

Original Research

Longitudinal Associations of Importance of Religion and Frequency of Service Attendance With Depression Risk Among Adolescents in Nova Scotia

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Objective: To examine the directionality of associations between self-reported religious importance or worship attendance and depression among adolescents, and to determine whether social supports or general self-efficacy are mechanisms of observed associations.

Method: A cohort ($n = 976$) of Canadian high school students were surveyed in Grade 10 (2000 to 2001) and 2 years later (2002 to 2003). Logistic regression was conducted separately among adolescents with and without elevated depressive symptoms to examine associations between baseline religious attendance and religious importance with later depression, adjusting for confounding factors. Effects of reverse causation were also assessed, determining associations between baseline depression and follow-up religious attendance and importance.

Results: Girls who were not depressed at baseline and who attended religious services had lower odds of later depression (adjusted odds ratio [AOR] 0.46; 95% CI 0.22 to 0.95, $P < 0.05$), which was accounted for by general self-efficacy. Boys who were depressed at baseline who attended religious services had lower odds of still being depressed at follow-up (AOR 0.23; 95% CI 0.06 to 0.80, $P < 0.01$). Depression at baseline predicted lower attendance at follow-up among boys (AOR 0.26; 95% CI 0.09 to 0.75, $P < 0.01$).

Conclusions: Religious attendance independently predicts lower depression at follow-up among girls, and may do so by increasing self-efficacy. Among boys with depression, religious attendance predicts a lower likelihood of still being depressed at follow-up. The relation between religious attendance and depression in boys is bidirectional.



Associations longitudinales de l'importance de la religion et de la fréquence de la pratique du culte avec le risque de dépression chez des adolescents de la Nouvelle-Écosse

Objectif : Examiner la directionnalité des associations entre l'importance auto-déclarée de la religion ou de la pratique du culte et la dépression chez les adolescents, et déterminer si les soutiens sociaux ou l'auto-efficacité générale sont des mécanismes des associations observées.

Méthode : Une cohorte ($n = 976$) d'élèves du secondaire canadiens a été interrogée en 10e année (2000 à 2001) et 2 ans plus tard (2002 à 2003). La régression logistique a été menée séparément chez des adolescents présentant ou pas des symptômes dépressifs élevés afin d'examiner les associations entre la pratique religieuse de départ et l'importance de la religion avec la dépression ultérieure, en corrigeant les facteurs de confusion. Les effets de la causalité inverse ont aussi été évalués, en déterminant les associations entre la dépression au départ et la pratique et l'importance de la religion au suivi.

Résultats : Les filles qui n'étaient pas déprimées au départ et qui pratiquaient leur religion avaient des probabilités plus faibles d'une dépression ultérieure (rapport de cotes corrigé [RCC] 0,46; IC à 95 % 0,22 à 0,95; $P < 0,05$), ce qui était attribué à l'auto-efficacité générale. Les garçons qui étaient déprimés au départ et qui pratiquaient leur religion

avaient des probabilités plus faibles d'être encore déprimés au suivi (RCC 0,23; IC à 95 % 0,06 à 0,80; $P < 0,01$). La dépression au départ prédisait une pratique plus faible au suivi chez les garçons (RCC 0,26; IC à 95 % 0,09 à 0,75; $P < 0,01$).

Conclusions : La pratique religieuse prédit indépendamment une dépression plus faible au suivi chez les filles, et ceci peut-être parce qu'elle accroît l'auto-efficacité. Chez les garçons souffrant de dépression, la pratique religieuse prédit une probabilité moindre d'être encore déprimé au suivi. La relation entre la pratique religieuse et la dépression chez les garçons est bidirectionnelle.

Suicidal behaviours and MDD are common among adolescents. By age 21, up to 25% of people experience an MDE, with attendant increased risk of self-harm.¹⁻³ Depression during adolescence can also increase the adult risk of psychiatric problems.^{2,4} In a 25-year longitudinal study,⁵ there was a dose-response relation between the number of depressive episodes between ages 16 to 21 and adverse adult outcomes, including suicidal behaviour. Regardless of their duration, MDEs are associated with psychosocial impairment and can increase the risk of suicide.^{2,6,7}

Understanding factors that are related to the onset, duration, and recurrence of depression during adolescence is important to helping prevent this condition and advise people in acute stages of depression. One factor that has been studied in association with depression is the role of religion. The past 20 years have seen the development of a body of literature examining associations between measures of religiosity and depression.^{8,9} Although definitions vary, religion can be thought of as a multidimensional concept that encompasses "organized system of beliefs, practices, rituals, and symbols designed to facilitate closeness to the sacred or transcendent..."^{9-11, p 18} Various measures of religiosity exist, but the most commonly measured items are frequency of religious attendance and the personal importance of religiousness.^{10,12}

In adults, studies have shown that greater religiosity is generally associated with lower odds of depression,¹¹ but among adolescents, these associations are less consistent. In a recent review, Dew et al¹³ found that the results of studies examining associations between religion and depression in adolescents were often conflicting. Regarding measures of religious attendance and religious importance, some studies show an inverse association between religion and depression,^{14,15} some show no association,^{16,17} while others suggest the presence of higher levels of depression

Abbreviations

AHS	Adolescent Health Study
AOR	adjusted odds ratio
CES-D	Center for Epidemiologic Studies Depression Scale
MDD	major depressive disorder
MDE	major depressive episode
SLE	stressful life event

Clinical Implications

- Religious attendance may be protective for the development of depression in girls and for persistence or recurrence among boys.
- A decline in religious activity in adolescent patients may be a sign of underlying depression.

Limitations

- The measure of depression was a screening tool designed to identify adolescents at risk of depression and is not the equivalent of a clinical diagnosis of depression.
- Self-report measures were used for all variables of interest, leading to a potential for social desirability in response patterns.

among more religious adolescents.^{18,19} Some studies,²⁰⁻²³ of both adults and adolescent populations, have shown that associations between measures of religiousness, spirituality, and depression may be stronger in females than in males. A recent study²⁴ of high school students showed an association between higher religious importance and lower odds of depression, but only among girls. Research has also shown that adolescent girls report higher levels of religiosity^{24,25} and depression,^{26,27} so that investigating these associations across gender is important.

If an association between religiosity and depression among adolescents does exist, cross-sectional studies cannot provide definitive information concerning the direction of the relation. Depression could conceivably limit one's interest in attending religious services, accounting for observed cross-sectional associations of depression with lower religiosity.^{13,28} Alternatively, it may be that religiosity lowers the likelihood of later depression. If this were the case, religiosity could lower the likelihood of ever having an MDE, decrease the duration of episodes, or decrease the number of episodes.

Several potential mechanisms for an association between higher religiosity and lower depression in adolescents have been proposed. A commonly suggested mechanism is indirect, such that more religious adolescents are less likely to use substances,^{13,29} and given that substance use predisposes people to depression,^{2,30} lower substance use among more religious adolescents lowers their risk of depression.^{11,31} Alternatively, being involved in a religious community may increase available social supports. Social support may buffer the effects of SLEs, and so reduce the

likelihood of depression.^{32,33} A third potential mechanism suggests that people who are more religious may have greater self-efficacy,^{34,35} which in turn buffers against depression.²⁹ Higher self-efficacy has been shown to be associated with lower depression in adolescents.³⁶ A recent longitudinal study²⁰ of junior high school students in the northeastern United States showed that higher levels of spirituality among adolescent girls was associated with decreases in depressive symptoms through sense of personal agency, which is a similar concept to self-efficacy.²⁰ To our knowledge, self-efficacy has not been studied regarding religious attendance and religious importance.

To date, few longitudinal studies^{13,32} have been conducted to determine the direction of the associations between religion and depression, which has been identified as a major limitation in this literature. A nationally representative US study³⁷ did show that higher baseline religious attendance predicted lower depression scores 1 year later, while another study¹⁶ of 240 adolescents showed depressive episodes in grades 7 to 11 were associated with lower odds of religious attendance at follow-up. A recent longitudinal study³⁸ of 145 outpatient psychiatric patients aged 12 to 18 examined associations of multiple measures of religiousness and depression, and only endorsing a loss of faith predicted lower improvement in depressive symptoms at 6-month follow-up. Further longitudinal study is important to unravelling the nature of these associations.

In our paper, we use panel data on high school students in Nova Scotia to examine longitudinal associations between religious attendance, religious importance, and depression. We address 4 questions: Does religious attendance or religious importance predict future risk of depression while controlling for depression at baseline? Conversely, does current risk of depression predict future religious attendance or religious importance? Do the effects of substance use, social support, or general self-efficacy mediate associations between religious attendance or importance and risk of depression? and, Do these associations differ by gender?

Methods

Sample

Data from the AHS were used for this analysis. The AHS is a longitudinal study done in 4 high schools in the northern part of Nova Scotia from 2000 to 2003. This region of Nova Scotia is predominantly white, and only 1.3% to 2.2% of people are visible minorities. Between 83.8% to 89.4% of people identify themselves as part of a Christian denomination. Depending on the district, the largest denominations are Roman Catholic (16.0% to 31.1%), United Church (20.7% to 30.1%), Baptist (3.1% to 14.8%), or Presbyterian (1.4% to 18.1%). No religion was endorsed by 10.5% to 15.7% and 0.1% to 0.5% identified as being of other religions.³⁹ At baseline in 2000 and 2001, all Grade 10 students registered at the schools and present on the day of the study were invited to complete a questionnaire. Two years later (in 2002 or 2003), the same students, now in Grade 12, were invited to complete a follow-up questionnaire. In total, 976 people responded to both questionnaires, 61.9% of the original baseline sample. While we were unable to collect

information on reasons for loss to follow-up, attrition is commonly due to dropping out of high school (8.3% of females and 13.2% of males dropped out of high school in Nova Scotia in 2000),⁴⁰ school absence on the day of the follow-up survey, which is typically 13%,⁴¹ and moving away from the district.

Survey Administration

Written consent was obtained from participants. Teachers administered surveys during regular class time, with members of the research team present. Teachers were instructed not to approach students as they completed surveys. Parents were not required to give written consent, but were informed of the study through a letter sent home with their children and were given the option of informing the school if they did not wish their children to participate. Ethics approval was obtained from the Dalhousie University Health Sciences Human Research Ethics Board.

Measures

The survey was developed by the AHS team members and reviewed by content experts at the provincial and federal levels. The AHS is a survey examining health and related social factors, and contains 196 items. All measures were pretested at a high school in the same area of Nova Scotia and found to have suitable internal consistency as measured by Cronbach alpha and test-retest reliability as measured by correlation coefficients and Cohen kappa.⁴²

Dependent Variable

Risk for depression was measured dichotomously using the 20-item CES-D, with scores ranging from 0 to 60, using established cut-offs for adolescents (more than 24 for females and more than 22 for males).⁴³

Key Independent Variables

Personal importance of religion was measured on a 4-item scale of responses to the question "How important is religion in your life?" Response choices were 1) not at all important; 2) not very important; 3) fairly important; or 4) very important. As in previous research, responses were dichotomized into high (fairly or very important, compared with not very or not at all important).²⁴ Frequency of attendance at religious services was also measured as a 4-item scale based on responses to the question: "How often do you attend religious services?" Response choices were 1) never; 2) a few times a year; 3) monthly; or 4) weekly. Responses were dichotomized into high (monthly and greater) compared with a few times per year or never.

Covariates

People were asked how many times in the previous 30 days they used marijuana. They were also asked if they used any of the following drugs in the previous 30 days: lysergic acid diethylamide (more commonly referred to as LSD), opiates, stimulants, barbituates, tranquilizers, cocaine, anabolic steroids, phencyclidine, solvents, psilocybin, and ecstasy. For each drug, colloquial names were included as descriptors of the drug. Responses were dichotomized into

any, compared with no, drug use in the past 30 days. Alcohol use was examined and consumption divided into heavy use (defined as having had more than 5 drinks at one sitting on more than 3 occasions within the 30 days previous to the survey) compared with less heavy consumption. Other predictor variables included family living situation (living with both parents, compared with other arrangements); school mark at last report card (dichotomized as less than 70%, compared with 70% or more), age, and gender. General self-efficacy was measured by degree of respondent agreement on a 4-point Likert scale with 10 statements tapping into this construct. Overall scores range from 10 to 40, with a higher score indicating greater self-efficacy.^{34,44} The scale assesses a general sense of perceived self-efficacy, ability to cope with daily hassles (for example, item 2, "If someone opposes me, I can find the means and ways to get what I want"), and adaptation after SLEs (for example, item 5, "Thanks to my resourcefulness, I know how to handle unforeseen situations"). The scale has been validated, showing good internal consistencies, item total correlations, and good fit in confirmatory factor analyses across ages and cultures.^{45,46} Social supports were measured by 6 multiple-choice items to measure satisfaction of social support networks. Scores ranged from 6 to 18. The higher the score, the greater the satisfaction with received social support. This was analyzed as a continuous variable.^{44,47}

Statistical Analysis

All statistical analysis was done using SAS version 9.2 (SAS Institute Inc, Cary, NC). First, tabulation of all variables was conducted at baseline and follow-up separately in males and females. McNemar tests were used to calculate change in prevalence of variables over time. Mean scores were calculated for continuous variables in males and females. Paired *t* tests were used to calculate change in mean scores over time.

To examine the stability of religious variables, cross-tabulation was done to determine the prevalence of different patterns of religious attendance and religious importance over the 2-year period. Four patterns were examined: 1) consistently high; 2) increased; 3) decreased; and 4) consistently low.

Longitudinal analyses were conducted separately for people with and without risk of depression at baseline. These analyses were stratified by gender. Initial unadjusted logistic regressions were done using SAS proc logistic, using risk of depression at follow-up as the dependent variable and religious attendance and religious importance at baseline as the predictor variables. Owing to multicollinearity, religious variables were included in separate models. Next, AORs were estimated by including baseline gender, age, living arrangement, school mark, use of alcohol, and cigarettes or illicit drugs as covariates in each model. If associations remained statistically significant between religious variables and depression, social supports and general self-efficacy were entered separately into the models to determine whether they accounted for observed associations.

To assess for reverse causation, logistic regression was used, with religious attendance and religious importance at follow-up as binary dependent variables. Risk of depression at baseline was the predictor variable. AORs were then estimated, including covariates of gender, age, living arrangement, school mark, and religious attendance or religious importance at baseline.

Owing to attrition in the sample, analyses to determine the potential of attrition on the results were conducted. A binary attrition variable was created, and associations between the main independent variables of interest (religious attendance and religious importance) and covariates with attrition were determined using logistic regression.

Results

Sample Characteristics

Males were less likely to be living with both parents at follow-up and less likely to have an average school grade or more than 70 (Table 1). They were more likely to use cigarettes, report binge alcohol use, and use illicit drugs at follow-up, compared with baseline. Females were also less likely to be living with both parents, were more likely to report binge alcohol use, and use illicit drugs at follow-up, compared with baseline. They reported higher scores on scales of general self-efficacy at follow-up, compared with baseline.

Changes in Religiosity Over Time

Most girls and boys reported consistently low attendance and low importance of religion (Table 2). A minority of people changed between low and high categories, but where a change occurred, it was more likely to be a decrease in attendance or importance.

Baseline Religiosity Associations With Depression at Follow-Up

Among girls (Table 3), higher levels of baseline religious attendance predicted lower odds of elevated depressive symptoms at 2-year follow-up among respondents without elevated depressive symptoms at baseline after adjusting for sociodemographic variables and substance use. These associations were still significant after adjusting for social supports (AOR 0.44; 95% CI 0.22 to 0.94, $P = 0.03$) but not after adjusting for general self-efficacy (AOR 0.49; 95% CI 0.23 to 1.04, $P = 0.07$) (not shown). Religious attendance or religious importance was not associated with later elevated depressive symptoms among girls without elevated depressive symptoms at baseline.

Boys with elevated depressive symptoms who attended religious services at baseline were over 4 times less likely to have elevated depressive symptoms at follow-up, independent of the effects of age, living arrangement, school mark, and substance use (Table 4). These associations remained after including adjustments for social supports (AOR 0.11; 95% CI 0.02 to 0.55, $P < 0.01$) and general self-efficacy (AOR 0.17; 95% CI 0.04 to 0.68, $P < 0.01$) (not shown). Religious attendance or religious importance was not associated with later elevated depressive symptoms

Table 1 Descriptive characteristics of females (n = 494) and males (n = 482)

Characteristic		Females Prevalence		Males Prevalence	
		Time 1	Time 2	Time 1	Time 2
Living situation, %	Both parents	72.8	69.5 ^a	77.9	74.5 ^a
Responses, n		493	493	480	482
School mark, %	>70	82.4	81.2	67.4	59.5 ^a
Responses, n		494	493	482	481
Cigarette use, %	Yes	13.0	15.4	15.6	18.9 ^b
Responses, n		494	492	481	482
Binge alcohol use, % ^c	Yes	10.3	17.2 ^a	20.1	33.2 ^a
Responses, n		494	489	482	480
Drug use, % ^d	Yes	26.7	34.8 ^a	32.3	46.7 ^a
Responses, n		494	493	481	482
Depression, % ^e	Yes	24.6	22.2	15.3	18.6
Responses, n		492	493	478	479
Age, years, mean (SD)		15.7 (0.6)	17.7 (0.6) ^a	15.7 (0.6)	17.7 (0.6) ^a
Responses, n		494	494	482	482
Social support, mean (SD)	score	13.17 (2.80)	13.33 (2.73)	13.73 (2.78)	14.16 (2.61)
Responses, n		488	492	476	480
Self-efficacy, mean (SD)	score	29.52 (4.74)	30.3 (4.69) ^b	31.00 (5.09)	31.53 (4.79)
Responses, n		487	493	476	475

^a $P < 0.01$; ^b $P < 0.05$ (P values represent change over the 2 study periods)
^c ≥ 5 drinks in 1 sitting on more than 3 occasions in the past month
^d Any use of illicit substances in the past 30 days
^e Elevated depressive symptoms over the past 2 weeks measured by CES-D

Table 2 Prevalence of patterns of religious attendance and religious

Pattern	Females (n = 494)		Males (n = 482)	
	Attendance, %	Importance, %	Attendance, %	Importance, %
Consistently high	18.4	32.6	15.8	24.7
Increased	3.2	3.6	1.2	5.2
Decreased	9.5	18.6	8.3	13.9
Consistently low	68.8	45.1	74.7	56.2

among boys without elevated depressive symptoms at baseline.

Reverse Causation

For boys, elevated depressive symptoms at baseline predicted lower levels of religious attendance at follow-up, independent of the effects of gender, age, living arrangement, and school mark (Table 5). No such associations were seen among girls.

Testing for potential impact of attrition showed that higher religious attendance at baseline was not associated with lower attrition among girls or boys. Baseline religious importance was not associated with attrition among girls or boys. Illicit drug use ($P > 0.01$), binge alcohol use ($P > 0.01$), cigarette smoking ($P > 0.01$), not living with both parents ($P > 0.01$), and having a school mark of less than 70

($P > 0.01$) were all associated with higher odds of attrition among girls and boys. Gender was not associated with loss to follow-up. Elevated depressive symptoms at baseline was associated with attrition among boys ($P = 0.002$), but not among girls. As a result, we conducted attrition analyses to assess the potential impact of loss to follow-up on these reverse-causality estimates in boys. The score on religious attendance at time 1 was carried forward for time 2 religious attendance for those people lost to follow-up, and logistic regression was conducted examining the association of baseline depression with time 2 religious attendance. This showed that elevated depressive symptoms at baseline was associated with lower odds of religious attendance follow-up (OR 0.44; 95% CI 0.19 to 0.99, $P < 0.05$). Elevated depressive symptoms at baseline was not associated with later religious importance

Table 3 Longitudinal associations of baseline religious attendance and importance with follow-up depression among females

Variable	Depression (time 2)					
	Without elevated depressive symptoms at baseline (n = 372)			With elevated depressive symptoms at baseline (n = 122)		
	Depressed, % ^a	OR (95% CI)	AOR (95% CI) ^b	Depressed, % ^a	OR (95% CI)	AOR (95% CI) ^b
Attendance (time 1)						
Low	20.8	1	1	38.7	1	1
High	9.3	0.39 ^c (0.19–0.79)	0.46 ^c (0.22–0.95)	40.0	1.06 (0.45–2.49)	1.29 (0.53–3.12)
Importance (time 1)						
Low	20.0	1	1	42.0	1	1
High	15.5	0.71 (0.42–1.21)	0.77 (0.44–1.35)	35.2	0.75 (0.36–1.56)	0.90 (0.42–1.95)

^a Percentages are row percentages. For example, 9.3% of females who were not depressed at baseline and attended religious services at baseline were depressed at follow-up.

^b AOR is adjusted for age, baseline living arrangement, school mark, use of cigarettes, binge drinking, and any illicit drug use in the past 30 days.

^c $P < 0.01$

Table 4 Longitudinal associations of baseline religious attendance and importance with follow-up depression among males

Variable	Depression (time 2)					
	Without elevated depressive symptoms at baseline (n = 406)			With elevated depressive symptoms at baseline (n = 76)		
	Depressed, % ^a	OR (95% CI)	AOR (95% CI) ^b	Depressed, % ^a	OR (95% CI)	AOR (95% CI) ^b
Attendance (time 1)						
Low	13.6	1	1	38.7	1	1
High	16.6	1.24 (0.66–2.33)	1.34 (0.69–2.60)	18.2	0.21 ^c (0.06–0.72)	0.23 ^c (0.06–0.80)
Importance (time 1)						
Low	12.9	1	1	50.0	1	1
High	16.5	1.38 (0.79–2.43)	0.47 (0.83–2.64)	30.3	0.44 (0.17–1.12)	0.42 (0.14–1.24)

^a Percentages are row percentages. For example, 16.6% of males who were not depressed at baseline and attended religious services at baseline were depressed at follow-up.

^b AOR is adjusted for age, baseline living arrangement, school mark, use of cigarettes, binge drinking, and any illicit drug use in the past 30 days.

^c $P < 0.01$

Discussion

In this panel study of high school students in Nova Scotia, we found that among girls without elevated depressive symptoms at baseline, regular religious attendance was protective of increased depressive symptoms at follow-up. Among boys, those with elevated depressive symptoms at baseline who attended religious services at least monthly were less likely to have increased depressive symptoms at follow-up, compared with those who attended less than monthly. However, we also found evidence of a bidirectional relation among boys, among whom having elevated depressive symptoms at baseline predicted lower religious attendance at follow-up.

Regarding the bidirectional findings, previous researchers have suggested that cross-sectional associations between religious attendance and depressive symptoms may relate to symptoms of depression leading to decreases in religious attendance, rather than a protective effect of religious attendance on the prevalence of depression,^{13,28} as a core disturbance in major depression is a decrease in activity levels. Our finding of higher baseline elevated depressive symptoms predicting lower levels of religious attendance at follow-up provides evidence that this may account for part of the association between religious attendance and risk of depression among boys.

Table 5 Association of baseline depression with follow-up religious attendance and religious importance

Variable	Among boys (n = 482) High attendance (time 2)					
	High attendance, % ^a	OR (95% CI)	AOR (95% CI) ^b	High importance, % ^a	OR (95% CI)	AOR (95% CI) ^b
Depression (time 1)						
No	17.6	1	1	30.0	1	1
Yes	9.6	0.50 (0.2–1.12)	0.26 ^c (0.09–0.75)	28.8	0.95 (0.55–1.64)	0.90 (0.46–1.78)
Variable	Among girls (n = 494) High attendance (time 2)					
	High attendance, % ^a	OR (95% CI)	AOR (95% CI) ^b	High importance % ^a	OR (95% CI)	AOR (95% CI) ^b
Depression (time 1)						
No	23.8	1	1	38.9	1	1
Yes	15.7	0.60 (0.35–1.03)	0.54 (0.27–1.09)	28.9	0.64 ^d (0.41–0.99)	0.70 (0.41–1.21)

^a Percentages are row percentages. For example, 9.6% of males who were depressed at baseline had high attendance at follow-up.

^b AOR is adjusted for age, living arrangement, school mark, and baseline attendance or importance.

^c P < 0.01, ^d P < 0.05

Our study also provides evidence for the protective effect of monthly or more religious attendance on development of elevated depressive symptoms in females and on the recurrence or persistence of elevated depressive symptoms in males. Among girls, these protective effects of religious attendance on risk of depression were independent of the effects of age, living arrangements, school marks, and comorbid substance use. However, the association between religious attendance and elevated depressive symptoms became nonsignificant when adjusted for general self-efficacy. This suggests that girls who attend religious services more frequently have a greater sense of agency when faced with SLEs and that this accounts for the observed association. Studying a sample of students in grades 6 to 9, Perez et al²⁰ showed that spirituality predicted changes in depressive symptoms through personal agency and direct coping only among girls. Our data suggest that a similar process may explain the association between religious attendance and lower risk of depression.

Among boys, monthly or greater religious attendance was associated with a reduction in depression among those with elevated depressive symptoms at baseline, independent of the effects of age, living arrangement, school mark, substance use, social support, and general self-efficacy. Mechanisms other than increased social support, or greater self-efficacy, may therefore account for the lower odds of depression among boys. Nooney⁴⁸ found that a lower prevalence of stressors accounted for religious effects on depression. It is possible that boys who are more likely to attend religious services also have lower likelihood of SLEs, accounting for the observed relation. In addition, family functioning has been linked to higher religiousness.⁴⁹ More religious families generally experience less divorce, less interpersonal violence, and more positive parent-child interactions.^{49–52} These factors, which we were unable to

examine in this research, may lead to less conflict and stress at home, resulting in lower depression and distress.

There are several aspects of our study that limit our understanding of the relations between religiosity and depression. First, although the longitudinal design permits causal inferences, we do not have information on the variables in the period between the 2 data collection points. Therefore, it is possible that these associations may differ in this intervening period. Second, while analyses showed that religious attendance and importance at baseline were not associated with attrition, it is still possible that the results would differ among adolescents lost to follow-up. However, the variables associated with higher attrition were also variables that are more commonly associated with higher rates of depression and lower rates of religiosity. Therefore, attrition may have led to a conservative bias in our estimates of associations between religiosity and depressive symptoms. However, depression at baseline was associated with loss to follow-up, thus this could have an impact on our reverse-causality estimates. We assessed the impact of attrition through a last observation carried forward approach, which is considered in most cases to be a conservative approach (although not in all cases), and it may lead to an overestimation of precision of results. Exploring more modern techniques was limited by our sample because these techniques are used optimally when the number of missing data are small and there are a greater number of time points from which to make inferences about the pattern of missing data.⁵³ Third, our measure of depression was a screening tool designed to identify adolescents at risk of depression; it is not the equivalent of a clinical diagnosis of depression. Fourth, our measures of religiosity were restricted to the 2 most commonly used measures in the literature. Religiosity is a multidimensional concept and these measures do not necessarily encompass

the totality of a person's religious world. Fifth, we relied on self-report measures for all the variables of interest, with the potential for social desirability of responses. Sixth, we did not have information on all demographic factors, including family income, to include as covariates in our study. Income is a risk factor for depression^{54,55} and higher religiousness has been associated with higher income level in Canada,⁵⁶ therefore, it is possible that income may account for these associations. Last, our study was carried out in a single region of central and northern Nova Scotia, which may limit its generalizability.

Our study contributes important longitudinal findings to the existing literature by exploring associations between religiousness and depression. Among adolescents, the relation between religious attendance and elevated depressive symptoms was found to be bidirectional. Religious attendance is protective in the development of elevated depressive symptoms in girls and protective of persistence or recurrence among boys. These factors should be considered in the management and prognosis of patients. Our study also provides evidence that religious attendance may protect against the development of depression among girls by increasing general self-efficacy. However, clinicians should also be aware that a decline in religious activity among youth may also be a sign of underlying depression.

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