (15.3%), or extremely important (4.2%).

There was no correlation between any of the descriptive data and total KaDS scores of the subjects either pretest or posttest. However, a significant
relationship was found between those subjects reporting a personal history of depression and those currently taking antidepressants (Table 3). Secondly, a significant relationship between those subjects with a family history of depression and those having a friend with depression was found (Table 3). Finally, a negative correlation was found between importance of religious beliefs and currently taking antidepressants (Table 3).

Table 3

Spearman rho Nonparametric Correlation Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation Coefficient</th>
<th>Sig. (2 tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship between history of depression and currently taking antidepressants.</td>
<td>.701**</td>
<td>.000</td>
</tr>
<tr>
<td>Relationship between a family history of depression and having a friend with depression</td>
<td>.657**</td>
<td>.000</td>
</tr>
<tr>
<td>Relationship between the importance of religious beliefs and currently taking antidepressants</td>
<td>-.333*</td>
<td>.047</td>
</tr>
</tbody>
</table>

** Significant at .001
* Significant at .005
To measure the overall score for knowledge about depression in the sample population, the knowledge scale items in section B of KaDS were scored for all seventy-two subjects both pretest and posttest. Table 4 displays these results. The internal reliability coefficient for KaDS pretest was $\alpha = .8703$ and posttest was $\alpha = .9281$.

Table 4

**Knowledge about Depression Scale Raw Scores**

<table>
<thead>
<tr>
<th>Comparison (n=36)</th>
<th>Experimental (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quest 1</strong></td>
<td>Depression is the most common mental illness among teenagers.</td>
</tr>
<tr>
<td>Right (%)</td>
<td>Wrong (%)</td>
</tr>
<tr>
<td>Pre Test</td>
<td>17</td>
</tr>
<tr>
<td>Post Test</td>
<td>(47.2)</td>
</tr>
<tr>
<td>Quest 2</td>
<td>If you have mental health problems, it is not your fault.</td>
</tr>
<tr>
<td>Pre Test</td>
<td>26</td>
</tr>
<tr>
<td>Post Test</td>
<td>(72.2)</td>
</tr>
<tr>
<td>Quest 3</td>
<td>Teens who claim to be depressed are weak and just need to pull themselves together.</td>
</tr>
<tr>
<td>Pre Test</td>
<td>22</td>
</tr>
<tr>
<td>Post Test</td>
<td>(61.1)</td>
</tr>
</tbody>
</table>
Table 4

**Knowledge about Depression Scale Raw Scores**

<table>
<thead>
<tr>
<th>Quest 4</th>
<th>Teens that threaten suicide are never going to actually end their lives.</th>
<th>Comparison (n=36)</th>
<th>Experimental (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Right (%)</td>
<td>Wrong (%)</td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td>27</td>
<td>6</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(75.0)</td>
<td>(16.7)</td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(83.2)</td>
<td>(5.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 5</th>
<th>If you are feeling depressed you should never tell someone else.</th>
<th>Comparison (n=36)</th>
<th>Experimental (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Right (%)</td>
<td>Wrong (%)</td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(80.6)</td>
<td>(8.3)</td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>31</td>
<td>2</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(86.1)</td>
<td>(5.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 6</th>
<th>Changes in sleep are a common symptom of depression in teens.</th>
<th>Comparison (n=36)</th>
<th>Experimental (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Right (%)</td>
<td>Wrong (%)</td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(69.4)</td>
<td>(8.3)</td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(88.9)</td>
<td>(0.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 7</th>
<th>Teens who are depressed often have a hard time thinking clearly or recognizing their symptoms.</th>
<th>Comparison (n=36)</th>
<th>Experimental (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Right (%)</td>
<td>Wrong (%)</td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(72.2)</td>
<td>(8.3)</td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>(91.7)</td>
<td>(2.8)</td>
</tr>
</tbody>
</table>
Table 4

**Knowledge about Depression Scale Raw Scores**

<table>
<thead>
<tr>
<th>Quest 8</th>
<th>A depressed person is unable to function at all in daily activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>19 11 6 16 9 11</td>
</tr>
<tr>
<td>Test</td>
<td>(52.8) (30.6) (16.7) (44.4) (25.0) (30.6)</td>
</tr>
<tr>
<td>Post</td>
<td>20 12 4 32 2 2</td>
</tr>
<tr>
<td>Test</td>
<td>(55.6) (33.3) (11.1) (88.9) (5.6) (5.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 9</th>
<th>Teens who are depressed talk a lot about feelings of sadness.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>11 14 11 17 13 6</td>
</tr>
<tr>
<td>Test</td>
<td>(30.6) (38.9) (30.6) (47.2) (36.1) (16.7)</td>
</tr>
<tr>
<td>Post</td>
<td>22 9 5 33 1 2</td>
</tr>
<tr>
<td>Test</td>
<td>(61.1) (25.0) (13.9) (91.7) (2.8) (5.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 10</th>
<th>Teens who are depressed often complain of headaches, loss of energy and appetite problems.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>22 3 11 16 7 13</td>
</tr>
<tr>
<td>Test</td>
<td>(61.1) (8.3) (30.6) (44.4) (19.4) (36.1)</td>
</tr>
<tr>
<td>Post</td>
<td>29 3 4 34 0 2</td>
</tr>
<tr>
<td>Test</td>
<td>(80.6) (8.3) (11.1) (94.4) (0.0) (5.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 11</th>
<th>Teen girls often don’t feel good about themselves.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>23 6 7 22 10 4</td>
</tr>
<tr>
<td>Test</td>
<td>(63.9) (16.7) (19.4) (61.1) (27.8) (11.1)</td>
</tr>
<tr>
<td>Post</td>
<td>29 5 2 33 1 2</td>
</tr>
<tr>
<td>Test</td>
<td>(80.6) (13.9) (5.6) (91.7) (2.8) (5.6)</td>
</tr>
</tbody>
</table>
Table 4

Knowledge about Depression Scale Raw Scores

<table>
<thead>
<tr>
<th>Quest 12</th>
<th>Untreated depression only lasts about a couple of months.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparison (n=36)</td>
</tr>
<tr>
<td></td>
<td>Right (%)</td>
</tr>
<tr>
<td>Pre</td>
<td>25</td>
</tr>
<tr>
<td>Test</td>
<td>(69.4)</td>
</tr>
<tr>
<td>Post</td>
<td>26</td>
</tr>
<tr>
<td>Test</td>
<td>(72.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 13</th>
<th>Most teens that are depressed get the help they need.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparison (n=36)</td>
</tr>
<tr>
<td></td>
<td>Right (%)</td>
</tr>
<tr>
<td>Pre</td>
<td>22</td>
</tr>
<tr>
<td>Test</td>
<td>(61.1)</td>
</tr>
<tr>
<td>Post</td>
<td>25</td>
</tr>
<tr>
<td>Test</td>
<td>(69.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 14</th>
<th>Depression among teens is not as common as people think.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparison (n=36)</td>
</tr>
<tr>
<td></td>
<td>Right (%)</td>
</tr>
<tr>
<td>Pre</td>
<td>24</td>
</tr>
<tr>
<td>Test</td>
<td>(66.7)</td>
</tr>
<tr>
<td>Post</td>
<td>20</td>
</tr>
<tr>
<td>Test</td>
<td>(55.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quest 15</th>
<th>Talking through feelings may help a friend recognize the need for professional help.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparison (n=36)</td>
</tr>
<tr>
<td></td>
<td>Right (%)</td>
</tr>
<tr>
<td>Pre</td>
<td>30</td>
</tr>
<tr>
<td>Test</td>
<td>(83.3)</td>
</tr>
<tr>
<td>Post</td>
<td>30</td>
</tr>
<tr>
<td>Test</td>
<td>(83.3)</td>
</tr>
</tbody>
</table>
Table 4

**Knowledge about Depression Scale Raw Scores**

<table>
<thead>
<tr>
<th>Quest 16</th>
<th>Comparison (n=36)</th>
<th>Experimental (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right (%)</td>
<td>Wrong (%)</td>
</tr>
<tr>
<td>Pre Test</td>
<td>19 (52.8)</td>
<td>8 (22.2)</td>
</tr>
<tr>
<td>Post Test</td>
<td>21 (28.3)</td>
<td>10 (27.8)</td>
</tr>
</tbody>
</table>

Changes in knowledge between pretest and posttest groups of students were found between group means (Table 5). The pretest mean scores of the comparison group and experimental group were 10.19 and 7.86 respectfully. The posttest mean scores of the comparison group and experimental group were 11.64 and 14.83 respectfully. Out of the total sample of seventy-two subjects in the pretest phase of the study, 56.42% of the responses were correct, 20.14% were incorrect, and 23.44% chose did not know responses.

Posttest results indicated increases in the number of overall correct score on KaDS and a decrease in incorrect and do not know responses for the sample as a whole. Posttest responses indicated that 81.78% of the responses were correct, 8.20% were incorrect, and 10.02% chose did not know responses.

Furthermore, differences in knowledge about depression between the comparison and experimental group posttest results were found. In the
comparison group, 70.87% responded correctly, 13.96% responded incorrectly, and 15.17% did not know the responses. Conversely, overall higher scores were obtained for the experimental group where 92.68% responded correctly, 2.44% responded incorrectly and 4.88% did not know the responses. Although the comparison group had significantly higher scores pretest in knowledge about depression, the experimental group showed significantly higher scores in knowledge about depression posttest.

Table 5

Pretest and Postest Mean Scores

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>36</td>
<td>10.19</td>
<td>4.05</td>
<td>14</td>
</tr>
<tr>
<td>Internet</td>
<td>36</td>
<td>7.86</td>
<td>4.50</td>
<td>14</td>
</tr>
<tr>
<td>Posttest Scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>36</td>
<td>11.64</td>
<td>4.21</td>
<td>16</td>
</tr>
<tr>
<td>Internet</td>
<td>36</td>
<td>14.83</td>
<td>3.34</td>
<td>16</td>
</tr>
</tbody>
</table>

The initial assumption in the research design was that both subject groups were equivalent. Therefore, they would have performed equally well on the pretests, and any differences would be due to sampling error. Differences in mean scores in the posttest would have been due to the intervention. However, in this data a significant difference was observed between pretest means of the comparison and experimental groups. Therefore, it was necessary to factor the pretest data into the ANOVA to increase the sensitivity of the quasi-experimental design. Consequently, the ANOVA technique used for the
detection of differences between groups in this study was an analysis of covariance — ANCOVA (Munro, 1997). The output of the analysis of covariance is contained in Table 6.

After statistically controlling for effects of the covariates (pretest scores) a significant difference in posttest knowledge scores between the comparison and experimental groups was noted. The ANCOVA results indicate that the only significant result was the difference in knowledge scores between the post experimental group and the post comparison group. The overall F was significant at .000 (α = .05). Therefore the null hypothesis was rejected; there is a significant difference in the knowledge of depression level among adolescent girls in grades 11 and 12 in the college preparatory stream who received information about depression via the Internet.
Table 6

**ANCOVA – Tests of Between – Subjects Effects**

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent Variable</th>
<th>Type III</th>
<th>df</th>
<th>Mean</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sum of Squares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Model</td>
<td>Post Experimental</td>
<td>7.391 (a) 2</td>
<td>3.695</td>
<td>.318</td>
<td>.730</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post Comparison</td>
<td>12.141 (b) 2</td>
<td>6.071</td>
<td>.329</td>
<td>.722</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>Post Experimental</td>
<td>874.737 1</td>
<td>874.737</td>
<td>75.249</td>
<td>.000*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post comparison</td>
<td>404.946 1</td>
<td>404.946</td>
<td>21.973</td>
<td>.000*</td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>Post experimental</td>
<td>4.192 1</td>
<td>4.192</td>
<td>.361</td>
<td>.552</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post comparison</td>
<td>.268 1</td>
<td>.268</td>
<td>.015</td>
<td>.905</td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>Post experimental</td>
<td>4.390 1</td>
<td>4.390</td>
<td>.378</td>
<td>.543</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post comparison</td>
<td>12.139 1</td>
<td>12.139</td>
<td>.659</td>
<td>.423</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>Post experimental</td>
<td>383.609 33</td>
<td>11.625</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post comparison</td>
<td>608.164 33</td>
<td>18.429</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Post experimental</td>
<td>8312.000 36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post comparison</td>
<td>5497.000 36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>Post experimental</td>
<td>391.000 36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post comparison</td>
<td>620.306 35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) R Squared = .019 (Adjusted R Squared = -.041)
(b) R Squared = .020 (Adjusted R Squared = -.040)

PE = Pretest Experimental
PC = Pretest Comparison
Internet Based Health Promotion

Chapter 5

Discussion

Prevalence of depression among girls by mid-adolescence and the propensity for this trend to continue through young adulthood into middle age emphasizes the importance of examining whether current approaches to the delivery of health information to adolescent girls are the most effective. Unfortunately, there has been little research evaluating the effectiveness of health promotion and prevention efforts specific to helping adolescents understand the experience of depression and know how to access services when needed. Consequently, there is no substantive evidence to verify program effectiveness. This study aimed to contribute information that would help to close the research gap by evaluating a program delivery approach suited to help adolescent girls acquire knowledge about adolescent depression. The results of this study support the hypothesis that the Internet is an effective method to provide health promotion information about adolescent depression to college preparatory grade 11 and 12 girls.

Although no correlation was found between the descriptive data responses and the total scores for KaDS, either pretest or posttest, the overall results were interesting. In this study, 32.5% of the subjects stated they had a personal history of depression. Although this finding is larger than frequencies of 15–20% found in other studies with subjects of similar ages, it is indicative of the increasing prevalence of depression in adolescent girls (Kessler et al.,
Based Health Promotion 1994; Lewinsohn, Rohde, & Seeley, 1998; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). For example, the lifetime prevalence rate of Major Depressive Disorder in adolescents has been estimated to range from 15 –20% (Kessler et al., 1994). Furthermore, about one fifth (18.1%) of the subjects were aware that a friend was currently depressed which corroborates the findings that increasing numbers of adolescents are depressed.

It was not surprising to find that a substantial number (30.6%) of subjects were currently taking antidepressants, in light of the number who acknowledged their state of depression. Knowledge about depression scores did not reflect better knowledge for those subjects being treated for depression than those who were not being treated. In view of the fact that 32.5% of the subjects reported having a history of depression and that 30.6% were taking antidepressants, it was expected that those subjects might have scored higher on KaDS scale. As indicated by the results of this study, this was not the case, i.e., no significant correlation between those with a history of depression and their knowledge about depression as measured by KaDS was found.

There was a significant relationship between those subjects having a personal history of depression and those currently taking antidepressants. Symptoms of depression during adolescence have been confused with the turbulence of the age group (Lewinsohn et al., 1994; Townsend, 2000). This could be interpreted to mean that the depression is only now being treated with
antidepressants or subjects may have had more than one occurrence of depression.

About one third of the subjects (27.8%) reported having a family history of depression. A significant relationship between those subjects with a family history of depression and having a friend with depression was identified. Subjects who have experienced the depression of a family member may be more apt to identify signs and symptoms of depression in a friend as opposed to those individuals who did not. If this were the case, one would have expected to see higher scores on KaDS for those subjects than were evident in this data.

Only 6.9% stated that religious beliefs were not important at all, with the balance (93.1%) stating that religion was at least somewhat important (15.3%), important (58.3%), very important (15.3%), or extremely important (4.2%).

There was no significant correlation between those subjects having a personal history of depression and the importance of religious beliefs. However, it was interesting to find a negative correlation between the importance of religious beliefs and individuals currently taking antidepressants (-.333). This finding is supported in the literature where it has been found that there is a relationship between spirituality and depression. According to McCullough and Larson (1999) spiritual roots can provide meaning and social support that serve as anchors of hope but the authors caution that further research is required to identify potential explanations beyond these.
Posttest results indicated an overall increase in correct scores on KaDS and a decrease in incorrect and do not know responses for both comparison and experimental groups. The proportion of correct posttest responses indicated that 81.78% of the subjects (N=72) had responded correctly and were well informed. Posttest incorrect responses indicated that 8.20% were misinformed, and 10.02% were uninformed since they did not know the responses. Furthermore, substantive differences in knowledge about depression between comparison and experimental group posttest results were found where those subjects in the experimental group obtained significantly higher posttest scores.

This finding indicates that small improvements in knowledge level about depression can be made using traditional paper based format for program delivery. However, since the prevalence of adolescent depression is on the rise, it is also evident that traditional paper based format falls short of promoting any marked changes in knowledge for individuals in this population. The Internet has been shown the more effective of these two delivery methods of information about depression to grade 11 and 12 adolescent girls in the college preparatory stream.

There were no comparable current studies found in the literature. However, one exploratory study on using the Internet in qualitative public health research was located (Stewart, Eckermann, & Zhou, 1998). The findings of Stewart et al. (1998) support the notion that the Internet has significant potential
as a health promotion and intervention strategy. In particular, both the
eagerness of the subjects in this study, and the reported interest of young
women in the study carried out by Stewart et al. are similar to findings in the
literature reporting that 51% of all new Internet users are women and that
number is continuing to grow (Takayoshi et al., 1999).

Subjects in this study increased their knowledge about depression in
three categories, namely: (1) prevalence of the problem, (2) symptoms of
adolescent depression, and (3) disclosure of depressive symptoms.

Prevalence of the Problem

Members of both comparison and experimental groups demonstrated an
increased awareness of prevalence of adolescent depression because of their
study participation. Posttest responses for this category indicated about a 30%
increase in knowledge for the comparison group and about a 50% knowledge
increase for the experimental group. However, there was a knowledge
decrease noted for KaDS question fourteen (Depression in teens is not as
common as people think) among the members of the comparison group; 66.7%
scored correctly on pretest and only 55.62% scored correctly on posttest.
Subjects in the experimental group demonstrated improvement in the number of
correct responses for question fourteen (36.1% scored correctly on pretest and
94.4% scored correctly on posttest). There is no obvious explanation for this
result.
**Symptoms of Adolescent Depression**

Eleven of the sixteen questions on KaDS contained information regarding symptoms of depression. All respondents showed improvements in their knowledge of symptoms. However, the experimental group improved their knowledge in this category about 45% more than the comparison group.

**Disclosure of Depressive Symptoms**

Subjects in the experimental group showed about 48% greater improvements than the comparison group in this category. This knowledge increase is encouraging and reflects an improved awareness among subjects that it is acceptable for an adolescent who is experiencing signs and symptoms of depression to talk about it with their friends, families or health professionals. There was a knowledge decrease noted for KaDS question two (If you have a mental health problem, it is not your fault) among the members of the comparison group; 72.2% scored correctly on pretest but only 47.2% scored correctly on posttest. Subjects in the experimental group demonstrated improvement in the number of correct responses for question two (69.4% scored correctly on pretest and 88.9% scored correctly on posttest). There is no obvious explanation for this result. Similarly, there was no variation in score for KaDS question fifteen (Talking through feelings may help a friend recognize the need for professional help) among the members of the comparison group; 83.3% scored correctly on pretest and posttest. Subjects in the experimental group demonstrated greater improvement in the number of correct responses
for question fifteen (63.9% scored correctly on pretest and 97.2% scored correctly on posttest). There is no obvious explanation for this different result in the comparison and experimental groups.

The total mean score pretest (N=72) was 9.03. Mean scores on KaDS pretest between the comparison (n=36) and experimental group (n=36) were 10.19 and 7.86 respectively. The total mean score posttest was 13.24 (N=72). Mean scores on KaDS posttest in the comparison (n=36) and experimental group (n=36) were 11.64 and 14.83 respectively. Analysis of covariance (ANCOVA) revealed that the difference was statistically significant. The principal finding for this study, therefore, is that there is a significant difference in knowledge of depression for adolescent girls in grades 11 and 12 in the college preparatory stream who received the educational intervention about depression via the Internet. The null hypothesis was rejected.

Education is essential to health promotion and “is a life-long process from birth to death, helping people to change and adapt at all stages” (Wass, 2000, p.231). Moreover, health education must take place within the context of people’s lives (McMurray, 1999; Wass, 2000). Therefore, to effectively change knowledge, attitude, and behaviour, health information must be offered in a format that is accessible, user friendly and meaningful to the target group (Edelman & Mandle, 1998; Pender, 1996). As predominance of depression among girls by mid-adolescence increases so too does the risk of depression occurring during young adulthood into middle age (Antognoli-Toland, 1999;
Silberg et al., 1999). Left unchecked, the long-term consequences are costly and the risk of depression in the next generation grows (Antognoli-Toland, 1999).

Increasing health knowledge does not guarantee that individuals will pursue healthy behaviours but improving the ease and appeal of accessing information via the Internet did enable adolescent girls in the experimental group to acquire more knowledge about adolescent depression. This knowledge has the potential to influence beliefs and beliefs affect both attitude and an individual’s behavioural intentions to perform certain behaviour. Therefore, individuals with increased knowledge are more likely to consider changing unhealthy behaviours, such as delaying seeking medical assessment, or counseling than those individuals with less knowledge.

To effectively change knowledge, attitude, and behaviour, health information must be offered in a format that is accessible, user friendly and meaningful to the target group (Edelman & Mandle, 1998; Pender, 1996). Increasing health knowledge does not guarantee that individuals will pursue healthy behaviours. Improving the ease and appeal of accessing information via the Internet did enable adolescent girls in the experimental group to acquire more knowledge about adolescent depression. This increase in knowledge has the potential to foster future health-information seeking behaviour and influence beliefs around prevalence of adolescent depression, symptoms of adolescent depression, and the acceptability of disclosure of depressive symptoms. Beliefs
affect both attitude and an individual's behavioural intentions to perform certain
behaviour. Therefore, individuals with increased knowledge are more likely to
consider changing unhealthy behaviours than those individuals with less
knowledge.

**Significance of the Research**

The purpose of this study was to assess the effectiveness of the Internet
for the delivery of information about adolescent depression to grade 11 and 12
girls enrolled in a college preparatory stream. Although increasing knowledge
alone does not change behaviours, education remains one of the fundamental
building blocks of health promotion strategies (McMurray, 1999). Therefore, it is
important to evaluate current delivery methods of health education in order to
determine best practices for future delivery of these programs.

Unfortunately, there has been little research evaluating the effectiveness
of these different health promotion and prevention efforts specific to helping
adolescents understand the experience of depression and know how to access
services when needed. Consequently, there is no substantive evidence to verify
program effectiveness. Therefore, this study addressed a gap in the current
research by evaluating the educative approach best suited to help adolescent
girls acquire new knowledge aimed at the prevention of adolescent depression.

This research provides a foundation for evaluating the delivery methods
of health promotion information to adolescent girls. The comparison between
the Internet and traditional paper based groups provided interesting results.
Furthermore, it is important to note that the significant difference between the two educational delivery methods used in this study document an effective strategy that all practitioners can incorporate into their health promotion programs. Specifically, the findings of this study emphasize that the context of the program delivery is as important as the content. The interactive, graphically appealing medium of the Internet, as used in this study, obviously captured the attention of the subjects as evident by the experimental group's higher score on KaDS. Given these results, it is essential to ensure that, regardless of the delivery method chosen, the principles extrapolated from this study about creative health promotion be incorporated into future programs for members of this population.

The findings of this study also have several potential benefits for clinical nursing practice. Firstly, the Internet is a powerful teaching tool and can reach a wide audience. Secondly, the Internet offers opportunity for the user to have an immediate response mechanism. Thirdly, the Internet has the capability to provide users with access to social support via 'live' chat rooms. Combined, these benefits of the Internet provide nurses with a powerful strategy to 'connect' with adolescents on their own turf and make health information accessible.

Implications for Future Research

Subjects in this study responded significantly better to a 'technologically centric' presentation of information about depression. In this study, the content
focused on the topic of adolescent depression via the Internet. However, based on the findings, it is theorized that other health promotion information for members of this age group could similarly be successfully delivered via the Internet. Additionally, health promotion information for members of other age groups could also be provided in this manner. For example, health promotion programs could be targeted towards the preadolescent age group as early intervention might help minimize the incidence of depression in adolescence.

Secondly, expanding the application of the conceptual framework used in this study to include the variables of attitude and behaviour may hold important implications for health education. The Theory of Planned Behaviour can be applied to health education because it is useful in predicting and understanding motivational influences on healthy and unhealthy behaviour beyond an individuals' volitional control and the outcome of those behaviours.

Lastly, incorporating a complementary qualitative approach to this research might enrich the findings of future studies. For example, the results of this study indicate the delivery of health promotion information to adolescent girls in college preparatory stream grades 11 and 12 via the Internet is more effective than delivering the same information in traditional paper based format. Exploring preferences about the vehicle of program delivery with participants could provide greater understanding as to why the Internet was more effective in this particular study. Thus, enhancements could be made to future program delivery.
Contributions to Theory Development

The application of the Theory of Planned Behaviour in this study was used to provide a framework for conceptualizing the influence of knowledge on individuals' beliefs. While beliefs do affect attitude and the individual's behavioural intentions to perform certain behaviour, discussion of these concepts is beyond the scope of this research.

The purpose of this study was to evaluate the effectiveness of the Internet for the provision of health promotion information about depression to adolescent girls in college preparatory grades 11 and 12. Results of this study indicated that the Internet, as opposed to traditional paper based methods, was the educative approach best suited to help adolescent girls acquire new knowledge aimed at the prevention of adolescent depression. Specifically, subjects in the experimental group scored higher on KaDS then those individuals in the comparison group. Subjects in this study increased their knowledge about depression in three major categories, namely: (1) prevalence of the problem, (2) symptoms of adolescent depression, and (3) disclosure of depressive symptoms.

This increase in knowledge reflects an improved awareness among study subjects that it is beneficial for an adolescent who is experiencing signs and symptoms of depression to talk about it with friends, families or health professionals. This newfound knowledge has the potential to influence beliefs and beliefs affect both attitude and an individuals' behavioural intentions to
perform certain behaviour. The Theory of Planned Behaviour indicates that these behaviours are taken partly because of information individuals have gained through health education. Therefore, individuals with increased knowledge are more likely to consider changing unhealthy behaviours than those individuals with less knowledge.

Final Summary

A quasi-experimental, comparison group design was used to assess the effectiveness of the Internet for the provision of information about adolescent depression to college preparatory grade 11 and 12 adolescent girls. The principal finding of this study is that there is a significant difference in knowledge about depression for those subjects.

No significant correlations were found between the dependent variable (level of knowledge) and the descriptive data. Significant relationships were found between subjects having a personal history of depression and those currently taking antidepressants, subjects with a family history of depression and those having a friend with depression. A negative correlation was found between subjects identifying an importance of religious beliefs and those currently taking antidepressants.

This study addressed a gap in current research by evaluating the educative approach best suited to help adolescent girls acquire new knowledge aimed at the prevention of adolescent depression. Easily accessible and appealing presentation of information enabled adolescents in the experimental
group to both acquire more knowledge about adolescent depression and evaluate their beliefs, attitudes, and individual behaviours. Knowledge generated from this study will be useful for determining future directions for health promotion education and research about adolescent depression.
References


Lewinsohn, P. M., Clarke, G.N., Seeley, & J. R., Rohde, P. (1994). Major depression in community adolescence: Age at onset, episode duration, and


CLUES TO LOOK OUT FOR

Depression differs from the 'blues'. Many teens feel down and blue at times, and feeling sad occasionally is normal. Because of this, it is difficult to know when depression is just a passing feeling or when it is more serious. The feeling of depression becomes significant when patterns of behaviour or emotional functioning are associated with some level of distress, suffering, or impairment in one or more areas of functioning such as school work, socializing and/or family interactions.

Check out Mental Health Risk Factors for Adolescents for more info!

Clues to watch for in your friends!

- Really sad: wearing dark clothing, writing poetry or stories with morbid themes.
- Can't sleep: all night television watching, difficulty getting up for school, sleeping during the day.
- No motivation: missed classes, drop in grades, slowed thinking and response to questions, poor hygiene
- Boredom: shows little interest in activities of peer group.
- Behaviour changes: alcohol and/or drug abuse.
CLUES TO LOOK OUT FOR

Depression differs from the 'blues'. Many teens feel down and blue at times, and feeling sad occasionally is normal. Because of this, it is difficult to know when depression is just a passing feeling or when it is more serious. The feeling of depression becomes significant when patterns of behaviour or emotional functioning are associated with some level of distress, suffering, or impairment in one or more areas of functioning such as school work, socializing and/or family interactions.

Clues to watch for in your friends!

- Really sad: wearing dark clothing, writing poetry or stories with morbid themes.
- Can't sleep: all night television watching, difficulty getting up for school, sleeping during the day.
- No motivation: missed classes, drop in grades, slowed thinking and response to questions, poor hygiene
- Boredom: shows little interest in activities of peer group.
- Behaviour changes: alcohol and/or drug abuse.
Appendix C

Knowledge about Depression Scale

Section A (Please complete this information)

Age _____ Gender □ Female □ Male

CODE __ __ __ __

What grade are you in? ___ ___ YEAR

Has anyone in your immediate family suffered from depression?

□ Yes □ No □ Don’t know

Do you have a close friend who has been treated for depression?

□ Yes □ No □ Don’t know

Have you been treated for depression?

□ Yes □ No □ Don’t know

Do you take antidepressants prescribed by your physician?

□ Yes □ No □ Don’t know

How important is religion in your life? Would you say?

□ Extremely important □ Very important □ Important □ Somewhat important □ Not important at all
Section B

I would like to ask you some questions about depression and teenagers.

Please indicate whether you think each of the following statements is true or false. Your answer can be either:

- True
- False
- Don’t Know

Please remember that your responses are completely confidential and that you may indicate if there are any questions you do not wish to answer.

1. Depression is the most common mental illness among teenagers.
   - True
   - False
   - Don’t Know

2. If you have mental health problems, it is not your fault.
   - True
   - False
   - Don’t Know

3. Teens who claim to be depressed are weak and just need to pull themselves together.
   - True
   - False
   - Don’t Know

4. Teens that threaten suicide are never going to actually end their lives.
   - True
   - False
   - Don’t Know
5. If you are feeling depressed you should never tell someone else.
   - True
   - False
   - Don't Know

6. Changes in sleep are a common symptom of depression in teens.
   - True
   - False
   - Don't Know

7. Teens who are depressed often have a hard time thinking clearly or recognizing their symptoms.
   - True
   - False
   - Don't Know

8. A depressed person is unable to function at all in daily activities.
   - True
   - False
   - Don't Know

9. Teens who are depressed talk a lot about feelings of sadness.
   - True
   - False
   - Don't Know

10. Teens who are depressed often complain of headaches, loss of energy and appetite problems.
    - True
    - False
    - Don't Know

11. Teen girls often don't feel good about themselves.
    - True
    - False
    - Don't Know
12. Untreated depression only lasts about a couple of months.
   - True
   - False
   - Don’t Know

13. Most teens that are depressed get the help they need.
   - True
   - False
   - Don’t Know

14. Depression among teens is not as common as people think.
   - True
   - False
   - Don’t Know

15. Talking through feelings may help a friend recognize the need for professional help.
   - True
   - False
   - Don’t Know

16. It is not hard to talk to a friend about feeling depressed.
   - True
   - False
   - Don’t Know

This is all for now.

Thank you for your help in completing this questionnaire!